WATER SANITATION AND HYGIENE PRACTICES AMONG PUBLIC SECONDARY SCHOOL STUDENTS IN EGOR-LOCAL GOVERNMENT AREA BENIN-CITY EDO STATE

BY

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DECLARATION

I hereby declare that this research project titled "**Water Sanitation and Hygiene practices among public secondary school students in Egor-local government area Benin-city Edo-state**" was carried out by **Ehimen Osemudiamen Kizito** with matriculation number **MED1807392** under supervision of Professor A. I. Obi and has not been submitted anywhere else in part or in full for the award of a degree or certificate.

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CERTIFICATION

This is to certify that this research study titled "**Water Sanitation and Hygiene Practices among Secondary School Students in Egor Local-Government area Benin-city, Edo state**" was conducted by EHIMEN OSEMUDIAMEN KIZITO with matriculation number MED1807392 under the supervision of **Professor A. I. Obi,** in the Department of Public Health and Community Medicine, College of Medical Sciences, University of Benin as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS) degree.

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DEDICATION

I dedicate this work to God Almighty, for granting me the fortitude and wisdom to do this work and see it to its finish. Furthermore, I also wish to dedicate this work to my wonderful parents, Mr. James Oyakhilomen Ehimen (late) and Mrs. Veronica Ehimen, whose immense love, sacrifices, and support have been of great help in the completion of this study and in shaping me into who I am today.

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I thank my Almighty God for seeing me through the storms and triumphs of this journey and keeping me in good health as this project unfolded. I also express my gratitude to the Department of Public Health and Community Medicine, University of Benin, for the opportunity to carry out this research.

I owe my deepest gratitude to my supervisor, Prof. Andrew Ifeanyichukwu Obi, whose unwavering guidance, patience, and encouragement have been a constant source of strength throughout the course of this project. Your wisdom and support have shaped not only my work but also my growth as a scholar. I am truly blessed to have had your mentorship, and I pray that God abundantly rewards you and grants the desires of your heart.

I owe a special debt of gratitude to my late father, Mr. James Oyakhilomen Ehimen, whose memory continues to inspire me and whose legacy of love and strength remains a guiding light in my life. To my mother, Mrs. Veronica Ehimen, I am deeply grateful for your endless sacrifices, prayers, and unwavering support that have carried me through every stage of this journey.

To my siblings Michael, Austine, Stephen, Nelly, and Jude, thank you for standing beside me with encouragement and love. I also honor the memory of my late sister, Omotohamen, whose presence is forever cherished and whose memory continues to live on in my heart.

This achievement is not mine alone, but a reflection of the love, strength, and unity of my family. May this success bring joy to each of you, as you have been the foundation upon which I have built my path.

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LIST OF ABBREVIATION

BCC: Behavioural Change Communication

COVID-19: Corona Virus Disease 2019

FGDs: Focused Group Discussion

WASH: Water Sanitation Hygiene

HBM: Health Belief Model

IBM: Integrated Behavioural Model

IDIs: In Depth Interviews

JSS: Junior Secondary School

PTAs: Parent Teacher Association

SDGs: Sustainable Development Goals

SPSS: Statistical Package for the Social Sciences

SSS: Senior Secondary School

UNICEF: United Nation International Children Education Fund

WASH: Water Sanitation and Hygiene

WHO: World Health Organization

DEFINITION OF TERMS

ABSENTEEISM: The habitual absence from school, often due to illness, inadequate facilities, or social factors, which negatively impacts learning outcomes and educational attainment.

COMMUNICABLE DISEASES: Illnesses due to specific infectious agents or their toxic products that arise through transmission from an infected person, animal, or inanimate reservoir to a susceptible host, either directly or indirectly.

DIARRHEAL DISEASES: Conditions characterized by the passage of three or more loose or watery stools per day, often caused by unsafe water, poor sanitation, or inadequate hygiene, and a leading cause of child mortality globally.

DISEASE: A pathological condition of the body or mind resulting from various causes such as infection, genetic defect, or environmental stress, characterized by an identifiable group of signs and symptoms.

GASTROINTESTINAL DISEASES: Diseases that affect the gastrointestinal tract and associated organs involved in digestion and absorption of nutrients, resulting in impaired function of the digestive system.

GIRL-FRIENDLY SPACES: Safe, private, and supportive facilities designed to meet the needs of female students, particularly for menstrual hygiene management, dignity, and gender equity.

HEALTH: a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity

HEALTH CLUBS: Student-led or teacher-supported groups that promote health awareness, peer education, and positive hygiene practices within the school environment.

HEALTH EDUCATION: comprises consciously constructed opportunities for learning involving some form of communication designed to improve health literacy, including improving knowledge, and developing life skills which are conducive to individual and community health.

HELMINTH INFECTIONS: Parasitic worm infestations that impair nutrition, cause anemia, and hinder growth and cognitive development in children.

MENSTRUAL HYGIENE: The practice whereby women and adolescent girls use clean menstrual management materials to absorb or collect menstrual blood, change these materials in privacy as often as necessary, use soap and water for washing the body as required, and have access to safe facilities for proper disposal of used materials.

MENSTRUAL HYGIENE MANAGEMENT: The process by which women and adolescent girls use clean materials to absorb menstrual blood, change them in privacy, wash with soap and water, and have access to safe disposal facilities, supported by education and enabling environments.

WATERBORNE DISEASES: Diseases caused by pathogenic microorganisms transmitted in contaminated water, including cholera, typhoid fever, dysentery, and hepatitis A.

WATER SANITATION AND HYGIENE: A critical, interrelated set of practices, infrastructure, and services aimed at ensuring safe water access, proper waste disposal, and hygiene to prevent infectious diseases.

ABSTRACT

Background: Water, Sanitation, and Hygiene (WASH) practices are essential for adolescent health, dignity, and academic performance. Inadequate knowledge, poor attitudes, and limited facilities in schools contribute to waterborne diseases, absenteeism, and reduced learning outcomes. Despite sensitization efforts, misconceptions about WASH remain common among secondary school students, influenced by age, sex, family structure, and socioeconomic background. Strengthening WASH education and infrastructure is critical to improving hygiene practices and reducing risks.

Objective: To assess the level of knowledge, attitudes, prevalence, and determinants of WASH practices among secondary school students in Egor Local Government Area, Edo State, Nigeria, with the aim of identifying gaps and making recommendations for improved hygiene management in schools.

Subjects and Methods: An analytical cross-sectional study was conducted among 550 secondary school students selected through a multistage sampling technique. Data were collected using a pretested self-administered questionnaire and analyzed with IBM SPSS version 27.0. Associations between socio-demographic characteristics and WASH knowledge, attitude, and practice were tested using chi-square statistics, with statistical significance set at $p < 0.05$ at 95% confidence.

Results: The mean age of respondents was 14.05 ± 1.85 years, with females comprising 60.4%. Awareness of WASH was moderate (71.9%), with teachers (48.3%) and parents (27.0%) as the main sources of information. Good knowledge of WASH was found in 177 (46.5%) respondents, while 204 (53.5%) demonstrated poor knowledge. Age was significantly associated with

knowledge: students aged ≥17 years had higher odds of good knowledge (OR = 9.52; 95% CI = 3.21–28.23; $p < 0.001$) compared to those aged 10–13 years. Female students were more likely to have good knowledge than males (OR = 1.78; 95% CI = 1.17–2.71; $p = 0.007$). Junior secondary students (JSS) were significantly less likely to have good knowledge compared to senior secondary students (SSS) (OR = 0.005, 95% CI = 0.001–0.017, $p < 0.001$). This finding confirms that class level, reflecting both age and curriculum exposure, is a critical determinant of WASH knowledge. Parental occupation also influenced knowledge, with students whose fathers were in skill level 4 jobs having higher odds of good knowledge (OR = 2.41; 95% CI = 1.31–4.43; $p = 0.036$). Mother's occupation showed similar associations (OR = 3.12; 95% CI = 1.45–6.71; $p = 0.004$).

Attitudes toward WASH were generally positive, but determinants were significant. Students with good knowledge were more likely to have positive attitudes (OR = 2.82; 95% CI = 1.34–5.92; $p = 0.006$). Conversely, not living with both parents reduced the odds of positive attitude (OR = 0.40; 95% CI = 0.21–0.76; $p = 0.005$).

The prevalence of good WASH practices was encouraging but not universal. While handwashing after toilet use was common (74.8%), fewer students practiced handwashing before meals (51.2%) or recognized the need for gender-separated toilets with nearby handwashing facilities (49.3%). Good knowledge increased the odds of good practice (OR = 2.21; 95% CI = 1.17–4.19; $p = 0.015$), while lack of privacy in hostels or public toilets was significantly associated with poor menstrual hygiene practice (OR = 1.70; 95% CI = 1.01–2.87; $p = 0.047$).

Conclusion: Although awareness and knowledge of WASH were encouraging, substantial gaps remain in practical knowledge, attitudes, and consistent hygiene practices. Younger students and males were more likely to have poor knowledge, while family structure and privacy issues

influenced attitudes and practices. Improving school-based health education, expanding the role of health clubs, strengthening WASH facilities, and providing private, girl-friendly spaces are essential to promote safe practices, reduce disease burden, and enhance academic performance among secondary school students.

Keywords: Water, Sanitation, Hygiene, WASH practices, knowledge, attitude, prevalence, determinants, secondary school students, Egor Local Government Area, Edo State.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Every child deserves quality education, and this goes beyond classrooms and textbooks. It also includes access to clean water, proper sanitation, and hygiene (WASH) services in schools. A safe and sufficient water supply, together with proper sanitation facilities, is essential for protecting children's right to basic education. Without these basic services, learning environments become unsafe and unhealthy. Providing adequate WASH facilities in schools is directly linked to achieving the Sustainable Development Goals (SDGs), especially Goal 6, which focuses on clean water and sanitation for all by 2030.[1] When schools meet this goal, they not only improve education but also contribute to healthier communities and stronger societies.

Ensuring that schools have enough water supply, proper sanitation, hygiene, and waste management brings many positive impact.[2] Children who have access to good WASH facilities at school are more likely to develop healthy hygiene habits that they continue to practice in their daily lives. These habits such as regular handwashing, safe water use, and proper waste disposal, help protect them from diseases and improve their overall wellbeing. Students also become agents of change by spreading awareness within their families and communities. Encouraging students to practice proper hygiene, sanitation, and water management not only benefits them personally but also helps them share knowledge and promote better hygiene practices at home and in their communities[3]. In this way, schools serve as a foundation for building healthier societies.

Unfortunately, many schools, especially those in rural areas, either lack drinking water, sanitation, and hand-washing facilities or have facilities that are inadequate in both quality and quantity[4]. This shortage creates serious challenges for students and teachers. Schools with poor WASH conditions, combined with frequent close contact among students and staff, create environments that are high-risk and unsafe. These conditions increase children's vulnerability to health hazards.[3] Inadequate water, sanitation, and hygiene in schools can negatively affect learning by contributing to serious health problems such as helminth infections, exposure to harmful chemicals in water (like lead and arsenic), diarrheal diseases, malaria, and other communicable diseases. These illnesses often lead to frequent absences among school children, which in turn affects their education and overall academic performance[1,4]. When children miss classes due to illness, they fall behind in their studies, and this can reduce their chances of completing school successfully.

Access to clean WASH services is therefore essential for creating a safe and supportive learning environment. When schools provide these facilities, they protect students' health, reduce the spread of diseases, and improve attendance. This directly enhances children's ability to learn and succeed academically. Adequate WASH services in schools are not just about health, they are about giving every child the opportunity to thrive in education and to grow into healthy, knowledgeable individuals who can contribute positively to their communities. Schools that invest in WASH facilities also promote dignity and equality, especially for girls, who often face greater challenges when sanitation facilities are lacking. By ensuring clean water, proper sanitation, and hygiene in schools, societies take a strong step toward achieving both educational goals and sustainable development. In addition, strong WASH systems in schools encourage long-term resilience, as students carry these practices into adulthood, shaping healthier families

and communities. They also reduce inequalities by ensuring that children from disadvantaged backgrounds are not left behind due to poor health or absenteeism. Ultimately, improving WASH in schools is not only an investment in education but also a commitment to building stronger nations, healthier generations, and a brighter future for all.[2,3]

1.2 STATEMENT OF THE PROBLEM

The availability of clean water, proper sanitation, and good hygiene is essential for students' health and learning. In Nigeria, nearly 70% of children under 18 lack these basic facilities.[5] This lack of essential WASH facilities in secondary schools is especially troubling, as it can result in higher absenteeism rates, following exposure to diarrheal diseases, chemical contamination in water, malaria parasites, and other waterborne related diseases.[2] Without safe water and sanitation, schools become unsafe environments, and children are more likely to suffer from illnesses that interrupt their education and reduce their chances of success.

The level of awareness and understanding of WASH practices among secondary school students is often insufficient. Several studies done in India, Cameroon and in Lagos State ,Nigeria, revealed that many schools lack adequate WASH materials associated with hand hygiene, leading to poor hand-washing practices among students[3,4,6]. This deficiency in knowledge contributes to the spread of hygiene-related diseases, adversely affecting students' health and academic performance.[4] When students do not receive proper guidance and facilities to practice hygiene, they are more vulnerable to infections, and their ability to concentrate and perform well in school is reduced.

Students' views and behaviors toward WASH practices are influenced by several factors, such as cultural beliefs and the accessibility of facilities. When schools lack proper WASH infrastructure,

students may develop negative hygiene habits, which can contribute to higher absenteeism and lower participation, especially among female students struggling with menstrual hygiene management.[3,7] Girls are particularly affected when schools do not provide safe and private sanitation facilities, as this can discourage them from attending classes during menstruation, further widening the gap in educational opportunities.

The prevalence of proper WASH practices amongst students in secondary schools remains low due to inadequate facilities and poor implementation of sanitation programs.[8] The absence of clean water and inadequate sanitation habits in schools have a profound impact on students' health, contributing to the transmission of infectious diseases such as gastrointestinal infections and even leading to neurological complications.[3,4] These health challenges not only affect students physically but also weaken their academic performance and reduce their ability to reach their full potential.

Promoting suitable WASH practices in schools depends on several interrelated determinants. One of the most critical is the adequacy of facilities, which has been widely reported as insufficient across different contexts. Studies done in Port Harcourt, Lagos State, and in Cameroon respectively consistently confirm widespread deprivations in school WASH infrastructure[2,4,6]. Global UNICEF reports further highlight that similar inadequacies are evident across regions worldwide[8]. Ensuring reliable access to clean water, properly maintained sanitation facilities, and the enforcement of effective school policies on sanitation and hygiene are essential for fostering healthy hygiene behaviors among students. Schools that prioritize these elements create safer and more supportive learning environments, reduce absenteeism, and promote equity among learners. Addressing these disparities and strengthening WASH programs

is crucial to guarantee that all children, regardless of background, can learn in environments that safeguard both their health and academic potential.

1.3 JUSTIFICATION

The importance of Water, Sanitation, and Hygiene (WASH) practices in schools cannot be overstated, as they play a crucial role in preventing the spread of communicable diseases and ensuring a healthy learning environment. In Nigeria, inadequate Water, Sanitation, and Hygiene (WASH) facilities in schools remain a significant public health concern, contributing to the spread of infectious diseases and poor educational outcomes among students.[4],[6] Many schools, particularly in public institutions, lack access to clean water, functional toilets, and proper hand-washing stations, leading to increased cases of waterborne diseases such as diarrhea, cholera, and dysentery.[3] These illnesses not only affect children's health but also reduce their ability to attend school regularly, thereby weakening their academic performance. Studies have shown that disparities in WASH access between urban and rural schools further exacerbate hygiene-related health risks, widening the gap in educational achievement and student well-being[3,4,5].This inequality highlights the urgent need for stronger policies and investments to ensure that all children, regardless of location, have equal access to safe and supportive learning environments.

Addressing these issues requires evidence-based research to assess the knowledge, attitudes, and prevalence of WASH practices among students, which can inform targeted interventions and policy improvements. Research that highlights the current state of WASH facilities and practices provides valuable insights into the areas that need urgent attention. By identifying gaps in

infrastructure, awareness, and behavior, stakeholders can design programs that directly respond to the needs of students and schools. Evidence-based findings will also help ensure that interventions are sustainable and effective, thus reducing the burden of disease and improving educational outcomes in the long term. Such research is critical for guiding government agencies, non-governmental organizations, and school authorities in making informed decisions that prioritize student health and well-being.

The findings in this study will help to give necessary information on the WASH infrastructure and awareness in secondary schools around Benin-City. By examining the factors that influence WASH practices and their effects on student health and school attendance, this study will offer practical recommendations for policymakers, school authorities, and other key stakeholders. These recommendations can guide the development of stronger policies, improved school facilities, and better awareness campaigns that encourage students to adopt healthy hygiene habits. In addition, the study will highlight the importance of community involvement, showing how schools, families, and local authorities can work together to improve WASH conditions. Strengthening WASH practices in schools will not only protect student's health but also enhance their academic performance, promote dignity and equality, and reduce gender-based barriers to education. By linking these findings to broader national and global goals, such as the Sustainable Development Goals, the study emphasizes that improving WASH in schools is not just a local priority but a global responsibility. Ultimately, investing in WASH facilities and practices in schools is an investment in healthier generations, stronger communities, and a brighter future for all.

1.4 RESEARCH QUESTIONS

This study addresses four research questions

1. What is the level of Knowledge of WASH Practices among Secondary School students?

2. What is the attitude of Secondary School students towards WASH Practices?

3. How prevalent are proper WASH practices among students?

4. What factors influence the promotion of appropriate WASH practices in schools?

1.5 AIMS AND OBJECTIVES

General

To assess WASH practices among secondary school students in Benin-City in-order to make appropriate recommendation for improve health practices

Specific

1. To assess level of Knowledge of WASH practices among Secondary School Students in Benin-City
2. To ascertain attitude towards WASH practices among Secondary School Students in Benin-City
3. To assess the Prevalence of wash practices among Secondary School Students in Benin-City
4. To identify factors in promoting appropriate wash practices among Secondary School Students in Benin-City

CHAPTER TWO

LTERATURE REVIEW

2.1 BACKGROUND

The challenges related to WASH practices in many West African countries, particularly Nigeria, have become more evident in recent years. These issues predominantly affect low-income and disadvantaged groups, including the poor and disabled, further perpetuating the cycle of poverty in developing nations.[10] Over the past decade, Nigeria has made mixed progress in providing safe water and sanitation in rural areas and at the household and school levels, there are still significant concerns about the quality and use of the WASH facilities.[4]

The adoption of hygiene practices such as hand-washing in schools, depends not only on the availability of hand-washing facilities and supplies but also on the presence of adequate water and sanitation infrastructure, as well as training and health-related knowledge.[11] Similarly, the accessibility and quality of water and sanitation in schools are influenced by the availability of hand hygiene facilities and hygiene materials within the school environment[12]. Student's attitudes and behaviors toward WASH practices are linked to their level of knowledge on it. Schools, as key learning environments, play a vital role in not only educating students about the importance of adequate WASH practices but also helps in reinforcing positive hygiene behaviors through structured lessons, hands-on activities, and the provision of necessary facilities.[6]

Inadequacies in water and sanitation in the school environment impact children's health and school attendance.[4] After all, pupils spend a long time at school, hence, schools have a valuable and vital role in shaping children's health knowledge, attitudes, behaviors, and health outcomes. Therefore, one of a school's primary functions is providing educational functions and providing children with life skills and capacities that promote their well-being.[13]

2.2 THEORECTICAL FRAMEWORK

This study is based on the Integrated Behavioural Model for Water, Sanitation, and Hygiene (IBM-WASH) and the Health Belief Model (HBM). These models help explain how students' knowledge, attitudes, and the surrounding environment work together to influence their WASH practices in public secondary schools. The Integrated Behavioural Model for WASH, explains hygiene behaviour as the result of several factors working together at different levels. The model highlights that WASH practices are not just individual choices, but are shaped by the environment, social influences, and available technology. IBM-WASH has three main areas. The contextual dimension includes things like school WASH facilities, access to water and toilets, school rules, and students' personal characteristics. The psychosocial dimension involves individual factors such as students' knowledge of WASH, their attitudes, beliefs, and motivation to practice good hygiene. The technological dimension refers to the availability and ease of use of WASH facilities, like Hand-washing stations, toilets, and soap. These dimensions are influenced across five levels: society/structure, community, household/family, individual, and habits. In a school setting, this model shows how students' knowledge and attitudes interact with school facilities and peer influence to determine their actual WASH behaviours[14]

The Health Belief Model (HBM) explains how a person's beliefs and perceptions affect their health behaviour. The model, is useful for understanding why students may or may not follow good WASH practices. HBM suggests that behaviour is influenced by perceived susceptibility (how likely a student thinks they are to get a WASH-related illness), perceived severity (how serious they think the illness could be), perceived benefits (whether they believe good WASH practices will help), perceived barriers (challenges to practising WASH, such as no soap or clean water), and self-efficacy (their confidence in being able to practice hygiene correctly). For

secondary school students, the model explains why having knowledge alone may not lead to good WASH practices if there are barriers like poor facilities[15]

2.3 POLICY FRAMEWORK FOR WASH IN SCHOOLS

The delivery of Water, Sanitation, and Hygiene (WASH) services in schools is shaped by a multi-level policy environment. These frameworks were designed to establish standards, guide implementation, and ensure accountability in promoting safe and equitable access to WASH.

Global Monitoring Standard: WHO/UNICEF Joint Monitoring Programme (JMP)

The WHO/UNICEF Joint Monitoring Programme (JMP) was created to provide a globally consistent system for measuring WASH access. It was designed to standardize definitions and indicators, ensuring comparability across countries. The JMP employs a service ladder framework ranging from "no service" to "safely managed services," allowing governments and researchers to track progress toward universal WASH coverage.[16]

Global Operational Frameworks: UNICEF WASH in Schools Acceleration Framework (2024–2030)

The UNICEF WASH in Schools (WinS) Acceleration Framework was designed to fast-track progress toward Sustainable Development Goal (SDG) targets by 2030. It addresses the need for stronger political commitment, sustainable financing, institutional capacity, and climate-resilient technologies. The framework works as an operational guide, encouraging countries to move from fragmented interventions to systemic, large-scale approaches in school WASH delivery[17].

Regional Frameworks (Africa): AU Agenda 2063 and Africa Water Vision 2063

The African Union Agenda 2063 was designed as a long-term development blueprint for the continent, recognizing water as a human right and committing member states to universal access to safe drinking water and sanitation. The Africa Water Vision 2063, launched at the 39th AU Summit, was created to prioritize water governance, sanitation investment, and equitable resource management. Together, these frameworks address the regional need for sustainable water and sanitation systems as part of Africa's broader socio-economic transformation[18].

National Policy Instruments (Nigeria)

Water, Sanitation and Hygiene National Outcome Routine Mapping (WASHNORM) 2021**:** Designed as Nigeria's national routine monitoring survey, WASHNORM provides baseline data for tracking progress toward SDGs. It addresses the need for evidence-based planning and accountability, highlighting gaps in safe handwashing, water supply, and integrated WASH services[19].

Federal Ministry of Education School Sanitation Policy (2006): This policy was created to establish minimum legal standards for sanitation and hygiene in schools. It addresses the need for a regulatory framework to ensure safe learning environments and protect student health[20].

Partnership for Expanded Water supply Sanitation and Hygiene (PEWASH 2016–2030): The National WASH Action Plan (PEWASH) was designed as Nigeria's umbrella framework for expanding WASH access nationwide. It addresses the need for coordinated national action but has been critiqued for lacking clear budgetary provisions for school-specific programmes, highlighting challenges in translating policy into practice[21].

2.4 CONCEPTUAL FRAMEWORK

The conceptual framework for this study combines ideas from both IBM-WASH and HBM. It shows the relationship between knowledge, attitude, environmental factors, and WASH practices among public secondary school students. The students' knowledge of WASH practices, attitudes toward hygiene, perceived risk and seriousness of WASH-related diseases, perceived benefits and barriers, and socio-demographic factors such as age, class level, and gender are considered independent factors that influence hygiene behaviour. These factors are affected by school and environmental conditions, including water supply, availability and condition of toilets and handwashing facilities, school sanitation policies, and peer influence. The main outcome of interest is students' WASH practices, which include handwashing with soap, proper use of toilets, and safe water handling. The framework also looks at the prevalence of good and poor WASH practices and the factors that affect them.

In summary, the framework suggests that students' knowledge and attitudes directly affect their hygiene and sanitation practices, but the effect is influenced by environmental and technological factors such as the presence and condition of WASH facilities. Even when students have the right knowledge and positive attitudes, poor facilities or lack of resources can prevent proper practice. By combining IBM-WASH and HBM, this study provides a clear way to examine both individual and environmental factors that determine WASH behaviour. It also guides the assessment of knowledge, attitudes, factors affecting WASH practices, and their prevalence among public secondary school students. The combination of these frameworks is outlined in the fig1 below

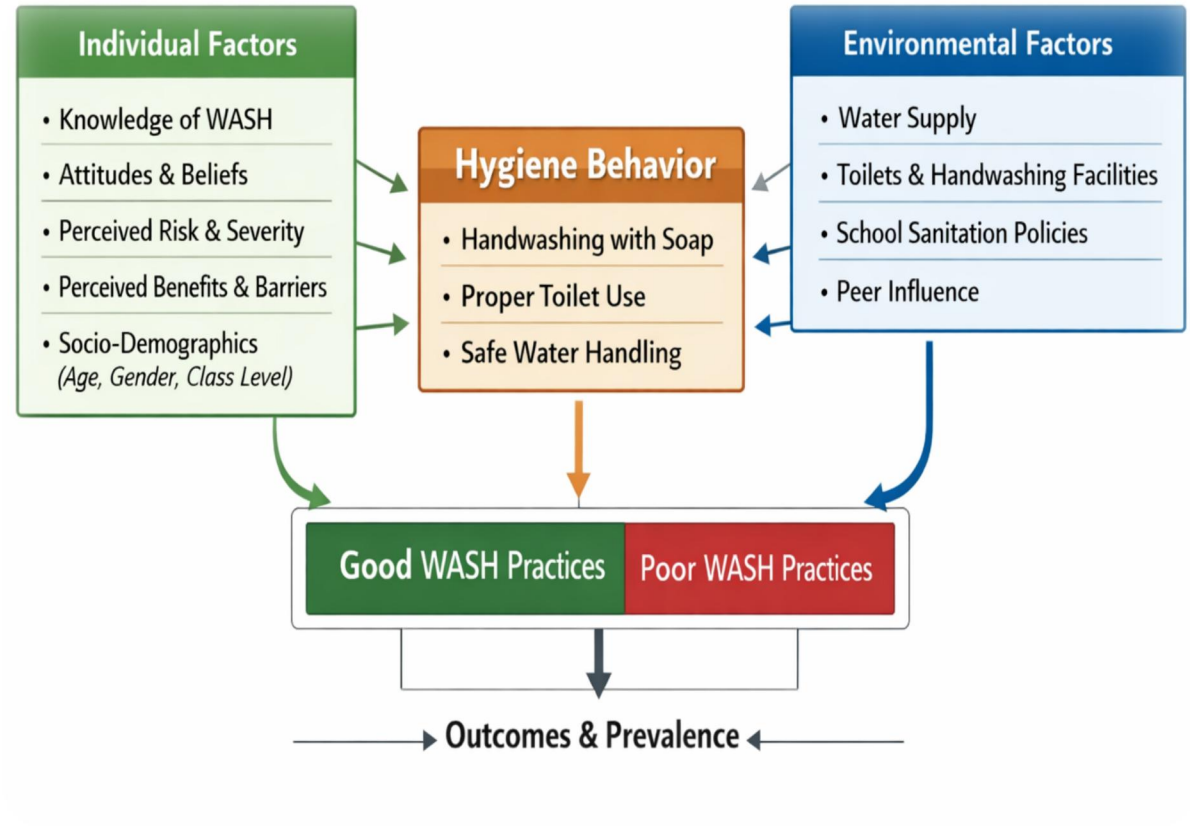

Fig 2.1 Conceptual framework

2.5 KNOWLEDGE OF WASH PRACTICES

A community-based cross-sectional study was conducted in the Eastern Province of Saudi Arabia in 2021 to determine the level of handwashing knowledge among school students. A total of 271 students from primary, middle, and high schools were sampled using a two-stage sampling technique, with data collected through a structured, reliable questionnaire (Cronbach's alpha = 0.608). The study shows that while a majority of participants displayed an "acceptable" level of knowledge regarding hand hygiene, specific gaps remained; for instance, only 46% of students correctly identified handwashing as a protective measure against diseases, while 34% believed its only purpose was to remove visible dirt. Furthermore, 69% of students did not believe that handwashing could effectively remove germs. The findings from the study show that students' primary source of knowledge was their parents (75% for boys and 74% for girls), rather than formal school education (18%). The strength of the study lies in its use of a validated questionnaire and its inclusion of multiple educational levels (primary to high school) to assess knowledge across different age groups. However, the study was limited by a gender imbalance in the sample (80% male) and a relatively small sample size, which may restrict the generalizability of the results to the entire student population of the region.[22]

A school-based descriptive cross-sectional study was conducted in the Bardiya district of Nepal in 2021 to assess the knowledge of handwashing among secondary level students. A total of selected students from four community schools were sampled, and data were collected through self-administered questionnaires that focused on their understanding of hygiene.

The study shows that 36.9% of the participants had poor knowledge regarding handwashing. While many students understood the basics, a significant portion was still unaware of the proper techniques and the full health benefits of regular hand hygiene. The findings from the study show

that having good knowledge did not always lead to good habits, as the number of students with poor handwashing practices (43.42%) was actually higher than those with poor knowledge. This suggests that even when students know what to do, they may not always do it.

The strength of the study lies in its focus on community schools, where improving hygiene education can have a big impact on public health. It clearly highlights the gap between what students know and what they actually practice. However, a limitation is that the study was conducted in only one district (Bardiya), so the results might not be the same for students in other parts of Nepal or in private schools. Additionally, the study suggests that schools need to take more responsibility for teaching these health habits more effectively.[23]

A school-based cross-sectional study was conducted in Central Kazakhstan between September and December 2024 (published in 2025) to assess the knowledge of personal and public hygiene among schoolchildren. A total of 382 students aged 11–18 years were randomly selected from six schools, and data were collected using an online questionnaire to measure their understanding of hygiene standards.

The study shows that there is a high level of theoretical knowledge among the students, with over 90% of participants being aware of basic personal hygiene rules. The findings from the study show that gender played a significant role in knowledge levels, as girls consistently demonstrated higher awareness and better understanding of hygiene practices compared to boys. For instance, 99% of girls knew about the importance of handwashing before eating, compared to 92.8% of boys.

The strength of the study lies in its pioneering role, as it is the first to provide local data on hygiene knowledge and practices specifically for Central Kazakhstan. However, a limitation is

the gap between knowledge and infrastructure; despite the students' high knowledge scores, their ability to practice hygiene at school was limited by a lack of basic supplies like soap, hot water, and well-maintained restrooms. Additionally, because the survey was conducted online, it may have excluded students with limited digital access.[24]

A cross-sectional study was conducted in the Wa Municipality of Ghana in 2021 to examine the knowledge and condition of Water, Sanitation, and Hygiene (WASH) in basic schools. A total of 600 respondents (comprising 570 students and 30 teachers) were sampled from 30 selected schools using a random sampling technique, with data collected through questionnaires and observation checklists.

The study shows that while many students had a general awareness of hygiene, there were significant gaps in their actual knowledge of effective practices. For instance, only 23.3% of students demonstrated a clear understanding of what constitutes effective handwashing. While 76.8% of students knew they should wash their hands after using the toilet, many lacked specific knowledge about germs, and there was a significant link between those who understood germ transmission and those who practiced better hygiene.

The findings from the study show that knowledge levels were influenced by the school environment; students in schools with better facilities and consistent water supply tended to be more sensitized to hygiene practices. However, forgetfulness and a lack of proper education materials were cited as major reasons why students did not fully understand or follow hygiene rules.

The strength of the study lies in its large sample size and the use of both student and teacher perspectives, which provides a broad view of the challenges in the municipality. However, a

limitation is that the study focused heavily on public schools, which may not fully reflect the knowledge levels or facility standards found in all private or specialized institutions in the region.[25]

A quantitative analytical cross-sectional study was conducted in the Iringa Region, Tanzania, in 2024 to assess the knowledge and attitudes toward Water, Sanitation, and Hygiene (WASH) among students. A total of 1,536 students from 64 schools in both rural and urban areas were sampled using a random selection technique, and data were collected through structured questionnaires.

The study shows that students possessed a high level of awareness, with an overall mean score of 85.90% regarding WASH principles. The findings from the study show that rural students actually had slightly higher scores (86.38%) than their urban counterparts (85.42%), which is unusual as urban areas typically have better access to facilities. Specifically, 82.4% of rural students showed a very strong understanding of hygiene compared to 79.8% of urban students.

The strength of the study lies in its very large sample size and the inclusion of both primary and secondary schools across different geographic settings, making the data very reliable. However, a limitation is that the study found that students in public and primary schools had only "moderate" attitudes in some areas, suggesting that while they know the basics, they may not yet fully value the importance of consistent hygiene practices.[26]

A school-based study was conducted in Dessie City, Ethiopia, in 2018 to see how much primary school students knew about Water, Sanitation, and Hygiene (WASH) and how it affected their health. The researchers studied 407 students and used both questionnaires and medical tests to check for illnesses.

The study shows that knowledge is a powerful shield against sickness. Students who did not understand hygiene were over 9 times more likely to have stomach parasites than those who had good knowledge. The findings from the study show that while many students (70%) knew they should wash their hands after the toilet, many did not know the importance of washing before meals. This specific gap in knowledge was a major reason why many children still got sick even if they knew "some" hygiene rules.

The strength of the study is that it linked knowledge to actual medical results, proving that what a child knows directly affects their physical health. However, a limitation is that it was carried out in a city, so it might not show the same knowledge gaps found in rural areas where health education is harder to get.[27]

A descriptive cross-sectional study was conducted in Ijebu Ode, Nigeria, in 2022 to evaluate water, sanitation, and hygiene (WASH) knowledge among secondary school students. A total of 360 students were sampled from six schools using a random sampling technique, with data collected via structured questionnaires and interviews. The study shows that 78.9% of students possessed adequate knowledge regarding WASH principles, indicating a high level of theoretical awareness. Specifically, 92.2% of students identified the importance of handwashing with soap, and 91.4% knew that drinking water should be odorless and colorless to be considered safe. The findings from the study show that while the majority of students understood the link between poor hygiene and disease transmission, there were no significant differences in knowledge levels between students in public and private schools. The strength of the study lies in its use of a structured assessment tool to quantify literacy across different dimensions of hygiene, providing a clear benchmark for student awareness. However, the study focused on a specific urban local

government area, which may limit the generalizability of these high knowledge scores to students in more rural or less-resourced regions of Nigeria[28]

A cross-sectional study was conducted in Benin City, Edo State, Nigeria, in 2023 to find out how much secondary school students knew about handwashing. The researchers picked 200 students from four different schools and gave them a questionnaire to test their hygiene knowledge.

The study shows that 66% of students had a good level of knowledge about handwashing. However, the findings from the study show a big difference based on the type of school: students in private schools knew much more about proper handwashing than students in public schools.

The strength of the study is its multi-stage sampling method, which makes the group of students a better representation of the city. However, a limitation is the small sample size (only 200 students), which means the results might not represent all students in the country.[29]

2.6 ATTITUDES TOWARDS WASH PRACTICES

In 2025, a study was conducted in Jamnagar, Gujarat, India, to understand how students feel about hygiene. The researchers used a mixed-method design, combining a cross-sectional survey of 566 students from 17 government and 17 non-government schools with focus group discussions. By using standardized questionnaires and thematic analysis, they explored the mindsets and beliefs that influence whether a student chooses to follow WASH rules.

The study shows that perception of risk and school environment are the biggest factors shaping student attitudes. The findings show that most students have a positive attitude toward the importance of handwashing, but their belief in the necessity of soap varies. A major finding was that students in non-government schools had a much more confident and proactive attitude toward hygiene because they viewed it as a basic standard of their school life. In contrast, the

qualitative data revealed that some students in government schools held detrimental cultural beliefs or felt indifferent, often because they perceived their school's poor facilities as a sign that hygiene wasn't a high priority. However, the study also found that older students generally developed a more serious attitude toward sanitation as they became more aware of social norms and health risks.

The strength of this study is its qualitative depth, which captures the "hidden" feelings and cultural attitudes that numbers alone cannot show. However, a limitation is that many students with a positive attitude felt "helpless" when faced with a lack of water or soap, leading to a state of attitude-behavior mismatch. The authors conclude that to change behavior in Gujarat, programs must move beyond just giving facts and focus on shifting cultural mindsets while ensuring the school environment supports the students' desire to stay clean.[30]

In 2024, a micro-study was conducted in the Murshidabad district of West Bengal, India, to evaluate the knowledge and attitudes of students toward school hygiene. The researcher used a descriptive survey approach and a micro-survey method among 498 XI-graded students selected through random sampling. Data was collected using a standardized scale and a closed-ended questionnaire, including a 21-item attitude scale based on a five-point Likert system. The study used independent sample t-tests and descriptive statistics (Mean, SD) to compare attitudes across different demographic groups, with a significance level of $P < 0.05$.

The study shows that gender and regional residency are the primary factors shaping students' attitudes toward school hygiene. The findings reveal that girls have a significantly more positive attitude toward school hygiene compared to boys, which the researchers attribute to girls being more culturally socialized to value personal appearance and cleanliness. A major finding was the

urban-rural divide; students in urban schools displayed a more proactive attitude toward hygiene, while rural students faced an "attitude barrier" often linked to a lack of hygiene promotion materials and basic supplies. The research also highlighted a positive correlation between knowledge and attitude, proving that as students learn more about the health benefits of WASH, their attitude shifts from indifference to active commitment.

The strength of this study is its rigorous statistical analysis and its ability to pinpoint exactly where the "gaps" in mindset exist within a specific local district. However, a limitation identified is the fear of social stigma among students; some participants were hesitant to provide honest answers due to a fear of their responses being published or seen by others, which may have led to "social desirability bias." The authors conclude that to improve attitudes in Murshidabad, schools must move beyond simple lectures and implement collaborative interventions involving parents and local authorities to make cleanliness a shared community value.[31]

In 2024, a school-based cross-sectional study was conducted in a rural government secondary school in Jumla, Nepal. The study included 368 adolescent students (43.3% male, 52.7% female) from grades nine and ten, with a mean age of approximately 15 years. Researchers utilized pre-tested, self-administered questionnaires to assess hygiene behaviors. Data were analyzed using SPSS version 16, with the Chi-square test applied to compare the proportions of quantitative variables and establish the relationship between the students' mindsets and their physical hygiene habits.

The study reveals a strong positive outlook on hygiene, though this mental state does not always translate into physical action. The findings show that while a vast majority (94.8%) of students possessed "good knowledge," a slightly lower but still high proportion—82.3%—maintained a

positive attitude toward personal hygiene. A major finding was the direct impact of mindset on behavior; students with a positive attitude demonstrated a significantly higher percentage of good hygiene practices compared to their peers. However, a significant "Attitude-Practice Gap" was identified: despite the high prevalence of positive attitudes, only 63.6% of students actually practiced good personal hygiene, leaving a 18.7% deficit between those who believe in hygiene and those who consistently perform it.

The strength of this study is its gender-based insight, noting that while boys appeared more knowledgeable than girls, these cognitive and attitudinal advantages were not reflected in their daily practices. Furthermore, the research found no statistically significant association between knowledge and attitude, suggesting that simply informing a student about hygiene does not necessarily foster the positive attitude required to change behavior. The authors conclude that rural health interventions should move beyond "knowledge-only" models and instead focus on enhancing the attitude and physical practice of youth to ensure that their internal beliefs result in improved health outcomes.[32]

In 2025, a study was conducted in the Kanungu and Wakiso Districts of Uganda to assess how students feel about using water and sanitation facilities. The researchers used a comparative research design with a mixed-method approach. A structured questionnaire was administered to 153 students, and additional qualitative data was collected through a key informant guide with 10 participants. The study was underpinned by the Theory of Planned Behavior, using t-tests and logistic regression analysis to determine how comfort and availability of facilities affected student mindsets.

The study shows that comfort with facilities and the availability of soap are the primary factors promoting a positive attitude toward WASH. The findings reveal that students who felt "comfortable" using their school's toilets—meaning the facilities were clean and private—developed significantly more positive attitudes toward sanitation. A major finding was the regional difference in attitude; students in Wakiso (more urban) had a different perception of water safety and tap water compared to those in Kanungu (more rural), where unprotected springs are more common. The research also found that the consistent provision of handwashing facilities and soap acts as a powerful driver, as it validates the importance of hygiene in the eyes of the students.

The strength of this study is its post-pandemic focus, showing that while Corona virus disease 2019(COVID-19) increased awareness, attitudes can only remain positive if schools continue to provide the necessary supplies. However, a limitation identified is the rural-urban disparity; students in rural areas often have a more skeptical or "survival-based" attitude toward water safety because they are used to unprotected sources. The authors recommend that to maintain high hygiene standards, schools must prioritize the supply of soap and water, as these physical items are the most effective tools for "shaping" a student's long-term attitude and knowledge.[33]

In 2018, a study in Morocco examined how school curricula influence students' knowledge and attitudes toward water conservation. The researchers adopted a descriptive and analytical design, which involved reviewing school curriculum documents and administering questionnaires to both students and teachers at the primary, middle, and secondary school levels. The study assessed how water-related topics were taught within subjects such as Science and Geography to determine whether formal classroom teaching encourages a genuine water-saving attitude among students.

The results showed that interdisciplinary teaching approaches and participation in extracurricular activities were the most effective factors in promoting positive attitudes toward water management. Although many students expressed a strong theoretical understanding—acknowledging that water is essential and should be conserved—this awareness was often not reflected in their everyday behavior. A key finding was the presence of a clear "cognitive–behavioral gap." Students from schools with active environmental clubs, excursions, or practical activities displayed more responsible and proactive attitudes toward water use than those who learned only through textbook-based instruction. In addition, teachers' attitudes were found to be highly influential; educators who used innovative, value-based teaching methods were more successful in nurturing a sense of responsibility and civic consciousness about water conservation among students.

One major strength of the study lies in its detailed analysis of school curricula, which highlights that simply including water topics in textbooks is insufficient to bring about meaningful behavioral change. However, a notable limitation is the limited availability of practical, field-based learning activities in many public schools. This gap leaves students with a largely passive attitude, where they understand water conservation issues but feel unable to actively address them. The authors therefore conclude that effective water education should go beyond factual knowledge and place greater emphasis on values-based teaching and hands-on school activities that encourage water conservation as part of students' daily lives.[34]

In 2024, a quantitative cross-sectional analytical study was carried out in the Iringa Region of Tanzania to evaluate students' attitudes toward water, sanitation, and hygiene (WASH) in both rural (Kilolo and Mufindi) and urban (Iringa Municipality) school settings. The study was conducted from July 4 to July 25, 2024, and involved 1,536 students randomly selected from 64

schools. Data were gathered using structured questionnaires and analyzed with SPSS software. Descriptive statistics, independent sample *t*-tests, and multinomial logistic regression were applied, with statistical significance set at $P < 0.05$, to determine factors influencing students' attitudes.

The results indicate that school location and school type were the most influential determinants of students' hygiene perceptions. Overall, students demonstrated a generally positive attitude toward WASH, with a mean attitude score of 85.90%. Notably, a rural–urban difference was observed, as students in rural areas recorded slightly higher attitude scores (86.38%) than those in urban schools (85.42%). Furthermore, 82.4% of rural students were classified as having a high level of attitude. The analysis also showed that pupils in primary schools and those attending public schools were more likely to exhibit moderate rather than high attitudes, highlighting educational level and school ownership as important predictors of hygiene attitudes.

A major strength of the study is its large sample size, which enhances the reliability and statistical power of the findings and provides a comprehensive picture of regional variations in Tanzania. However, the study also identified a key limitation: despite the high attitude scores, socio-economic constraints and limited access to adequate WASH facilities hinder the translation of positive attitudes into regular hygienic practices. The authors conclude that although rural students demonstrate a more favorable mindset toward hygiene, there is an urgent need for context-specific educational interventions and improved infrastructure to convert positive attitudes into sustained behaviors and improved health outcomes across the region.[26]

In 2020, a descriptive cross-sectional study was carried out in Somolu Local Government Area of Lagos State, Nigeria. Using a multistage sampling technique, the researchers selected 420 students from public secondary schools. Data were gathered through pretested, self-administered

questionnaires and analysed with IBM SPSS version 22. Bivariate analysis was used to examine the association between students' demographic characteristics and their perceptions of hygiene, with statistical significance set at $P \leq 0.05$.

The findings showed that students generally had a very positive perception of handwashing, although this did not always translate into regular practice. Almost all respondents (99.5%) believed that handwashing is important for maintaining good health. Despite this strong belief, only about 71% of the students actually demonstrated good handwashing practices. At home, personal and psychological factors such as forgetfulness (49.8%) and laziness (33.8%) were major reasons for poor practice. Within the school setting, students' positive attitudes were further undermined by environmental challenges, particularly the lack of soap (50%) and inadequate access to water (46.2%).

A major strength of the study is its clear demonstration of the gap between knowledge, attitude, and practice. It highlights that even when students strongly believe in the benefits of hygiene, practical and environmental barriers can prevent consistent handwashing behavior. However, the study is limited by its focus on public secondary schools in a single local government area, which may reduce the generalizability of the findings to private schools or rural parts of Lagos State. The authors therefore recommend that interventions should go beyond creating awareness and instead focus on targeted health education alongside the provision of reliable handwashing facilities, so that positive attitudes toward hygiene can be effectively translated into daily practice.[35]

In 2024, a cross-sectional study was conducted among 394 in-school adolescents in Ibadan, Oyo State, Nigeria. The study population had a mean age of 13.7 years, with 58.9% attending public

schools. Researchers used a structured instrument comprising 29 knowledge-based and 24 practice-based questions. Data were analyzed using SPSS, employing multivariable logistic regression (level of significance $\alpha = 0.05$) to identify predictors of hand hygiene adherence.

The study demonstrates that socio-institutional environments strongly shape hygiene attitudes and habits. The findings reveal that 73.1% of adolescents observed "good" hand hygiene practices, with a significant disparity between school types: 81.5% in private schools compared to 67.2% in public schools. A major finding was the "Predictor Effect" of school ownership; adolescents in private schools had over two times higher odds (OR = 2.41) of maintaining good hand hygiene practices than those in public schools. The research also found that while knowledge was relatively high (58.4%), practice was even higher (73.1%), suggesting that school-based enforcement or social norms may be pushing students to wash their hands even when their theoretical understanding is incomplete.

The strength of this study is its metropolitan focus, highlighting that even in a city like Ibadan, the "public-private divide" creates two different hygiene realities. However, a limitation identified is that the walk-through survey found many schools, especially public ones, lacked boreholes or wells, forcing students to participate in water collection, which can negatively impact their attitude toward hygiene as it becomes a chore rather than a health choice. The authors conclude that improving prevalence requires building sustainable hygiene infrastructure and using social media and television (the students' primary information sources) to promote lasting behavioral change.[36]

In 2022, a descriptive cross-sectional study was conducted in Ijebu Ode, Ogun State, Nigeria, to evaluate Water, Sanitation, and Hygiene (WASH) practices among secondary school students.

The researchers used a random sampling technique to select 60 students from six schools (three public and three private), representing a broader student population. Data were collected through structured questionnaires and personal interviews. The data were then analyzed using descriptive statistics and SPSS version 20 to assess the levels of knowledge and the actual frequency of hygiene practices among the participants.

The study shows that knowledge does not always translate into action without the support of a functional environment. The findings reveal that while a high majority of students (78.9%) possessed adequate knowledge and a positive understanding of the importance of WASH, this did not reflect in their behavior, as 45.6% demonstrated inadequate practices. A major finding was that students' attitudes toward hygiene were hampered by a lack of enabling resources, such as consistent water supply and accessible soap. The research also found that while students recognize the health risks associated with poor hygiene (especially in light of the COVID-19 pandemic), their daily attitude is one of forced non-compliance—they want to practice good hygiene but are unable to do so due to school infrastructure failures.

The strength of this study is its timeliness, as it highlights how the COVID-19 era increased student awareness and improved attitudes toward WASH, even if the physical infrastructure remained lagging. However, a limitation identified is the small sample size (60 students), which may not fully represent the diverse conditions of all schools in the region. The authors conclude that to bridge the gap between positive attitudes and poor practices, there must be a coordinated effort to provide reliable WASH resources and establish strict school and home schedules that turn hygiene knowledge into a daily habit.[28]

2.7 PREVALENCE OF WASH PRACTICES

In 2024, an exploratory qualitative study was conducted at Katiadi Government High School in an upazilla town in Bangladesh to assess the prevalence of sanitation and hygiene practices. The study was guided by the Integrated Behavioral Model for Water, Sanitation, and Hygiene (IBM-WASH). Data were collected through in-depth interviews (IDIs) with 24 students (14 males and 10 females) and focus group discussions (FGDs) involving 35 participants. The researchers used thematic analysis to categorize the interrelated factors—contextual, socio-behavioral, and individual—that determine how frequently and effectively students engage in hygiene behaviors.

The study shows that actual hygiene practices are alarmingly low, even when students possess a reasonable level of theoretical knowledge. The findings reveal that the prevalence of consistent handwashing and proper latrine use is severely limited by contextual barriers, specifically the lack of upkeep, cleanliness, and the unavailability of sanitary products within the school. A major finding was that socio-behavioral norms and peer influence significantly dictate the prevalence of practices; students often skip hygiene routines if they perceive that their peers are not practicing them or if there is a lack of social pressure to maintain cleanliness. The research also found that gender-specific needs are often unmet, leading to a lower prevalence of safe menstrual hygiene management among female students due to a lack of private and equipped facilities.

The strength of this study is its use of the IBM-WASH model, which allows for a multi-level understanding of why students fail to practice what they know. However, a limitation identified is that the qualitative nature and small geographic scope (one upazilla town) mean the results may not represent the prevalence of WASH practices across all of Bangladesh, particularly in mega-cities or more remote rural areas. The authors conclude that to increase the prevalence of

healthy behaviors, schools must implement multi-level interventions, including the regular delivery of WASH materials, improved cleaning services, and the introduction of gender-sensitive infrastructure that empowers all students to practice hygiene with dignity.[37]

In 2024, a descriptive cross-sectional study was conducted among secondary school students in India to evaluate the prevalence of Water, Sanitation, and Hygiene (WASH) practices. The researchers utilized a structured questionnaire to assess the daily habits of students. Data were analyzed using descriptive statistics to determine the frequency of hygiene behaviors and inferential statistics to identify how socio-demographic factors, such as parental education and school type, influenced the actual performance of these practices.

The study shows that while students have high theoretical awareness, the prevalence of complete hygiene routines is inconsistent. The findings reveal that although most students reported washing their hands, the prevalence of washing hands specifically with soap at all critical times (before meals and after using the toilet) was lower than expected. A major finding was the prevalence of poor menstrual hygiene management among female students, often linked to the lack of private disposal facilities and a lack of access to sanitary products within the school premises. The research also found that the prevalence of safe drinking water practices was higher among students who brought their own water bottles from home compared to those who relied on communal school taps.

The strength of this study is its focus on the practical barriers within the South Asian school context, highlighting that cultural taboos still affect the prevalence of certain sanitation practices. However, a limitation identified is that the prevalence was measured through self-reporting, which may lead to "social desirability bias," where students report better habits than they actually practice. The authors conclude that to increase the prevalence of healthy behaviors, there is an

urgent need for behavioral change communication (BCC) and the provision of gender-sensitive WASH infrastructure to ensure all students can practice hygiene consistently.[38]

In 2022, a cross-sectional study was carried out among 300 adolescents aged 15–19 years attending a secondary boarding school in Banten Province, Indonesia. Participants were selected using a two-stage stratified random sampling technique, and data were collected between March and June 2021. The researchers employed a pre-tested questionnaire adapted from the Global School-based Health Survey (GSHS) to evaluate multiple aspects of personal hygiene, including handwashing and oral care. Data analysis involved multivariable logistic regression, with statistical significance set at $P < 0.05$, to assess the prevalence of hygiene practices and their associations with sociodemographic characteristics.

The findings indicated that personal hygiene behaviors were generally inadequate, revealing a pronounced gap between knowledge and routine practice. Only 40% of students reported consistently washing their hands before meals, while an even smaller proportion (19%) reported handwashing after toilet use. Additionally, regular use of soap during handwashing was reported by just 28% of participants. A notable result was the presence of gender disparities, with male students exhibiting poorer hygiene behaviors; they were 2.02 times more likely to demonstrate poor oral hygiene and 2.14 times more likely to omit handwashing after toileting compared with female students. The study also highlighted the importance of information exposure, showing that students who had received hygiene-related education were significantly more likely to engage in appropriate handwashing and bathing practices.

A key strength of the study was its specific focus on the boarding school setting, where communal living and shared sanitation facilities—used by 76.1% of students—heighten the risk of infectious disease transmission. However, the authors acknowledged limitations, including the

cross-sectional design, which restricts causal inference, and the reliance on self-reported data, which may overestimate positive behaviors due to social desirability bias. The study concluded that improving hygiene practices requires health promotion strategies that go beyond information provision, emphasizing empowerment and addressing the unique challenges associated with adolescent boarding school environments and limited protective factors.[39]

In 2022, an institution-based cross-sectional study was conducted among 670 primary school students in Harar Town, Eastern Ethiopia, with data collection carried out from June 1 to 30, 2021. A multistage sampling technique was employed, in which 6 of the 20 primary schools were selected using simple random sampling, followed by the selection of individual students through probability proportional to size. Data were obtained using pre-tested questionnaires administered via face-to-face interviews, alongside direct observational assessments. Data analysis was performed using SPSS version 23, applying both binary and multivariable logistic regression models at a significance level of $P < 0.05$ to assess the prevalence of handwashing practices and their associated determinants.

The findings demonstrated that the level of proper handwashing practice was alarmingly low, with only 37% (95% CI: 33.3–40.06) of students adhering to correct hand hygiene practices. Students in higher grades, particularly those in Grade 8, were found to be 4.9 times more likely to practice proper handwashing compared to students in lower grades. A key result of the study was the strong influence of role models (referents): students who identified parents, teachers, and health professionals as role models were significantly more likely to practice handwashing, with adjusted odds ratios of 4.41, 3.69, and 3.17, respectively. The study further highlighted the critical role of physical infrastructure, showing that the availability of handwashing facilities and

direct access to soap and water increased the likelihood of proper handwashing practice by 3.62 and 2.89 times, respectively.

A major strength of the study lies in its emphasis on behavioral psychology, demonstrating that the presence of positive role models is as important as the availability of functional handwashing facilities. However, the authors acknowledged a limitation in that the study was conducted during the COVID-19 pandemic, which may have temporarily increased reported handwashing practices due to heightened global awareness and intensified school-based hygiene promotion activities. The study concluded that, to achieve the 2030 Sustainable Development Goals, Ethiopian health authorities should prioritize strengthening WASH club participation and ensuring the continuous supply of soap and water in schools to translate knowledge into sustained hygienic behavior.[40]

In 2023, a mixed-methods study was carried out in the Kirkos and Akaki Kality sub-cities of Addis Ababa, Ethiopia, involving 384 students and 98 school directors. The study utilized interviewer-administered questionnaires, observational checklists, and in-depth interviews to evaluate handwashing practices. Quantitative data were analyzed using SPSS version 22.0, with multivariable logistic regression ($P < 0.05$) applied to identify factors associated with good hygiene practices, while qualitative data were examined using thematic analysis.

The results indicated that despite the availability of handwashing infrastructure, appropriate hygiene behavior remained notably low. Although 86.7% of schools had handwashing facilities, only 35.2% of students practiced proper handwashing. A key finding was the disparity between school types, with approximately 65.9% of students who demonstrated good hygiene practices attending private schools, where resources were more consistently available. Gender and

educational factors were also significant predictors, as female students were 2.45 times more likely to practice proper hygiene, and schools with active health education programs recorded a 2.53-fold increase in handwashing practice.

A major strength of the study was its mixed-methods approach, which provided deeper insight into the gap between infrastructure availability and actual usage, highlighting that the mere provision of facilities does not ensure proper hygiene without continuous soap supply and effective health education. However, the authors noted a limitation in that data collection occurred shortly before the full emergence of the COVID-19 pandemic (January to March 2020), which may limit the applicability of the findings to periods of heightened hygiene awareness during the pandemic. The study concluded that improving handwashing prevalence requires schools to go beyond infrastructure development by investing in trained personnel, routine maintenance, and dependable water supplies to support the translation of hygiene knowledge into practice.[41]

In 2022, a mixed-methods cross-sectional study was conducted in Akinyele Local Government Area, Ibadan, Nigeria, to examine disparities in WASH practices. The researchers utilized multi-stage sampling to select 400 students from five public and five private secondary schools. Data were collected through semi-structured questionnaires and observational checklists based on the WHO/UNICEF Joint Monitoring Programme (JMP) standards. Analysis was performed using inferential statistics (95% CI) and multivariate analysis to determine the prevalence of hygiene behaviors across different school types and socioeconomic backgrounds.

The study shows that open defecation and poor hand hygiene are highly prevalent, especially in public institutions where infrastructure is absent. The findings reveal that 51.1% of all students admitted to practicing open defecation at school, with the prevalence significantly higher in

public schools. Only 30% of students reported practicing handwashing with soap and water while at school, citing the absence of water and forgetfulness as the primary reasons for skipping the practice. A major finding was the institutional divide; none of the public schools provided any basic sanitation or hygiene services, leading to public school students being 7.3 times more likely to engage in open defecation compared to their private school counterparts. The research also found that habitual behavior plays a role, as students who practiced open defecation at home were 6.13 times more likely to continue the practice at school.

The strength of this study is its mixed-methods approach, combining student self-reports with direct physical observation of facilities, which exposes the true scale of inequality. However, a limitation identified is that the study focused on a single low-income peri-urban community, which may not capture the full range of WASH prevalence in wealthier urban centers or extremely remote rural areas. The authors conclude that achieving Sustainable Development Goal 6 in Nigeria is stalled by these inequalities and recommend that local stakeholders (PTAs and community leaders) take ownership of WASH interventions rather than relying solely on failing government infrastructure.[9]

In 2025, a descriptive cross-sectional study was carried out in Ikeduru Local Government Area (LGA) of Imo State, Nigeria, to examine differences in WASH-related knowledge and practices among students attending public and private secondary schools. A multistage sampling approach was applied to select 400 students from 20 secondary schools. Data were collected using structured questionnaires and an observational checklist. Statistical analysis was conducted with SPSS, using both descriptive and inferential methods at a 5% level of significance to determine variations in hygiene practices between the two school types.

The study identified a clear "knowledge–practice gap" across school categories. Although students in public schools demonstrated higher levels of WASH knowledge (87.1%), those in private schools showed a greater prevalence of appropriate hygiene practices (65.5%) compared with their public school counterparts (55.7%). One of the most striking findings was the marked difference in open defecation practices: over half of public school students (55.7%) reported engaging in open defecation due to inadequate sanitation facilities, whereas only 6.9% of private school students reported the same behavior. The study further revealed differences in water sources, with private school students more likely to rely on sachet water, while public school students predominantly used water brought from home, underscoring the influence of resource availability on hygiene behaviors.

A key strength of the study lies in its comparative focus within a rural setting, highlighting that access to infrastructure, rather than knowledge alone, strongly determines the adoption of healthy practices. However, the authors noted a limitation in that reliance on sachet water in private schools does not necessarily ensure water safety, as previous microbiological studies in Nigeria have reported frequent contamination of such sources. The study concluded that improving WASH practices in public schools will require more than curricular interventions; government efforts must prioritize the provision of functional toilets and handwashing facilities to close the gap between students' knowledge and their capacity to practice safe hygiene behaviors.[42]

In 2023, a descriptive cross-sectional study was conducted among students in selected public secondary schools in Port Harcourt, Rivers State, Nigeria. The researchers utilized the Taro Yamane formula to determine a sample size of 500 students (with a 95% confidence level) across five major government schools, including Government Girls Secondary School Rumuokwuta and Federal Government College Port Harcourt. Data were collected using

structured questionnaires and analyzed through descriptive statistics and Chi-square tests to establish the prevalence of hygiene awareness and the adequacy of existing sanitation infrastructure.

The study shows that while infrastructure is largely present, behavioral consistency is hampered by minor resource gaps. The findings reveal a near-perfect prevalence of handwashing awareness (99%) and a high prevalence of practice (96.6%), particularly after using the toilet. Unlike many rural studies, the majority of these urban public schools reported having potable water (89.4%) and handwashing facilities with soap (94%). However, a major finding was the prevalence of "drying gaps"; while soap and water were available, there was a total lack of hand towels or tissues for hygienic drying. The research also found that forgetfulness (58.2%) was the most prevalent reason cited for skipping hand hygiene, rather than a lack of time or facilities.

The strength of this study is its urban focus, which demonstrates that the massive investment in school infrastructure in Rivers State has successfully increased the prevalence of available facilities compared to national averages. However, a limitation identified is that the results are based on self-reported data, which may mask the actual quality or maintenance status of the water points and toilets over time. The authors conclude that while the prevalence of infrastructure is high, health agencies must now focus on water treatment protocols to eradicate waterborne diseases and provide hygienic drying materials to complete the sanitation cycle.[2]

2.8 FACTORS INFLUENCING WASH PRACTICES

A mixed-methods study was conducted in the Potohar Region of Pakistan (District Rawalpindi) in 2024 (published in 2025) to evaluate how environmental education acts as a driver for hygiene behavior. The research sampled 70 students aged 12 to 16 years from secondary schools in

Tehsil Gujar Khan, utilizing a combination of questionnaires and focus group discussions to identify the specific factors that promote sustainable hygiene practices among adolescents.

The study shows that integrated environmental education and the development of a "sustainable mindset" are the primary factors promoting the use of WASH services. The findings from the study show that students with a high level of environmental awareness—specifically those who understood the impact of pollution and climate change—demonstrated a significantly better attitude toward daily hygiene rituals. For instance, the study found that 96% of students possessed a strong conceptual understanding of the environment, which served as a foundational promoter for physical practices: 60% followed strict hand hygiene, 71% routinely clipped their nails, and 72% consistently used tissues or handkerchiefs for respiratory hygiene. The research highlights that when hygiene is taught not just as a health rule, but as part of a larger responsibility toward environmental sustainability, students are more likely to internalize and maintain these behaviors. Furthermore, the use of focus group discussions revealed that peer-to-peer environmental advocacy acts as a reinforcing factor, encouraging students to cover their mouths while coughing and maintain clean school surroundings.

The strength of this study lies in its mixed-methods approach, which captures both the statistical data of hygiene compliance and the underlying "why" through student discussions, showing that environmental literacy is a powerful tool for public health. However, a limitation identified in the research is the sample size and narrow geographic focus, as a group of 70 students in one district may not fully represent the diverse socio-economic challenges faced by children across all of Pakistan. Additionally, the study emphasizes a "knowledge-practice gap," noting that while knowledge levels were exceptionally high (96%), actual practice rates for certain behaviors like twice-daily tooth brushing (45%) remained lower, suggesting that even strong promoters like

education require consistent structural support and supply of materials to reach full effectiveness.[43]

In 2025, a large-scale study was published involving 3,980 students (grades 5, 9, and 11) in the Karaganda region of Central Kazakhstan. The researchers used a cross-sectional design and binary logistic regression to find out which specific factors helped students maintain better handwashing habits during and after the pandemic.

The study shows that school-based discussions and parental background are the strongest factors promoting the use of WASH services. The findings show that students who participated in active classroom discussions about handwashing were 38% more likely to have good hygiene practices than those who did not. A major promoter was maternal education and occupation; students whose mothers had a higher education or were business owners showed significantly better hygiene habits. The research also found that urban school environments act as a promoter, with urban students being 1.7 times more likely to wash their hands properly than rural students, likely due to better infrastructure. Additionally, gender and age were key drivers, as female students and older students (grade 11) demonstrated more consistent hygiene behavior compared to their peers.

The strength of this study is its massive sample size, which provides very reliable data on how social and economic status promote health. However, a limitation is the geographic gap; rural schools faced much bigger barriers, such as a lack of modern sinks, which often canceled out the benefits of hygiene education. The authors conclude that while teaching kids is a great promoter, the most effective way to sustain WASH services is to combine school-based policy support with

improved physical facilities to ensure that all students—regardless of where they live—can stay clean.[44]

In 2021, a qualitative study was conducted at Shahjalal University of Science and Technology in Bangladesh to identify the drivers of Water, Sanitation, and Hygiene (WASH) practices among university students. The researchers used the Integrated Behavioral Model for Water, Sanitation, and Hygiene (IBM-WASH) to analyze data from 17 in-depth interviews, 4 focus group discussions, and 7 key informant interviews with staff. This approach allowed for a deep understanding of why high hygiene knowledge often fails to result in high-quality practice.

The study shows that early-life habituation and gender-specific attitudes are the primary internal factors promoting the use of WASH services. The findings show that students who were exposed to WASH interventions during their primary and secondary school years carried those positive habits into their university life, identifying early education as a lifelong driver of hygiene. A major promoter identified was gender-related norms; female students were found to have a stronger sense of "standard courtesy" and health benefits, leading to more consistent hygiene practices compared to their male counterparts. The research also found that peer influence and social media act as modern promoters, as maintaining a "civilized" or "polite" image often includes visible hygiene habits.

The strength of this study is its multi-level analysis, which looks at how individual, social, and physical environments overlap to promote health. However, a limitation identified is the "supply-side failure"; even the most motivated students were stopped by a lack of soap (rarely seen in toilets) and poor maintenance of facilities. The study concludes that for individual promoters to work, they must be supported by institutional accountability, such as regular monitoring of

cleaning staff and a consistent supply of sanitary products. Without these structural drivers, the students' knowledge remains "trapped" and cannot be practiced.[45]

In 2023, a study was conducted in Jamnagar, Gujarat,West coast India to compare how government and private schools manage hygiene. The researchers used a mixed-method study, which combined different ways of collecting data. They ran a cross-sectional survey with 566 students from 17 government and 17 non-government schools. They used standardized questionnaires to get numbers on what students knew and did, and they held focus group discussions to hear the students' personal stories. Finally, they used statistical tests ($P < 0.05$) and thematic analysis to make sure their findings were accurate and significant.

The study shows that private school attendance and urban residency are the strongest factors promoting the use of WASH services. The findings show that students in non-government (private) schools were much better at things like handwashing and using toilets safely because their schools provided more soap and cleaner facilities. A major promoter was higher parental education and wealth, which act as "home drivers" that help children practice good hygiene. The research also found that urban locality acts as a promoter, with city students having 2.3 times better hygiene than rural students. Additionally, older age was a key driver, as older students showed a more mature and positive attitude toward staying clean.

The strength of this study is its mixed-method design, which doesn't just look at numbers but also explains the reasons why students behave the way they do through their own words. However, a limitation is that government schools faced major barriers like "detrimental cultural beliefs" and a lack of money, which often stopped students from using their knowledge. The authors conclude that while private schools are currently better promoters, government schools

need extra support and better infrastructure to ensure that every child in Gujarat can grow up with healthy habits.[30]

A mixed-methods school-based study was conducted in Addis Ababa, Ethiopia, in 2020 (published in 2023) to identify the factors that promote proper handwashing practices among students. The researchers gathered data from 384 students across 98 schools, utilizing both student interviews and direct observation of school facilities to determine what successfully drives hygiene compliance in a school setting.

The study shows that institutional leadership and targeted health education are the most critical factors promoting the consistent use of WASH services. The findings from the study show that students in schools with a dedicated hygiene coordinator were more than twice as likely to practice proper handwashing, proving that staff oversight is a major driver of success. Additionally, the presence of active student health clubs and regular hygiene lessons acted as powerful promoters, as these programs provide the peer support and knowledge necessary for students to value and use the available facilities. The type of school also played a role, with private school students showing better hygiene practices due to more reliable access to both soap and water simultaneously, which significantly lowers the barrier to practicing good hygiene. Furthermore, being female was a strong predictor of better hygiene, as girls were nearly two and a half times more likely to follow handwashing protocols than boys.

The strength of this study lies in its mixed-methods approach, which allowed researchers to see that having a sink is not enough to promote hygiene unless it is supported by education and proper management. However, a limitation is that the study was focused on an urban capital city,

which means the factors promoting WASH might differ significantly in rural areas where water scarcity is more severe and school resources are even more limited.[41]

A descriptive survey was conducted in the Ningo-Prampram District of the Greater Accra Region, Ghana, in 2020 to evaluate the status of WASH programs in Junior High Schools. The study sampled 404 participants, including 250 pupils and 154 teachers and headteachers across 18 schools, using a combination of purposive and random sampling to identify the factors that influence the success of hygiene interventions.

The study shows that consistent financial investment and rigorous administrative oversight are the most essential factors promoting the sustainability of WASH services. The findings from the study show that the availability of regular funding is a primary driver, as it allows schools to procure necessary hygiene items and maintain infrastructure before it falls into disrepair. Furthermore, the research identified that frequent supervision and monitoring by the Ghana Education Service (GES) act as a significant promoter, ensuring that schools adhere to health standards and that hygiene facilities remain functional for both students and staff. The study also highlighted that when schools prioritize the maintenance of private and safe toilet facilities, it significantly promotes better health outcomes, particularly for female students, by reducing the risk of hygiene-related infections.

The strength of this study lies in its holistic evaluation of the school system, gathering perspectives from both those who manage the programs and those who use them. However, a limitation identified in the research is the significant gap in current infrastructure; while the study highlights what should promote WASH, it found that many schools were struggling due to a lack of basic facilities, which hinders the practical application of hygiene knowledge. Additionally, because the study was focused on a specific district in the Greater Accra Region, the factors

promoting WASH services may differ in more impoverished or geographically isolated regions of the country.[46]

A school-based cross-sectional study was conducted in Bishoftu Town, Ethiopia, in 2022 (published in 2023) to assess the factors influencing access to basic WASH services. The researchers surveyed 41 schools (both primary and secondary, public and private) using a combination of questionnaires, key informant interviews, and physical observations to determine which institutional factors successfully promote a healthy school environment.

The study shows that private school management and institutional ownership are the strongest factors promoting high-quality WASH services. The findings from the study show that being a private school was a major driver for success; private institutions were significantly more likely to provide basic water and sanitation services compared to public schools, largely due to better budget allocation and internal accountability. Furthermore, the presence of dedicated school health clubs served as a critical promoter, as these clubs actively engage in the day-to-day monitoring and cleaning of facilities. The study also highlighted that schools located in urban settings had better access to municipal water lines, which acted as a primary driver for consistent hygiene practices. Additionally, the availability of gender-segregated latrines with locks was identified as a key factor promoting sanitation access, particularly for female students, as it ensured the privacy and dignity necessary for them to use the facilities during school hours.

The strength of this study lies in its comprehensive assessment of infrastructure, as it evaluated schools against the specific WHO and UNICEF Joint Monitoring Program (JMP) standards. However, a limitation identified in the research is the significant disparity between public and private schools; while private management acts as a promoter, the lack of government funding in

public schools acts as a barrier that prevents the scaling of these successful WASH factors. Additionally, because the study focused on an urban town, the factors promoting WASH services might be less effective in rural areas where the distance to water sources and lack of electricity create more complex challenges.[47]

A descriptive cross-sectional study was conducted in the Somolu Local Government Area (LGA), Lagos, Nigeria, in 2020 to assess the knowledge, attitudes, and practices (KAP) of handwashing among secondary school students. The study utilized a multistage sampling method to recruit 420 respondents from public secondary schools, using self-administered questionnaires to identify the specific factors that drive or hinder consistent hygiene compliance.

The study shows that parental education and social cognitive factors are the primary drivers promoting the use of WASH services. The findings from the study show that students with a positive attitude toward handwashing (found in 99.5% of respondents) were much more likely to attempt consistent hygiene, identifying psychological readiness as a key internal promoter. Furthermore, a statistically significant association was found between the parents' level of education and the handwashing practices of the students; children from households with higher educational attainment demonstrated superior hygiene habits, likely due to better reinforcement and the availability of supplies at home. The research also highlighted that higher academic class levels served as a promoter, suggesting that as students mature and gain more exposure to health education within the school curriculum, their hygiene practices improve. In contrast, the study identified that the unavailability of soap (50%) and lack of nearby water supply (46.2%) were the main structural barriers that prevented these internal promoters from translating into action.

The strength of this study lies in its focus on a densely populated urban setting, providing actionable data for local government health interventions in Lagos. However, a limitation identified in the research is the discrepancy between attitude and practice; while nearly all students had a positive attitude, only 71% maintained good practices, hampered by "laziness" and "forgetfulness." Additionally, because the study was restricted to public schools in one specific LGA, the factors promoting WASH services may differ in private schools or in rural parts of Nigeria where infrastructure and socio-economic status vary significantly.[35]

A descriptive survey was conducted in selected public secondary schools in Ogbia Town, Bayelsa State, Nigeria, in 2024 to assess the level of personal hygiene knowledge and practice among students. The study utilized a random sampling technique to survey 364 respondents, employing structured questionnaires to identify the specific individual, social, and structural factors that promote or hinder hygiene compliance in the Niger Delta region.

The study shows that teacher-led health education and the availability of on-site facilities are the primary factors promoting the use of WASH services. The findings from the study show that teachers serve as the most significant source of information, with 33% of students identifying them as the primary driver for their hygiene knowledge. The research found that 58.2% of students possessed good theoretical knowledge of personal hygiene, which acted as a foundational promoter for healthy habits. Furthermore, the study highlighted that the physical presence of handwashing facilities (sinks with soap and water) is the single most critical factor influencing whether students actually adopt the practice, particularly during lunch breaks and after using the restroom. Additionally, higher educational levels within the school system (JSS vs. SSS levels) were associated with varying degrees of practice, suggesting that consistent, age-appropriate reinforcement can promote better long-term outcomes.

The strength of this study lies in its direct assessment of the "practice gap", noting that while over half of the students had good knowledge, only 46.1% maintained good practices, which helps public health officials identify where interventions are failing. However, a limitation identified in the research is the significant structural barrier of water scarcity; many students cited a lack of consistent water supply and "lack of time" during the school day as reasons for non-compliance, which can undermine even the best educational promoters. Additionally, the study noted that certain religious or cultural beliefs and a lack of adequate facilities in rural public schools continue to act as barriers that prevent the effective scale-up of hygiene interventions in the Bayelsa region.[48]

A Cross sectional exploratory study was conducted across seven local Government areas in Enugu State, Nigeria, in 2023 to look at how schools manage their water and toilets. Researchers visited 60 schools including government, private, and church-run (mission) schools to see which ones had the best hygiene and why.

The study shown that who runs the school and how they get their water are the most important factors promoting WASH services. The findings show that church-run (mission) schools are the best at promoting hygiene because they have stricter rules and better maintenance. These schools were much more likely to have handwashing stations and clean toilets compared to government schools. Another major promoter is "self-help" water sources. Instead of waiting for the government to provide water, the most successful schools used their own boreholes and rainwater tanks to ensure a steady supply. The research also found that the physical layout of the school acts as a promoter; when toilets and sinks are built close together, students are much more likely to wash their hands because it is convenient.

The strength of this study is that it compares different types of schools, showing that better management (like in mission schools) is just as important as having money. However, a limitation is that many schools still struggle with a lack of soap, which is a "missing link" in an otherwise good system. Also, while the study shows that having a borehole is a great promoter, it can be very expensive for poor government schools to build one, meaning the benefits of these promoters are not shared equally by all students.[49]

In 2023, a study was conducted by in Okura Community of Dekina LGA, Kogi State, Nigeria. The research focused on secondary school boarding students, a group that relies entirely on school facilities for their daily needs. Using a descriptive study design, the researchers examined how school-based health education and the boarding environment work together to promote or hinder personal hygiene practices.

The study shows that structured supervision and the reliability of school-based health talks are the primary factors promoting the use of WASH services. The findings show that for boarding students, regular health education sessions act as a critical driver for behavioral change, with students who receive frequent instruction being much more likely to maintain good personal cleanliness. A major promoter identified was the supervisory role of hostel administrators (housemasters and mistresses); their daily inspections and enforcement of rules act as an institutional driver that ensures hygiene is practiced consistently. Furthermore, the research found that social influence and peer accountability within the dormitories serve as a powerful promoter, as students in close quarters tend to adopt the positive hygiene habits of their peers. The study also highlighted that consistent access to water within the hostel area is the most essential physical driver, as it removes the burden of students having to search for water elsewhere, which often leads to poor hygiene.

The strength of this study is its focus on the boarding context, where hygiene is a 24-hour requirement rather than just a daytime activity. However, a limitation identified in the research is that overcrowding in dormitories can act as a significant barrier, making it difficult for even the most motivated students to maintain sanitary conditions in shared spaces. The authors conclude that while education is a powerful promoter, it must be supported by adequate facility-to-student ratios and a constant supply of cleaning materials to ensure that the "school-based health education" effectively translates into lifelong healthy habits.[50]

CHAPTER THREE

METHODOLOGY

3.1 STUDY AREA

This study was carried out in Egor Local Government Area (LGA), one of the metropolitan Local Government Areas within Benin City, Edo State, Nigeria. Edo State is located in the South–South geopolitical zone of Nigeria and was created in 1991 following the dissolution of the former Bendel State. The state occupies a landmass of approximately 19,743 square kilometers and it is positioned between latitudes 6°23'55"N to 6°27'39"N and longitudes 5°36'18"E to 5°44'18"E. The state shares boundaries with Ondo State to the west, Anambra State to the east, Kogi State to the northeast, and Delta State to the southeast. Benin City serves as the state capital and the major administrative and commercial center.

Egor LGA is predominantly urban with some peri-urban settlements. The area is mainly inhabited by the Bini (Edo) ethnic group, although other ethnic groups such as Esan, Owan, Afemai and others are also present due to internal migration. English is the official language of instruction in schools, while indigenous languages and Pidgin English are commonly spoken in informal settings. The population practices Christianity predominantly, alongside Islam and traditional beliefs. The total area of the LGA is 93 km2 with a population of 340,287 as at the 2006 national census and a projected population of 502,700 by 2022[51]

Educational records show that Egor LGA has about 12 public secondary schools and over 128 private secondary schools, most of which operate as day schools[52,53]. Out of the twelve public secondary schools, six were chosen for the study. These included Iyoba Girls Secondary School, which is exclusively for girls; Edo Boys Secondary School and Ohonre Secondary School, both

of which are all-boys institutions; as well as Egor, Uselu, and Eweka Secondary Schools, which operate as co-educational schools for both boys and girls.

The student population largely comprises adolescents aged 10–19 years, a period during which personal hygiene behaviors are developed and reinforced. Economic activities in the area include trading, civil service, artisan work, and small-scale entrepreneurship, resulting in varying socioeconomic conditions that may influence access to safe water, sanitation facilities, and hygiene materials.

Although Egor LGA is accessible and not considered geographically isolated, some communities experience challenges such as irregular water supply, inadequate sanitation infrastructure, overcrowding, and poor waste management. These challenges also extend to Schools located in the area and thus makes the area appropriate for assessing knowledge, attitudes, prevalence, and determinants of Water, Sanitation, and Hygiene (WASH) practices among public secondary school students.

3.2 STUDY DESIGN

An Analytical cross-sectional study was utilized for this study

3.3 STUDY POPULATION

The study population Consisted of secondary school students attending selected public secondary schools in Egor Local Government Area, Benin City, Edo State.

3.4 SELECTION CRITERIA

3.4.1 Inclusion Criteria

- Secondary school students enrolled in selected schools within Egor LGA

- Students who were willing to participate in the study

3.4.2 Exclusion Criteria

- Students who were too ill to participate on the day of data collection in respective schools
- Students whose questionnaire were partially filled and fell below the acceptable completion threshold
- Students who recently joined the school and lacked familiarities with its WASH practices

3.5 STUDY DURATION

The study was conducted over a period of one year, from December 2024 to May 2026.

3.6 SAMPLE SIZE DETERMINATION

The minimum sample size was calculated using Cochran's formula for descriptive studies:

$n=Z^2pq/d^2$

Where:

n = minimum required sample size

z = standard normal deviate at 95% confidence level (1.96)

p = estimated proportion of students with good WASH practices from a previous study

q = 1 − p

d= margin of error (0.05)

A prevalence of 73.1% (0.731) was adopted from a previous study conducted among secondary school students in oyo state Nigeria[36].

p=0.731 q=0.269

Substituting into the formula:

$n=1.96^2 \times \frac{0{\cdot}269\times0{\cdot}731}{0{\cdot}05^2} = 302.16 \sim 302$

To enhance representativeness and compensate for non-response, incomplete questionnaires, and student absenteeism, a 10% allowance will be added:

ns = adjusted sample size

ns = calculated sample size + non response

nr = nor response rate = 10% = 0.1

nr = 0.1 × 302 = 30.2

n = calculated sample size = 302

ns = 302 + 32.3 = 334.3

design effect = 1.5

The final sample size to be used for the study will be ns × 1.5

= 334.3 × 1.5

= 501.45 ~ 502

However, a sample size of 550 was used.

3.7 SAMPLING TECHNIQUE

A multi-stage sampling method was used to select the respondents for this study.

STAGE 1: SELECTION OF LOCAL GOVERNMENT AREA (LGA)

Benin City comprises five LGAs: Egor, Ikpoba-Okha, Ovia North-East, Oredo, and Uhunmwonde. Using a simple random sampling method by balloting, Egor LGA was selected for the study.

STAGE 2: SELECTION OF SCHOOLS

There are Twelve public secondary schools in Egor LGA, out of this, six were selected using simple random sampling by balloting to participate in this study. These schools were

1. Iyoba Girls Secondary School
2. Egor Secondary School
3. Edo boys Secondary School
4. Uselu Secondary School
5. Ohonre Secondary School
6. Eweka Secondary School .

STAGE 3: STRATIFICATION BY CLASS LEVEL

Within each selected secondary school, students were stratified into six groups based on class levels: JSS1, JSS2, JSS3, SS1, SS2, and SS3. This ensured that the study included participants across both junior and senior secondary school levels.

STAGE 4: SELECTION OF RESPONDENTS

From each class stratum (JSS1–SS3), students were selected using a simple random sampling technique. This ensured that every student within each class level had an equal chance of being included in the study, thereby maintaining representativeness across the different strata.

3.7.1 Sample size Allocation

The total student population of the selected schools was obtained from the Edo State Ministry of Education's official enrollment records for the 2025/2026 academic session. Each school was treated as a separate stratum to ensure fair and proportional representation of students from all the selected schools. The selected schools and their current student populations were as follows:

1. Iyoba Girls Secondary School – 975 Students
2. Egor Secondary School – 2020 Students
3. Edo boys Secondary School – 1073 Students
4. Uselu Secondary School – 1145 Students
5. Ohonre Secondary School – 360 Students
6. Eweka Secondary School – 511 Students

The total population of students across the selected Schools was

$$975 + 2020 + 1073 + 1145 + 360 + 511 = 6084$$

A total sample size of 550 students was selected for the study. To ensure proportional representation from each school, the sample was allocated using a proportionate sampling formula:

$$n_h = \frac{N_h \times n}{N}$$

Where:

- n_h = sample size for each school
- N_h = Population of the Student in the school
- N = Total population of Students (6,084)
- n = Total sample size (550)

Table 3.1: Proportional Allocation Table of study sample size

School	Total Population (N_h)	Calculation	Sample Size (n_h)
Iyoba Girls	975	$\frac{975 \times 550}{6084} = 88.14$	88
Egor	2020	$\frac{2020 \times 550}{6084} = 182.6$	183
Edo boys	1073	$\frac{`1073 \times 550}{6084} = 97.00$	97
Uselu	1145	$\frac{1145 \times 550}{6084} = 103.5$	103
Ohonre	360	$\frac{360 \times 550}{6084} = 32.54$	33
Eweka	511	$\frac{511 \times 550}{6084} = 46.2$	46

Total Sample size was 550

This approach ensured that each school was proportionally represented based on Student population, thereby reducing sampling bias and improving the overall representativeness of the study.

3.8 DATA COLLECTION AND MANAGEMENT

3.8.1 Method of Data Collection

Data were collected using two instruments adapted from the WHO/UNICEF Joint Monitoring Program (JMP) on Water, Sanitation and Hygiene (WASH) and this included a checklist which was administered to each school head or their representative. Secondly, a pre-tested, structured, self-administered questionnaire which was distributed to students within the school environment[48]. Privacy was ensured throughout the process, and both parental/guardian consent and student assent were obtained prior to questionnaire administration.

3.8.2 Tools for Data Collection

THE QUESTIONNAIRE

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

This section contained 14 questions designed to collect background information on respondents and to identify social and economic characteristics that could influence their water, sanitation, and hygiene (WASH) practices.

SECTION B: KNOWLEDGE OF WASH PRACTICES

This section comprised 40 questions aimed at assessing respondents' knowledge of water, sanitation, and hygiene (WASH) practices.

SECTION C: ATTITUDE TOWARDS WASH PRACTICES

This section had 14 Likert scale items used to assess respondents' views and attitudes toward WASH practices.

SECTION D: PREVALENCE OF WASH PRACTICES

This section comprised 15 items used to assess the prevalence of WASH (Water, Sanitation, and Hygiene) practices among respondents**.**

SECTION E: ADDITIONAL FACTORS INFLUENCING WASH BEHAVIOR

This section comprised 7 items used to assess the additional factors influencing WASH (Water, Sanitation, and Hygiene) practices and it focused on factors that encourage and prevent the use of WASH facilities available in schools.

THE CHECKLIST

A checklist divided into three domains of Water, Sanitation and Hygiene respectively was used to assess WASH indicators in respective Schools. The Water domain contained 9 items, the Sanitation domain contained 28 items and Hygiene domain contained 10 items. The checklist contained 47 items in total and was administered to the school head or their representative at the time of visit.

3.8.3 Training of Research assistants

Six Research assistants who were 500 level medical students of the University of Benin were used for this research. They received thorough training before data collection so as to ensure consistency, accuracy, and reliability in administering the questionnaires and gathering

information from respondents. The training covered the study objectives, ethical guidelines, effective communication with participants, and proper techniques for questionnaire administration.

3.8.4 Pre-testing of Research Tool

Pre-testing of the questionnaire was conducted among Ogbe and Edokpolor secondary school students in Oredo Local government, which has similar characteristics to the study area. Ten percent of the sample size (55 questionnaires) was used. Necessary modifications were made before the final data collection. The pre-testing was conducted to evaluate the clarity, relevance, and reliability of the questionnaire items, ensuring they were well understood by respondents and appropriate for the study context. It also helped identify potential challenges in administration and allowed for necessary modifications before the final data collection.

3.9 DATA ANALYSIS

Completed questionnaires was checked for accuracy and completeness, after which data set was cleaned, coded, and entered into IBM Statistical Package for Social Sciences (SPSS) version 27.0 for analysis.

Univariate Analysis

Descriptive statistics were applied to summarize the study variables. This involved constructing frequency tables and calculating measures such as means and percentages where appropriate.

Bivariate Analysis

The association between respondents' sociodemographic characteristics and WASH (Water, Sanitation, and Hygiene) practices was examined using Fisher's exact test and the chi- square test. Statistical significance was set at a p- value less than 0.05.

Multivariate Analysis

All sociodemographic variables included in the bivariate analysis were subsequently entered into a logistic regression model. This allowed for the identification of factors that independently influenced WASH (Water, Sanitation, and Hygiene) practices while controlling for possible confounders. Results from the regression analysis were presented as odds ratios with their corresponding 95% confidence intervals.

Measurement of variables and scoring

The dependent variable in this study was the prevalence of WASH (Water, Sanitation, and Hygiene) practices among secondary school students. The independent variables included sociodemographic factors such as age, class level, religion, ethnicity, parents' educational attainment, parents' occupation, and household socioeconomic status, along with environmental and cultural factors that may influence WASH practices

3.10 SCORING SYSTEM

Socio-demographic characteristics

This section gathered information on respondents' sociodemographic characteristics, including age (as at last birthday), class level, religion, ethnicity, living arrangement, parents' educational attainment, and parents' occupation. Age was categorized using an adapted World Health Organization's adolescent age classification and further subdivided into early (10–13 years), middle (14–16 years), and late adolescence (17–19 years) for analysis[55]. Parental and Gaurdian's

Occupations were categorized according to the International Labour Organization's International Standard Classification of Occupations (ISCO-08), which provides a four-level hierarchical structure and skill-level framework. Skill level 1 included unemployed persons, retirees, and homemakers; skill level 2 covered unskilled workers; skill level 3 comprised semi-skilled workers such as traders, tailors, farmers, and artisans; while skill level 4 represented skilled technical workers, professionals, and managers.[56]

Knowledge towards Wash practices

Knowledge of WASH (Water, Sanitation, and Hygiene) practices was assessed using a comprehensive set of 40 questions designed to evaluate respondent's understanding of safe water use, sanitation, and appropriate hygiene practices. Reliability testing of the knowledge items was conducted using SPSS, and the Cronbach's alpha value obtained for the scale was 0.891, indicating excellent internal consistency. All 40 items were retained for analysis. Correct responses were scored as 1, while incorrect responses were scored as 0.

Knowledge levels were categorized as

Poor Knowledge: (0% – <70%)

Good Knowledge: (≥70% – 100%)

This cut off was adapted from a previous study that assessed WASH among secondary school students in Ikeduru Local government area Imo state[42].

Attitude towards WASH practices

Attitude towards WASH (Water, Sanitation, and Hygiene) practices was assessed using Likert scale items designed to evaluate respondents' perceptions, beliefs, and feelings regarding hygiene and sanitation. Responses were graded on a 5-point scale ranging from strongly agree to strongly disagree. The attitude section of the questionnaire contained a full set of items, and reliability testing of these items using SPSS produced a Cronbach's alpha value of 0.921, indicating excellent internal consistency. Since all items contributed positively to the reliability of the scale, none were removed. Responses were coded and summed to obtain each respondent's total attitude score.

Respondents' attitude levels were categorized as:

Negative attitude for scores between 0–70%,

Positive attitude for scores between 71–100%.

This approach was adapted from a study on WASH adherence among secondary schools in Ikeduru Local government area Imo state[42].

Prevalence of WASH Practices

Water, sanitation, and hygiene (WASH) practices were assessed under three separate domains namely: water practices, sanitation practices, and hygiene practices. Each domain consisted of structured practice-related questions designed to evaluate respondent's adherence to recommended WASH behaviours.

Responses obtained for each domain were scored and converted to percentage scores respectively. A cutoff score of 50% was used to categorize respondent's practices within each domain as either Satisfactory practice (≥50%) or Unsatisfactory practice (<50%). Respondents who achieved satisfactory scores in all three domains (water, sanitation, and hygiene practices) were regarded as having good overall WASH practice and were assigned an overall score of 100%. Conversely, respondents who failed to attain satisfactory scores in any one of the three domains were categorized as having poor overall WASH practice. This was based on an all-or-none approach.

This composite scoring method was adapted from previous WASH assessment studies which evaluated water, sanitation, and hygiene indicators as separate but complementary domains in determining overall WASH practice[3,4,30].

Factors Influencing WASH

The bivariate analysis first examined how sociodemographic characteristics influenced WASH practices. In addition, environmental and institutional factors were considered to give a fuller picture of what shapes students' behaviors. Encouraging factors for toilet use included cleanliness, gender separation, teacher support, and privacy through locks, while dirty toilets were identified as barriers. Handwashing was further assessed in relation to soap availability, which limited regular practice. These contextual variables complemented the sociodemographic findings and highlighted the importance of school infrastructure and support in promoting WASH practices.

The Checklist

Each item was given a score of 1 if present and a score of 0, when absent. Responses from each domain was calculated into percentages, and a total WASH percent score was gotten by dividing the sum of the percentages by 3. Schools with <50% will be classified as having over all poor WASH practice Levels and those with ≥50% will be classified as having over all good WASH practice levels.

3.11 ETHICAL CONSIDERATION

Ethical approval for the study (Protocol Number: ADM/E/22/A/VOL. VII/1486549127290) was granted by the Ethics and Research Committee of the University of Benin Teaching Hospital. Clearance was also obtained from the Ministry of Education and Edo State Universal Basic Education Board before data collection commenced.

Written informed consent was secured from parents or guardians, and assent was obtained from the students prior to participation.

Participation was voluntary, and respondents were informed of their right to decline or withdraw at any stage without penalty.

Confidentiality was strictly maintained throughout the study; no names, addresses, or other identifying information were collected in the questionnaire. Respondents were assured that all data would be used solely for academic purposes and handled with strict confidentiality.

This study is beneficial in several ways as it enhances understanding of students' WASH practices, highlighting gaps in knowledge, attitudes, and practice. The findings provide valuable evidence to guide school- based interventions and inform policies by the Ministry of Education

and State Universal Basic Education Board, particularly in improving toilet facilities, ensuring soap availability, and strengthening hygiene education. By identifying barriers to proper WASH practices, the study contributes to better public health outcomes, reducing risks of infection and absenteeism among adolescents. Academically, it enriches the literature on WASH behaviors in Nigeria, offering reliable data with strong internal consistency that future researchers can build upon. Beyond schools, the results also foster community and parental engagement, sensitizing families to their role in supporting improved hygiene practices and extending the impact of the study to the wider society.

3.12 LIMITATIONS OF STUDY

The study was limited by the possibility of recall bias, as respondents may not always accurately remember or report their WASH practices. This was minimized by framing questions to focus on recent and routine behaviors.

Social desirability bias was also a potential concern, as some respondents may have provided answers they considered acceptable rather than their actual practices. To address this, confidentiality and anonymity were assured, and no identifying information was collected.

In addition, the use of a self- administered questionnaire may have posed challenges for some respondents in fully understanding certain questions. The researcher and research assistance were available during data collection to provide clarification where necessary without influencing responses.

CHAPTER FOUR

RESULTS

A total of 550 respondents participated in the study with a 96.3% response rate. The results are presented in the following sections in line with the specific objectives.

SECTION A: Socio-demographic characteristics of respondents

SECTION B: Knowledge of Water, Sanitation and Hygiene (WASH) practices among secondary school students

SECTION C: Attitude towards Water, Sanitation and Hygiene (WASH) practices

SECTION D: Prevalence of Water, Sanitation and Hygiene (WASH) practices

SECTION E: Factors influencing WASH practices among secondary school students

SECTION F: Observational assessment of WASH facilities among secondary schools

SECTION A

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Table 4.1: Socio-demographic characteristics of respondents

Variables	Frequency (n=530)	Percent (%)
Age (in years)		
10–13	218	41.1
14–16	261	49.2
≥17	51	9.6
Mean ± SD	14.05±1.85	
Sex		
Female	320	60.4
Male	210	39.6
Class		
JSS 1	112	21.1
JSS 2	111	20.9
JSS 3	92	17.4
SS 1	109	20.6
SS 2	74	14.0
SS 3	32	6.0
Religion		
Christianity	433	81.7
Islam	80	15.1
African Traditional Religion	17	3.2
Ethnic Group		
Benin	201	37.9
Esan	87	16.4
Igbo	80	15.1
Urhobo	58	10.9
Yoruba	41	7.7
Etsako	35	6.6
Hausa	18	3.4
Efik	10	1.9
Resides With		
Both Parents	339	64.0
Mother	120	22.6
Father	41	7.7
Guardian	30	5.7
Birth Position		
1st	108	20.4
2nd	223	42.1
3rd	122	23.0
4th	41	7.7
≥ 5	36	6.8
Parental Educational Qualification		
Father's Education (n=450)		
Tertiary	142	31.6
Secondary	196	43.6
Primary	97	21.5
None	15	3.3
Mother's Education (n=495)		
Tertiary	162	32.7
Secondary	185	37.4
Primary	131	26.5
None	17	34.4
Guardian's Education (n=30)		
Tertiary	13	43.3
Secondary	12	40.1
Primary	4	13.3
None	1	3.3
Father's ILO Category (n = 452)		
Skill level 1	4	0.9
Skill level 2	349	77.2
Skill level 3	32	7.1
Skill level 4	67	14.8
Mother's ILO Category (n = 496)		
Skill level 1	8	1.6
Skill level 2	416	83.9
Skill level 3	11	2.2
Skill level 4	61	12.3
Guardian's ILO Category (n = 30)		
Skill level 1	1	3.3
Skill level 2	15	50.0
Skill level 3	5	16.7
Skill level 4	9	30.0

Table 4.1 shows the socio-demographic characteristics of respondents. A total of 530 students participated in the study, yielding a 100% response rate. The mean age of respondents was 14.05 ± 1.85 years, reflecting a predominantly mid-adolescent population. Nearly half of the respondents were aged 14–16 years (49.2%), followed by those aged 10–13 years (41.1%), while only 9.6% were 17 years or older. This distribution suggests that the majority of participants were in the critical developmental stage where health education and behavioral reinforcement are most impactful, particularly in relation to water, sanitation, and hygiene practices.

In terms of sex distribution, females constituted the majority (60.4%), while males accounted for 39.6%. This gender imbalance may reflect enrollment patterns in public secondary schools in Egor Local Government Area and is important when interpreting WASH practices, as female students often bear greater responsibility for hygiene practices both at home and in school.

Class distribution revealed that junior secondary students (JSS 1–3) formed a slightly larger proportion (59.4%) compared to senior secondary students (40.6%). This indicates that the majority of respondents were in the early stages of secondary education, which may influence their level of exposure to WASH concepts and practices. The relatively smaller proportion of SS3 students (6.0%) may be attributed to examination schedules or reduced availability during data collection.

Christianity was the predominant religion (81.7%), followed by Islam (15.1%) and African Traditional Religion (3.2%). Ethnic composition revealed Benin students as the largest group (37.9%), followed by Esan (16.4%), Igbo (15.1%), and Urhobo (10.9%). Smaller proportions were Yoruba (7.7%), Etsako (6.6%), Hausa (3.4%), and Efik (1.9%). This diversity reflects the multi-ethnic composition of Benin City and provides a broad cultural context for interpreting WASH attitudes and practices.

Most respondents resided with both parents (64.0%), while 22.6% lived with their mothers, 7.2% with their fathers, and 6.2% with guardians. This suggests that family structure may play a role in shaping hygiene behaviors, as students living with both parents may have more consistent supervision compared to those living with single parents or guardians.

Birth order analysis showed that second-born children were most represented (42.1%), followed by third-born (23.0%) and first-born (20.4%). This distribution may reflect family size patterns in the study area, where larger families are common.

Parental education was generally moderate. Among fathers, 43.6% had attained secondary education, 31.6% tertiary, 21.5% primary, and 3.3% had no formal education. Mothers showed a similar pattern, with 37.4% having secondary education, 32.7% tertiary, 26.5% primary, and 3.4% none. Guardians, though fewer in number, were mostly educated to tertiary (43.3%) or secondary (40.1%) levels. These findings suggest that most parents and guardians had at least secondary education, which may positively influence students' awareness and adoption of WASH practices.

Occupational distribution based on ILO skill levels revealed that the majority of fathers (77.2%) and mothers (83.9%) were engaged in skill level 2 work, representing semi-skilled occupations. Smaller proportions of fathers were in skill level 4 (14.8%) and skill level 3 (7.1%), while only 0.9% were in skill level 1. Mothers showed similar patterns, with 12.3% in skill level 4, 2.2% in skill level 3, and 1.6% in skill level 1. Guardians displayed a more varied distribution, with half (50.0%) in skill level 2, 30.0% in skill level 4, 16.7% in skill level 3, and 3.3% in skill level 1.

These occupational patterns suggest that most parents were engaged in semi-skilled work, which may influence household income and, consequently, the availability of resources for WASH

facilities at home and school. The relatively small proportion of parents in skill level 1 (elementary occupations) indicates that extreme economic disadvantage was less common among respondents, though the presence of such cases highlights inequalities that may affect WASH practices.

Overall, the socio-demographic profile of respondents indicates a predominantly mid-adolescent, female, Christian, and Benin-origin population, with parents largely educated to secondary level and engaged in semi-skilled occupations. These background characteristics provide important context for interpreting the knowledge, attitudes, and practices of WASH among the respondents, as socio-economic and cultural factors are likely to shape both awareness and behavior.

SECTION B

Knowledge of Water, Sanitation and Hygiene (WASH) practices among secondary school students

Table 4.2: Awareness and source of information about WASH

Variables	Frequency (n=530)	Percent (%)
Heard of the term WASH	**381**	**71.9**
Source of Information*		
School Teachers	184	48.3
Parents	103	27.0
School health clubs	59	15.5
Social media	34	8.9
Internet	24	6.3
Guardians	22	5.8
Television	22	5.8
Radio	21	5.5
Friends	11	2.9
Others	8	2.1

***Multiple response question**

Table 4.2 shows awareness and source of information on WASH of respondents. Out of the 530 respondents, 381 (71.9%) reported that they had heard of the term Water, Sanitation and Hygiene (WASH*)*, while 149 (28.1%) indicated no prior awareness. This finding suggests that although a majority of students are familiar with the concept, nearly one- third remain uninformed, highlighting a significant gap in WASH sensitization among secondary school students in Egor Local Government Area.

Among those who had heard of WASH, the most frequently cited source of information was school teachers, reported by 48.3% of respondents. This underscores the central role of formal education and classroom instruction in disseminating WASH knowledge. Parents were the second most common source (27.0%), reflecting the influence of family in shaping hygiene awareness. School health clubs contributed to awareness for 15.5% of students, suggesting that extracurricular health- focused initiatives also play a meaningful role, though their reach remains limited.

Mass media and digital platforms were less prominent. Social media accounted for 8.9% of responses, while the internet was cited by 6.3%. Traditional media sources such as television (5.8%) and radio (5.5%) were similarly low, indicating that WASH messaging through mass communication channels has not penetrated strongly among this age group. Guardians (5.8%) and friends (2.9%) were minor sources, while 2.1% mentioned “others,” which may include community programs or religious institutions.

The dominance of teachers as the primary source of WASH information highlights the importance of integrating hygiene education into school curricula. However, the relatively low contribution of health clubs, media, and peer networks suggests that opportunities for reinforcing WASH awareness outside the classroom are underutilized. The limited role of digital platforms

is particularly notable given the increasing reliance of adolescents on social media and the internet for information. This gap points to the need for innovative strategies that leverage these channels to expand WASH awareness.

Overall, while awareness of WASH among students is encouraging, the reliance on teachers and parents as the main sources of information suggests that knowledge dissemination is narrowly concentrated. Expanding the role of school health clubs, peer education, and media campaigns could help reach the nearly one- third of students who remain unaware of WASH, thereby strengthening the foundation for improved hygiene practices in schools.

Table 4.3: Knowledge of WASH among respondents

Variables	Frequency (n=381)	Percent (%)
WASH refers to		
A critical, interrelated set of practices, infrastructure, and services aimed at ensuring safe water access, proper waste disposal, and hygiene	232	60.9
Focused teaching of students on how to wash their hands only	79	20.7
The construction of toilets in schools without hygiene education	29	7.6
Activities done only by health workers	24	6.3
The cleaning of classrooms and school compounds every morning	17	4.5
Drinking water should be		
Colourless, odourless, tasteless and free from harmful germs and chemicals	248	65.1
Odourless only	49	12.9
Clear in colour only	47	12.3
Tasteless only	23	6.0
Collected from any available source	14	3.7
Recognized safe water sources*		
Borehole	300	78.7
Protected well	177	46.5
Pipe-borne water	168	44.1
Rainwater harvesting	134	35.2
River or stream	16	4.0
Recommended hygiene practices*		
Washing hands with soap and water after using the toilet	285	74.8
Washing hands before eating	195	51.2
Covering mouth and nose when coughing or sneezing	192	50.4
Regular bathing and wearing clean clothes	145	38.2
Using water only without soap	10	2.6
Appropriate sanitation facilities*		
Flush toilet connected to a septic tank	240	63.0
Clean and private school toilets separate for boys and girls	189	49.6
Toilets with handwashing facilities nearby	188	49.3
Ventilated Improved Pit (VIP) latrine	153	40.2
Open defecation areas	32	8.4
A major benefit of good WASH practices in schools is		
Prevention of water- and sanitation-related diseases	248	65.1
Increased absenteeism	93	24.4
Spread of infections	22	5.8
Poor academic performance	18	4.7
Diseases resulting from poor WASH*		
Cholera disease	235	61.7
Diarrhoea diseases	213	55.9
Typhoid disease	160	41.0
Better concentration in class	52	13.6
Improved student health	21	5.5
Increased school attendance	16	4.2
Recommended action for dirty or non-functioning school toilets		
Report to a teacher or school authority	288	75.6
Practice open defecation	70	18.4
Ignore the problem	18	4.7
Stop using toilets completely	5	1.3
Diseases prevented by good WASH*		
Cholera	251	65.8
Diarrhoea	244	64.0
Typhoid fever	208	54.6
Malaria	25	6.6
Worm infestations	16	4.2
Safe water handling practices*		
Covering water storage containers	322	84.5
Using clean cups or ladles to fetch water	217	57.0
Treating water when necessary	165	43.3
Dipping hands directly into water container	15	3.9
Leaving containers open at all times	3	0.8
Recommended action after coughing or sneezing		
Wash hands with soap and water	331	86.9
Wipe hands on clothes	32	8.4
Do nothing	11	2.9
Shake hands with friends	7	1.8
Consequences of poor maintenance of school toilets		
Increased spread of diseases	342	89.8
Better learning environment	27	7.1
Improved student hygiene	8	2.1
Increased toilet use	4	1.0

*Multiple response question

Table 4.3 shows the Knowledge of WASH among respondents. Out of the 381 respondents who had heard of WASH, understanding of its meaning varied considerably. A majority (60.9%) correctly defined WASH as a critical, interrelated set of practices, infrastructure, and services aimed at ensuring safe water access, proper waste disposal, and hygiene. This demonstrates that more than half of the students had a comprehensive grasp of the concept. However, notable misconceptions were evident. About one- fifth (20.7%) believed WASH referred only to focused teaching on handwashing, while 7.6% associated it exclusively with toilet construction without hygiene education. Smaller proportions thought it was limited to activities performed by health workers (6.3%) or simply the cleaning of classrooms and compounds (4.5%). These findings highlight that while many students understand WASH broadly, a significant minority still hold narrow or incorrect interpretations, underscoring the need for more holistic education.

Knowledge of safe drinking water was relatively strong. Nearly two- thirds (65.1%) correctly identified that drinking water should be colourless, odourless, tasteless, and free from harmful germs and chemicals. However, misconceptions persisted: 12.9% believed water only needed to be odourless, 12.3% considered clarity alone sufficient, and 6.0% emphasized tastelessness only. Alarmingly, 3.7% reported that water could be collected from any available source, reflecting risky practices that could expose students to waterborne diseases. These results suggest that while most students recognize the multiple qualities of safe water, a substantial proportion still rely on partial or incorrect criteria.

When asked about recognized safe water sources, boreholes were most frequently identified (78.7%), reflecting their widespread use in schools and communities. Protected wells (46.5%) and pipe- borne water (44.1%) were less commonly recognized, despite being important safe sources. Rainwater harvesting was acknowledged by 35.2%, indicating moderate awareness of

alternative safe sources. Encouragingly, only a small proportion (4.0%) considered rivers or streams safe, showing that most students correctly rejected unsafe surface water.

Taken together, these findings reveal that while a majority of students have a sound understanding of WASH and safe water, misconceptions remain prevalent. Many students still equate WASH with single practices such as handwashing or toilet construction, and a notable proportion fail to recognize the full criteria for safe drinking water. Similarly, awareness of safe water sources is uneven, with boreholes widely recognized but other sources less so. These gaps highlight the need for comprehensive WASH

Table 4.4: Correctness of responses to Knowledge of WASH

Variables	Knowledge Responses (n=381)	
	correct (%)	incorrect (%)
Wash refers to a critical, interrelated set of practices, infrastructure, and services aimed at ensuring safe water access, proper waste disposal, and hygiene	232 (60.9)	149 (39.1)
Drinking water should be colourless, odourless, tasteless and free from harmful germs and chemicals.	248 (65.1)	133 (34.9)
Borehole is a Recognized safe water source	300 (78.7)	81(21.3)
Protected well is a Recognized safe water source	177(46.5)	204(53.5)
Pipe-borne water is a Recognized safe water source	168(44.1)	213(55.9)
Rainwater harvesting is a Recognized safe water source	134(35.2)	247(64.8)
River or stream is a Recognized safe water source	365(95.8)	16(4.2)
Washing hands with soap and water after using the toilet is a recommended hygiene practice	285 (74.8)	96(25.2)
Washing hands before eating is a recommended hygiene practice	195 (51.2)	186(48.8)
Covering mouth and nose when coughing or sneezing is a recommended hygiene practice	192 (50.4)	189(49.6)
Regular bathing and wearing clean clothes is a recommended hygiene practice	145 (38.1)	236 (61.9)
Using water only without soap is a recommended hygiene practice	371(97.4)	10 (2.6)
Flush toilet connected to a septic tank is an appropriate sanitation facility	240(63)	141(37.0)
Clean and private school toilets separate for boys and girls is an appropriate sanitation facility	189(49.6)	192(50.4)
Toilets with handwashing facilities nearby is an appropriate sanitation facility	188(49.3)	193(50.7)
Ventilated Improved Pit (VIP) latrine is an appropriate sanitation facility	153(40.2)	228(59.8)
Open defecation areas is an appropriate sanitation facility	349(91.6)	32(8.4)
Prevention of water- and sanitation-related diseases is a major benefit of good WASH practice in schools	248(65.1)	133(34.9)
Increased absenteeism is a major benefit of good WASH practice in schools	93(24.4)	288(75.6)
Spread of infections is a major benefit of good WASH practice in schools	359(94.2)	22(5.8)
Poor academic performance is a major benefit of good WASH practice in schools	363(95.3)	18(4.7)
Cholera disease resulting from poor WASH	235(61.7)	146(38.3)
Diarrhoea is a disease resulting from poor WASH	213(55.9)	168(44.1)
Typhoid is a disease resulting from poor WASH	160(42)	221(58.0)
Better concentration is a disease in class resulting from poor WASH	329(86.4)	52(13.6)
Improved student health is a disease resulting from poor WASH	360(94.5)	21(5.5)
Increased school attendance is a disease resulting from poor WASH	365(95.8)	16(4.2)
Covering water storage containers is a safe water handling practice	322(84.5)	59(15.5)
Using clean cups or ladles to fetch water is a safe water handling practice	217(57)	164(43.0)
Treating water when necessary is a safe water handling practice	165(43.3)	216(56.7)
Dipping hands directly into water container is a safe water handling practice	366(96.1)	15(3.9)
Leaving containers open at all times is a safe water handling practice	378(99.2)	3(0.8)
Washing hands with soap and water is a recommended action after coughing or sneezing	331(86.9)	50(13.1)
Wipe hands on clothes is a recommended action after coughing or sneezing	349(91.6)	32(8.4)
Doing nothing is a recommended action after coughing or sneezing	370(97.1)	11(2.9)
Shaking hands with friends is a recommended action after coughing or sneezing	374(98.2)	7(1.8)
Increased spread of diseases is a consequence of poor maintenance of school toilet	342(89.8)	39(10.2)
Better learning environment is a consequence of poor maintenance of school toilet	27(7.1)	354(92.9)
Improved student hygiene is a consequence of poor maintenance of school toilet	8(2.1)	373(97.9)
Increased toilet use is a consequence of poor maintenance of school toilet	4(1)	377(98.9)

$\alpha = 0.891$

Table 4.4 shows the correctness of responses on knowledge of WASH. Among the 381 respondents who had heard of WASH, the correctness of their knowledge varied across different domains. A majority (60.9%) correctly identified WASH as a critical, interrelated set of practices, infrastructure, and services aimed at ensuring safe water access, proper waste disposal, and hygiene. However, 39.1% held incorrect views, limiting WASH to narrower or unrelated activities. This finding shows that while most students grasp the holistic nature of WASH, a substantial minority still misunderstand its scope.

Knowledge of safe drinking water was relatively strong, with 65.1% correctly stating that water should be colourless, odourless, tasteless, and free from harmful germs and chemicals. Yet, 34.9% provided incomplete or incorrect responses, suggesting that misconceptions about water quality persist among a significant proportion of students.

Recognition of safe water sources showed mixed results. Boreholes were widely acknowledged as safe (78.7%), but fewer students correctly identified protected wells (46.5%) and pipe-borne water (44.1%). Rainwater harvesting was recognized by only 35.2%, while a majority (64.8%) incorrectly rejected it. Encouragingly, almost all respondents (95.8%) correctly rejected rivers and streams as safe sources, demonstrating awareness of the risks associated with untreated surface water. These findings suggest that while boreholes are well understood as safe, knowledge of other safe sources remains limited, reflecting possible gaps in exposure or emphasis during health education.

Hygiene practices were better recognized in some areas than others. A large majority (74.8%) correctly identified handwashing with soap and water after toilet use as essential, while just over half (51.2%) recognized handwashing before eating. Covering the mouth and nose when coughing or sneezing was correctly identified by 50.4%, but nearly half (49.6%) failed to

acknowledge its importance. Regular bathing and wearing clean clothes was correctly recognized by only 38.1%, with 61.9% providing incorrect responses, indicating weak awareness of personal hygiene beyond handwashing. Encouragingly, almost all respondents (97.4%) correctly rejected the use of water only without soap as adequate, showing strong recognition of the role of soap in effective hygiene.

Sanitation knowledge was uneven. While 63.0% correctly identified flush toilets connected to septic tanks as appropriate facilities, fewer than half recognized clean, private, gender-separated toilets (49.6%) or toilets with nearby handwashing facilities (49.3%). Only 40.2% correctly identified ventilated improved pit (VIP) latrines, while 59.8% did not. Alarmingly, 8.4% incorrectly considered open defecation areas appropriate, though the majority (91.6%) correctly rejected them. These findings highlight significant gaps in understanding of appropriate sanitation facilities, particularly regarding gender separation and the integration of handwashing stations.

Students demonstrated stronger knowledge of the benefits of WASH. Nearly two-thirds (65.1%) correctly identified prevention of water- and sanitation-related diseases as a major benefit, while 94.2% rejected the spread of infections and 95.3% rejected poor academic performance as benefits. However, 24.4% incorrectly believed increased absenteeism was a benefit, reflecting confusion about the outcomes of poor WASH practices.

Knowledge of diseases linked to poor WASH was moderate. Cholera (61.7%) and diarrhoea (55.9%) were correctly identified, while typhoid was less frequently recognized (42.0%). Encouragingly, most respondents correctly rejected unrelated outcomes such as better concentration (86.4%), improved student health (94.5%), and increased school attendance

(95.8%) as diseases resulting from poor WASH, showing discernment between health outcomes and disease conditions.

Safe water handling practices were better understood. Covering water storage containers was correctly identified by 84.5%, and 57.0% recognized the use of clean cups or ladles. However, only 43.3% correctly identified treating water when necessary, while 56.7% failed to do so. Encouragingly, unsafe practices were widely rejected: 96.1% correctly disagreed with dipping hands directly into containers, and 99.2% rejected leaving containers open.

Responses to hygiene actions after coughing or sneezing were largely appropriate. A high proportion (86.9%) correctly identified washing hands with soap and water, while 91.6% rejected wiping hands on clothes, 97.1% rejected doing nothing, and 98.2% rejected shaking hands with friends. These findings suggest strong awareness of respiratory hygiene practices among students.

Finally, knowledge of the consequences of poor toilet maintenance was high. Most respondents (89.8%) correctly identified increased spread of diseases, while very few incorrectly associated poor maintenance with better learning environments (7.1%), improved hygiene (2.1%), or increased toilet use (1.0%). This indicates that students are aware of the health risks posed by inadequate sanitation infrastructure.

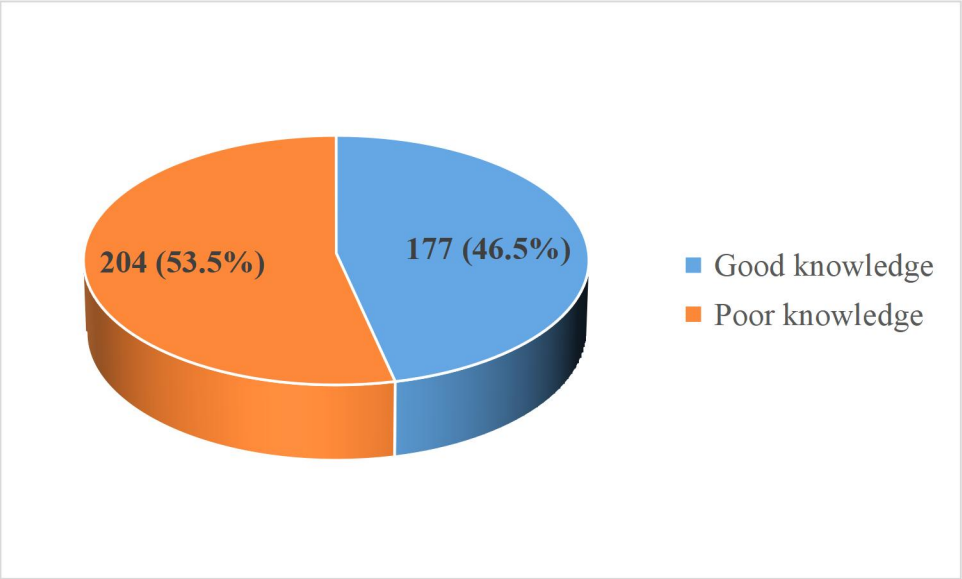

Figure 4.1: Knowledge level of WASH among respondents who had heard of WASH (n=381)

Figure 4.1 presents the distribution of knowledge levels of Water, Sanitation, and Hygiene (WASH) among respondents who had heard of the term. The chart shows that 177 students (46.5%) demonstrated good knowledge, while a slightly higher proportion, 204 students (53.5%), exhibited poor knowledge.

Table 4.5: Factors associated with knowledge of WASH among respondents(n=381)

Variable	Knowledge Freq (%)		Test Statistic	p- value
	Good	Poor	(χ^2)	
Age (years)			97.784	**<0.001**
10–13	21 (15.4)	115 (84.6)		
14–16	116 (57.7)	85 (42.3)		
≥17	40 (90.9)	4 (9.1)		
Sex			7.227	**0.007**
Female	121 (51.9)	112 (48.1)		
Male	56 (37.8)	92 (62.2)		
Class			273.449	**<0.001**
JSS	18 (8.5)	193 (91.5)		
SSS	159 (93.5)	11 (6.5)		
Ethnicity			0.037	0.847
Edo	105 (46.1)	123 (53.9)		
Non- Edo	72 (47.1)	81 (52.9)		
Religion			6.089	**0.048**
African Traditional	7 (53.8)	6 (46.2)		
Christianity	154 (48.7)	162 (51.3)		
Islam	16 (30.8)	36 (69.2)		
Residence			6.914	0.075
Both Parents	123 (51.0)	118 (49.0)		
Father	10 (45.5)	12 (54.5)		
Guardian	11 (45.8)	13 (54.2)		
Mother	33 (35.1)	61 (64.9)		
Father's education			0.568	0.904
None	2 (33.3)	4 (66.7)		
Primary	25 (44.6)	31 (55.4)		
Secondary	68 (47.6)	75 (52.4)		
Tertiary	54 (45.8)	64 (54.2)		
Mother's education			2.364	0.500
None	2 (28.6)	5 (71.4)		
Primary	35 (47.3)	39 (52.7)		
Secondary	72 (49.7)	73 (50.3)		
Tertiary	56 (42.4)	76 (57.6)		
Guardian's education			2.843	0.416
None	1 (100.0)	0 (0.0)		
Primary	0 (0.0)	2 (100.0)		
Secondary	3 (42.9)	4 (57.1)		
Tertiary	5 (41.7)	7 (58.3)		
Father's occupation (ILO skill level)			8.567	**0.036**
Skill Level 1	1 (33.3)	2 (66.7)		
Skill Level 2	102 (42.1)	140 (57.9)		
Skill Level 3	11 (44.0)	14 (56.0)		
Skill Level 4	35 (63.6)	20 (36.4)		
Mother's occupation (ILO skill level)			13.302	**0.004**
Skill Level 1	2 (66.7)	1 (33.3)		
Skill Level 2	131 (42.4)	178 (57.6)		
Skill Level 3	8 (88.9)	1 (11.1)		
Skill Level 4	24 (63.2)	14 (36.8)		
Guardian's occupation (ILO skill level)			1.198	0.549
Skill Level 2	4 (40.0)	6 (60.0)		
Skill Level 3	3 (60.0)	2 (40.0)		
Skill Level 4	2 (28.6)	5 (71.4)		

Table 4.5 shows the factors associated with knowledge of WASH among respondents. Analysis of socio-demographic variables revealed several significant associations with knowledge of WASH among respondents.

Age was strongly associated with knowledge ($\chi^2 = 97.784$, $p < 0.001$). Students aged 10–13 years had the lowest proportion of good knowledge, with only 21 (15.4%) demonstrating adequate understanding compared to 115 (84.6%) with poor knowledge. In contrast, those aged 14–16 years showed marked improvement, with 116 (57.7%) having good knowledge. The highest proportion of good knowledge was observed among students aged 17 years and above, where 40 (90.9%) demonstrated good knowledge compared to only 4 (9.1%) with poor knowledge. This pattern suggests that maturity and prolonged exposure to school health education significantly enhance WASH knowledge.

Sex also showed a significant association ($\chi^2 = 7.227$, $p = 0.007$). Female students were more likely to have good knowledge, with 121 (51.9%) compared to 112 (48.1%) with poor knowledge. Among males, only 56 (37.8%) had good knowledge, while 92 (62.2%) had poor knowledge. The finding highlights gender differences, possibly reflecting the greater involvement of females in hygiene-related activities both at home and in school.

Class level was highly significant ($\chi^2 = 273.449$, $p < 0.001$). Junior secondary students (JSS) had very low levels of good knowledge, with only 18 (8.5%) compared to 193 (91.5%) with poor knowledge. In contrast, senior secondary students (SSS) demonstrated much higher knowledge, with 159 (93.5%) showing good knowledge and only 11 (6.5%) poor knowledge. This sharp contrast underscores the role of curriculum exposure and age progression in shaping WASH awareness.

Ethnicity was not significantly associated with knowledge ($\chi^2 = 0.037$, $p = 0.847$). Both Edo and non-Edo respondents showed similar distributions, with 46.1% and 47.1% respectively having good knowledge.

Religion showed a modest but significant association ($\chi^2 = 6.089$, $p = 0.048$). Christian respondents had nearly equal proportions of good (48.7%) and poor (51.3%) knowledge. African Traditional respondents had slightly better knowledge, with 53.8% good. However, Muslim respondents had the lowest proportion of good knowledge (30.8%), with the majority (69.2%) demonstrating poor knowledge.

Residence did not show a statistically significant association ($\chi^2 = 6.914$, $p = 0.075$), though patterns were observed. Students living with both parents had slightly higher good knowledge (51.0%) compared to those living with mothers only (35.1%), fathers only (45.5%), or guardians (45.8%).

Parental education was not significantly associated with knowledge. Fathers' education ($\chi^2 = 0.568$, $p = 0.904$) and mothers' education ($\chi^2 = 2.364$, $p = 0.500$) showed no clear trends, with good knowledge distributed fairly evenly across primary, secondary, and tertiary levels. Guardians' education also showed no significant association ($\chi^2 = 2.843$, $p = 0.416$).

Father's occupation (ILO skill level) was significantly associated with knowledge ($\chi^2 = 8.567$, $p = 0.036$). Students whose fathers were in skill level 4 (professional/technical) had the highest proportion of good knowledge (63.6%), while those in skill level 2 (semi-skilled) had lower proportions (42.1%). Skill level 1 (elementary occupations) was associated with the lowest knowledge, with only 33.3% good.

Mother's occupation (ILO skill level) also showed a significant association ($\chi^2 = 13.302$, $p = 0.004$). Students whose mothers were in skill level 3 (technical) had the highest proportion of good knowledge (88.9%), followed by skill level 4 (63.2%). Those in skill level 2 (semi- skilled) had lower proportions (42.4%), while skill level 1 (elementary) showed moderate levels (66.7%).

Guardian's occupation (ILO skill level) was not significantly associated with knowledge ($\chi^2 = 1.198$, $p = 0.549$).

Table 4.6: Predictors of Good knowledge of WASH among respondents(n=381)

Factors	B	Odds Ratio	95% Confidence Interval		p-value
			Lower Limit	Upper Limit	
Age (last birthday)	-0.050	0.951	0.702	1.288	0.746
Sex					
Female	0.575	1.777	0.728	4.338	0.207
Male*		1			
Religion					
Christainity	0.190	1.209	0.063	23.164	0.900
African Traditional	0.314	1.369	0.403	4.643	0.615
Islam*		1			
Class					
JSS	-5.320	0.005	0.001	0.017	**<0.001**
SSS*		1			
Residence					
Both Parents	0.486	1.626	0.460	5.755	0.451
Father	-0.109	0.897	0.066	12.123	0.935
Guardian	1.447	4.249	0.339	53.279	0.262
Mother		1			
Ethnicity					
Edo	0.472	1.603	0.635	4.047	0.318
Non-Edo*		1			
Father's education					
None	0.399	1.491	0.044	51.077	0.825
Primary	1.245	3.475	0.829	14.566	0.089
Secondary	0.684	1.982	0.639	6.141	0.236
Tertiary*		1			
Mother's education					
None	-1.470	0.230	0.003	17.465	0.506
Primary	0.006	1.006	0.272	3.720	0.993
Secondary	-0.550	0.577	0.189	1.761	0.334
Tertiary*		1			
Father's occupation (ILO skill level)					
Skill Level 1	-1.525	0.218	0.064	0.735	**0.014**
Skill Level 2	-1.436	0.238	0.034	1.662	0.148
Skill Level 3	-2.611	0.073	0.000	11.535	0.311
Skill Level 4*		1			
Mother's occupation (ILO skill level)					
Skill Level 1	0.119	1.127	0.255	4.985	0.875
Skill Level 2	18.350	1.771	0.000	0.215	0.999
Skill Level 3	17.949	1.567	0.000	1.352	0.999
Skill Level 4*		1			
Guardian ILO					
Skill Level 2	-0.293	0.746	0.041	13.474	0.617
Skill Level 3	1.126	3.082	0.209	45.524	0.413
Skill Level 4*		1			
Guardian Level of Education					
None	19.983	477213187.9	0.000	-	>0.999
Primary	-19.207	0.000	0.000	-	0.999
Secondary	0.140	1.151	0.094	14.122	0.913
Tertiary*		1			

*Reference category; R^2 = 57.5-76.8

Table 4.6 shows the predictors of good knowledge of WASH among respondents.The Multivariate analysis was conducted to identify independent predictors of good knowledge of WASH among respondents. Several socio- demographic and parental factors were examined, with results expressed in terms of regression coefficients (β), odds ratios (OR), confidence intervals (CI), and p- values.

Age was not a significant predictor (β = –0.050, OR = 0.951, 95% CI = 0.702–1.288, p = 0.746). This indicates that after adjusting for other factors, age did not independently influence the likelihood of having good WASH knowledge, even though bivariate analysis had shown strong associations.

Sex also did not emerge as a significant predictor. Female respondents had higher odds of good knowledge compared to males (OR = 1.777, 95% CI = 0.728–4.338), but this was not statistically significant (p = 0.207). This suggests that gender differences observed in earlier analyses may be explained by other confounding factors.

Religion showed no significant predictive effect. Christianity (OR = 1.209, p = 0.900) and African Traditional Religion (OR = 1.369, p = 0.615) did not differ significantly from Islam, which was used as the reference category. This implies that religious affiliation did not independently predict WASH knowledge.

Class level was the strongest predictor. Junior secondary students (JSS) were significantly less likely to have good knowledge compared to senior secondary students (SSS) (β = –5.320, OR = 0.005, 95% CI = 0.001–0.017, p < 0.001). This finding confirms that class level, reflecting both age and curriculum exposure, is a critical determinant of WASH knowledge.

Ethnicity was not a significant predictor (OR = 1.603, 95% CI = 0.635–4.047, p = 0.318). This suggests that cultural background did not independently influence knowledge levels once other factors were controlled.

Father's education did not significantly predict knowledge. Although respondents whose fathers had primary education showed higher odds (OR = 3.475, p = 0.089), this was not statistically significant. Similarly, secondary education (OR = 1.982, p = 0.236) and no education (OR = 1.491, p = 0.825) were not significant compared to tertiary education.

Mother's education also showed no significant predictive effect. None of the categories (none, primary, or secondary) differed significantly from tertiary education, with p-values ranging from 0.334 to 0.993.

Father's occupation (ILO skill level) was a significant predictor. Respondents whose fathers were in skill level 1 (elementary occupations) had significantly lower odds of good knowledge compared to those in skill level 4 (professional/technical) (β = –1.525, OR = 0.218, 95% CI = 0.064–0.735, p = 0.014). Skill level 2 (semi-skilled) and skill level 3 (technical) also showed reduced odds (OR = 0.238 and OR = 0.073 respectively), but these were not statistically significant. This finding highlights the role of socio-economic status, with children of fathers in higher skill levels more likely to have good WASH knowledge.

Mother's occupation (ILO skill level) did not significantly predict knowledge. Although skill levels 2 and 3 showed elevated odds ratios (OR = 1.771 and OR = 1.567 respectively), the confidence intervals were extremely wide and p-values were non-significant (p = 0.999). This suggests that maternal occupation did not independently influence WASH knowledge in this sample.

SECTION C:

ATTITUDE TOWARDS WASH PRACTICES IN SCHOOLS

Table 4.7: Attitudinal responses of respondents towards WASH practices in schools

Variables	Attitudinal responses				
	SA (n=530) Freq(%)	A (n=530) Freq(%)	N (n=530) Freq(%)	D (n=530) Freq(%)	SD (n=530) Freq(%)
Clean and safe water is essential for maintaining good health	151 (28.5)	97 (18.3)	30 (5.7)	53 (10.0)	199 (37.5)
Drinking water in school should come only from safe and approved sources	121 (22.8)	140 (26.4)	28 (5.3)	111 (20.9)	130 (24.5)
Sharing drinking cups or bottles with classmates is safe	86 (16.2)	108 (20.4)	165 (31.1)	119 (22.5)	52 (9.8)
Proper handwashing in school is essential to prevent diseases	131 (24.7)	152 (28.7)	21 (4.0)	109 (20.6)	117 (22.1)
Open defecation is acceptable if school toilets are dirty	96 (18.1)	104 (19.6)	92 (17.4)	189 (35.7)	49 (9.2)
Clean, private, gender- separated toilets are important for students' dignity	189 (35.7)	38 (7.2)	82 (15.5)	49 (9.2)	172 (32.5)
Poor sanitation in schools does not affect students' health	159 (30.0)	79 (14.9)	73 (13.8)	176 (33.2)	43 (8.1)
Using soap and water to wash hands regularly in school is a waste of time	166 (31.3)	84 (15.8)	57 (10.8)	179 (33.8)	44 (8.3)
Good personal hygiene improves students' comfort and confidence in school	170 (32.1)	34 (6.4)	54 (10.2)	123 (23.2)	149 (28.1)
Using open bushes instead of toilets is harmful to students' health	176 (33.2)	75 (14.2)	80 (15.1)	96 (18.1)	103 (19.4)
Maintaining WASH facilities is only the responsibility of school cleaners	31 (5.8)	98 (18.5)	186 (35.1)	143 (27.0)	72 (13.6)
Students have a role to play in keeping school WASH facilities clean	145 (27.4)	92 (17.4)	117 (22.1)	69 (13.0)	107 (20.2)
Cultural beliefs can make it difficult for students to practice good hygiene	209 (39.4)	129 (24.3)	63 (11.9)	72 (13.6)	57 (10.8)
I am willing to support school programs that promote good WASH practices	179 (33.8)	52 (9.8)	57 (10.8)	120 (22.6)	122 (23.0)

*SA=Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Table 4.7 represents attitudinal responses of respondents to WASH practices in schools. Respondents' attitudes towards WASH practices revealed a mixture of positive perceptions, misconceptions, and areas of neutrality.

On the importance of clean and safe water, 28.5% strongly agreed and 18.3% agreed, together accounting for nearly half of the respondents (46.8%). However, a large proportion either disagreed (10.0%) or strongly disagreed (37.5%), while 5.7% remained neutral. This indicates that although many students recognize the health benefits of safe water, a significant number still undervalue its importance.

When asked whether drinking water in schools should come only from safe and approved sources, 22.8% strongly agreed and 26.4% agreed, while 20.9% disagreed and 24.5% strongly disagreed. This shows that attitudes were divided, with nearly half supporting safe sources but a substantial proportion expressing inappropriate views.

On the issue of sharing drinking cups or bottles, 31.1% were neutral, while 22.5% disagreed and 9.8% strongly disagreed. However, 16.2% strongly agreed and 20.4% agreed that sharing was safe. This suggests that many students remain uncertain or hold risky attitudes toward practices that can spread infections.

Handwashing was generally valued. About 24.7% strongly agreed and 28.7% agreed that proper handwashing in school is essential to prevent diseases, while 20.6% disagreed and 22.1% strongly disagreed. Although more than half expressed positive attitudes, a sizeable minority did not, highlighting gaps in conviction about hygiene practices.

Attitudes towards open defecation were concerning. While 35.7% disagreed and 9.2% strongly disagreed that it was acceptable when toilets were dirty, 18.1% strongly agreed and 19.6%

agreed, with 17.4% neutral. This indicates that tolerance for open defecation persists among a notable proportion of students, reflecting infrastructural challenges and cultural normalization.

Regarding sanitation facilities, 35.7% strongly agreed that clean, private, gender-separated toilets are important for dignity, but 32.5% strongly disagreed, and 9.2% disagreed. This polarization suggests that while many students value privacy and dignity, others may be accustomed to inadequate facilities and therefore undervalue them.

On whether poor sanitation affects health, 30.0% strongly agreed and 14.9% agreed that it does not, while 33.2% disagreed and 8.1% strongly disagreed. This reveals confusion, with many students failing to connect poor sanitation with adverse health outcomes.

Attitudes towards regular handwashing with soap were also mixed. While 31.3% strongly agreed and 15.8% agreed that it is a waste of time, 33.8% disagreed and 8.3% strongly disagreed. This shows that although many students recognize its importance, a significant proportion trivialize the practice.

Personal hygiene was more positively perceived. About 32.1% strongly agreed and 6.4% agreed that good hygiene improves comfort and confidence, while 23.2% disagreed and 28.1% strongly disagreed. This suggests that while many students value hygiene, others may not see its relevance to self-esteem and well-being.

On the harmfulness of using bushes instead of toilets, 33.2% strongly agreed and 14.2% agreed, while 18.1% disagreed and 19.4% strongly disagreed. This again reflects divided attitudes, with many recognizing the health risks but others remaining indifferent or tolerant.

Regarding responsibility for maintaining WASH facilities, 27.0% disagreed and 13.6% strongly disagreed that it is only the duty of cleaners, while 5.8% strongly agreed and 18.5% agreed. A large proportion (35.1%) remained neutral, suggesting uncertainty about shared responsibility.

On students' role in keeping facilities clean, 27.4% strongly agreed and 17.4% agreed, while 13.0% disagreed and 20.2% strongly disagreed. This indicates that while many students accept responsibility, others reject it, possibly due to cultural norms or lack of enforcement.

Cultural beliefs were widely acknowledged as barriers, with 39.4% strongly agreeing and 24.3% agreeing, while 13.6% disagreed and 10.8% strongly disagreed. This highlights the influence of socio- cultural factors on hygiene practices.

Finally, willingness to support school programs promoting WASH was mixed. About 33.8% strongly agreed and 9.8% agreed, while 22.6% disagreed and 23.0% strongly disagreed. This suggests that while many students are supportive, nearly half are indifferent or resistant, which may hinder program implementation.

Table 4.8: Appropriateness of attitudinal responses on WASH practices in schools

Variables	Attitudinal responses	
	Appropriate (n=530) Freq(%)	Inappropriate (n=530) Freq(%)
Clean and safe water is essential for maintaining good health	248 (46.8)	282 (53.2)
Drinking water in school should come only from safe and approved sources	261 (49.2)	269 (50.8)
Sharing drinking cups or bottles with classmates is safe	171 (32.3)	359 (67.7)
Proper handwashing in school is essential to prevent diseases	283 (53.4)	247 (46.6)
Open defecation is acceptable if school toilets are dirty	238 (44.9)	292 (55.1)
Clean, private, gender- separated toilets are important for students' dignity	227 (42.8)	303 (57.2)
Poor sanitation in schools does not affect students' health	219 (41.3)	311 (58.7)
Using soap and water to wash hands regularly in school is a waste of time	223 (42.1)	307 (57.9)
Good personal hygiene improves students' comfort and confidence in school	204 (38.5)	326 (61.5)
Using open bushes instead of toilets is harmful to students' health	251 (47.4)	279 (52.6)
Maintaining WASH facilities is only the responsibility of school cleaners	215 (40.6)	315 (59.4)
Students have a role to play in keeping school WASH facilities clean	237 (44.7)	293 (55.3)
Cultural beliefs can make it difficult for students to practice good hygiene	338 (63.8)	192 (36.2)
I am willing to support school programs that promote good WASH practices	231 (43.6)	299 (56.4)

α = 0.921

Table 4.8 shows the appropriateness of attitudinal responses to WASH practices. The analysis of attitudinal responses revealed that many students held inappropriate views regarding WASH practices, with correct responses often falling below half of the sample.

On the importance of clean and safe water for maintaining good health, only 46.8% of respondents provided appropriate responses, while a majority (53.2%) expressed incorrect views. Similarly, when asked whether drinking water in schools should come only from safe and approved sources, less than half (49.2%) responded correctly, while 50.8% held inappropriate attitudes. This indicates that although awareness exists, conviction about safe water practices remains weak.

Risky attitudes were particularly evident in relation to sharing drinking cups or bottles. Only 32.3% correctly disagreed with this practice, while 67.7% considered it acceptable or were uncertain. This highlights a major behavioral risk that could facilitate the spread of communicable diseases among students.

Handwashing was better recognized, with 53.4% correctly affirming its importance in preventing diseases. However, 46.6% still held inappropriate views, showing that nearly half of the respondents undervalued this critical hygiene practice.

Attitudes towards open defecation were concerning. Less than half (44.9%) correctly rejected it as acceptable when toilets are dirty, while 55.1% considered it acceptable or were indifferent. This reflects infrastructural challenges and cultural tolerance of unsafe practices.

Sanitation facilities were undervalued. Only 42.8% correctly recognized the importance of clean, private, gender- separated toilets, while 57.2% did not. Similarly, 41.3% correctly acknowledged that poor sanitation affects health, while 58.7% failed to make this connection. Regular

handwashing with soap was also trivialized by many, with only 42.1% rejecting the notion that it is a waste of time, while 57.9% held inappropriate views.

Personal hygiene was undervalued by the majority. Only 38.5% correctly recognized its role in improving comfort and confidence, while 61.5% did not. Likewise, fewer than half (47.4%) correctly identified that using bushes instead of toilets is harmful, while 52.6% failed to acknowledge the risks.

Responsibility for maintaining WASH facilities was also misunderstood. Only 40.6% correctly rejected the idea that it is solely the duty of cleaners, while 59.4% held inappropriate views. Similarly, fewer than half (44.7%) correctly acknowledged that students have a role to play in keeping facilities clean, while 55.3% did not.

Cultural beliefs were widely recognized as barriers, with 63.8% correctly acknowledging their influence, while 36.2% did not. This suggests that socio- cultural norms remain a significant challenge to effective WASH practice.

Finally, willingness to support school programs promoting WASH was limited. Only 43.6% expressed appropriate willingness, while a majority (56.4%) were indifferent or resistant. This lack of support could hinder the success of WASH interventions in schools.

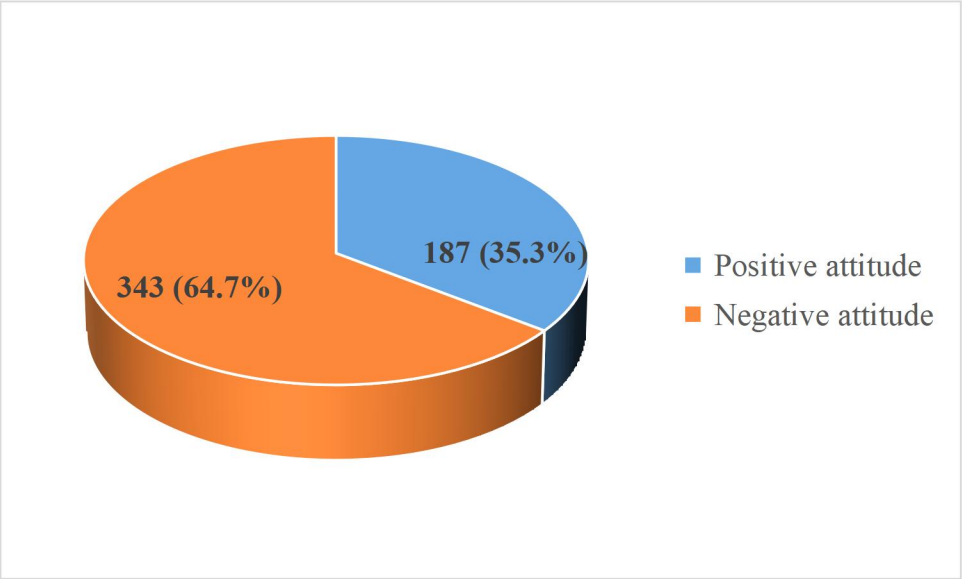

Figure 4.2: Attitudinal level towards WASH practices among respondents (n=530)

Figure 4.2 illustrates the overall distribution of respondents' attitudes towards WASH practices. The chart shows that 187 students (35.3%) demonstrated positiveattitudes,343 students (64.7%), expressed negative attitudes.

Table 4.9: Factors associated with attitude towards WASH practices in schools(n=530)

Variable	Attitude towards WASH Freq (%)		Test Statistic	p-value
	Positive	Negative	(χ^2)	
Age (years)			135.860	**<0.001**
10–13	20 (9.2)	198 (90.8)		
14–16	124 (47.5)	137 (52.5)		
≥17	43 (84.3)	8 (15.7)		
Sex			13.947	**<0.001**
Female	133 (41.6)	187 (58.4)		
Male	54 (25.7)	156 (74.3)		
Class			248.442	**<0.001**
JSS	26 (8.3)	289 (91.7)		
SSS	161 (74.9)	54 (25.1)		
Ethnicity			2.202	0.138
Edo	106 (32.8)	217 (67.2)		
Non-Edo	81 (39.1)	126 (60.9)		
Religion			11.553	**0.003**
African Traditional	10 (58.8)	7 (41.2)		
Christianity	160 (37.0)	273 (63.0)		
Islam	17 (21.3)	63 (78.8)		
Residence			3.291	0.349
Both Parents	117 (34.5)	222 (65.5)		
Father	14 (34.1)	27 (65.9)		
Guardian	13 (43.3)	17 (56.7)		
Mother	43 (35.8)	77 (64.2)		
Father's education			10.726	**0.013**
None	2 (13.3)	13 (86.7)		
Primary	23 (23.7)	74 (76.3)		
Secondary	56 (28.6)	140 (71.4)		
Tertiary	57 (40.1)	85 (59.9)		
Mother's education			11.101	**0.011**
None	4 (23.5)	13 (76.5)		
Primary	30 (22.9)	101 (77.1)		
Secondary	74 (40.0)	111 (60.0)		
Tertiary	57 (35.2)	105 (64.8)		
Guardian's education			5.692*	0.128
None	1 (100.0)	0 (0.0)		
Primary	0 (0.0)	4 (100.0)		
Secondary	6 (50.0)	6 (50.0)		
Tertiary	8 (61.5)	5 (38.5)		
Father's occupation (ILO skill level)			3.849*	0.278
Skill Level 1	1 (25.0)	3 (75.0)		
Skill Level 2	100 (28.7)	249 (71.3)		
Skill Level 3	11 (34.4)	21 (65.6)		
Skill Level 4	27 (40.3)	40 (59.7)		
Mother's occupation (ILO skill level)			17.031*	**0.001**
Skill Level 1	2 (25.0)	6 (75.0)		
Skill Level 2	133 (32.0)	283 (68.0)		
Skill Level 3	10 (90.9)	1 (9.1)		
Skill Level 4	20 (32.8)	41 (67.2)		
Guardian's occupation (ILO skill level)			1.378*	0.711
Skill Level 1	1 (100.0)	0 (0.0)		
Skill Level 2	7 (46.7)	8 (53.3)		
Skill Level 3	2 (40.0)	3 (60.0)		
Skill Level 4	5 (55.6)	4 (44.4)		
Knowledge category			130.409	**<0.001**
Poor	26 (12.7)	178 (87.3)		
Good	124 (70.1)	53 (29.9)		

*Fisher's Exact Test.

Table 4.9 shows the factors associated with attitude towards WASH practices in schools. The analysis of socio-demographic and background variables revealed several significant associations with respondents' attitudes towards WASH practices.

Age was strongly associated with attitudes ($\chi^2 = 135.860$, $p < 0.001$). Younger students aged 10–13 years had overwhelmingly negative attitudes, with only 9.2% positive compared to 90.8% negative. Among those aged 14–16 years, attitudes were more balanced, with 47.5% positive and 52.5% negative. The oldest group (≥17 years) demonstrated the most favorable attitudes, with 84.3% positive compared to only 15.7% negative. This clear gradient suggests that maturity and prolonged exposure to WASH education significantly improve attitudes.

Sex also showed a significant association ($\chi^2 = 13.947$, $p < 0.001$). Female students were more likely to have positive attitudes (41.6%) compared to males (25.7%). Conversely, negative attitudes were more prevalent among males (74.3%) than females (58.4%).This finding highlights gender differences, possibly reflecting greater involvement of females in hygiene-related activities both at home and in school.

Class level was highly significant ($\chi^2 = 248.442$, $p < 0.001$). Junior secondary students (JSS) had overwhelmingly negative attitudes, with only 8.3% positive compared to 91.7% negative. In contrast, senior secondary students (SSS) demonstrated much more favorable attitudes, with 74.9% positive and only 25.1% negative. This sharp contrast underscores the role of curriculum exposure and age progression in shaping WASH attitudes.

Ethnicity was not significantly associated with attitudes ($\chi^2 = 2.202$, $p = 0.138$). Edo respondents had 32.8% positive attitudes compared to 39.1% among non-Edo respondents, showing no meaningful difference.

Religion showed a significant association ($\chi^2 = 11.553$, $p = 0.003$). African Traditional respondents had the highest proportion of positive attitudes (58.8%), followed by Christians (37.0%). Muslim respondents had the lowest proportion of positive attitudes (21.3%), with the majority (78.8%) expressing negative attitudes. This suggests that religious affiliation may influence perceptions of hygiene and sanitation practices.

Residence was not significantly associated with attitudes ($\chi^2 = 3.291$, $p = 0.349$). Students living with guardians had the highest proportion of positive attitudes (48.5%), while those living with both parents (34.5%), mothers only (35.8%), or fathers only (28.9%) showed lower proportions.

Father's education was significantly associated with attitudes ($\chi^2 = 10.726$, $p = 0.013$). Positive attitudes increased with higher educational attainment: only 13.3% of students whose fathers had no education expressed positive attitudes, compared to 23.7% for primary, 28.6% for secondary, and 40.1% for tertiary education. This suggests that paternal education plays an important role in shaping children's attitudes towards WASH.

Mother's education also showed a significant association ($\chi^2 = 11.101$, $p = 0.011$). Positive attitudes were lowest among students whose mothers had primary education (22.9%) and highest among those with secondary education (40.0%). Tertiary education was associated with 35.2% positive attitudes, while mothers with no education had 23.5% positive attitudes. This indicates that maternal education also influences WASH attitudes, though the pattern is less consistent than for fathers.

Guardian's education was not significantly associated with attitudes ($\chi^2 = 5.692$, $p = 0.128$).

Father's occupation (ILO skill level) was not significantly associated with attitudes ($\chi^2 = 3.849$, $p = 0.278$). Positive attitudes ranged from 25.0% among skill level 1 (elementary occupations) to

40.3% among skill level 4 (professional/technical), but differences were not statistically significant.

Mother's occupation (ILO skill level) was significantly associated with attitudes ($\chi^2 = 17.031$, $p = 0.001$). Students whose mothers were in skill level 3 (technical) had the highest proportion of positive attitudes (90.9%), while those in skill level 1 (elementary) had the lowest (25.0%). Skill levels 2 and 4 showed moderate proportions (32.0% and 32.8% respectively). This suggests that maternal occupation, particularly technical roles, strongly influences children's attitudes towards WASH.

Guardian's occupation (ILO skill level) was not significantly associated with attitudes ($\chi^2 = 1.378$, $p = 0.711$).

Finally, knowledge category was strongly associated with attitudes ($\chi^2 = 130.409$, $p < 0.001$). Among students with poor knowledge, only 12.7% had positive attitudes, while 87.3% had negative attitudes. In contrast, among those with good knowledge, 70.1% had positive attitudes compared to 29.9% negative. This finding confirms that knowledge and attitudes are closely linked, with better knowledge strongly predicting more favorable attitudes.

Table 4.10: Predictors of positive attitude towards WASH practices in schools

Factors	β	Odds Ratio	95% Confidence Interval		p-value
			Lower Limit	Upper Limit	
Age (last birthday)	0.145	1.156	0.883	1.513	0.291
Sex					
Female	0.944	2.572	1.107	5.976	**0.028**
Male*		1			
Religion					
Christianity	2.808	16.578	1.582	173.703	**0.019**
African Traditional	1.182	3.260	0.945	11.248	0.061
Islam*		1			
Residence					
Both Parents	-0.058	0.944	0.611	1.458	0.794
Father	-0.315	0.730	0.330	1.614	0.436
Guardian	0.522	1.685	0.774	3.669	0.189
Mother		1			
Class					
JSS	-3.227	0.040	0.010	0.159	**<0.001**
SSS*		1			
Ethnicity					
Edo	0.828	2.288	1.029	5.087	**0.042**
Non-Edo*		1			
Father's education					
None	-0.175	0.839	0.035	20.364	0.914
Primary	-0.354	0.702	0.189	2.599	0.596
Secondary	-1.307	0.271	0.098	0.748	**0.012**
Tertiary*		1			
Mother's education					
None	-1.099	0.333	0.012	9.432	0.519
Primary	-1.257	0.285	0.077	1.052	0.060
Secondary	-0.074	0.929	0.345	2.500	0.884
Tertiary*		1			
Guardian's education					
None	20.193	588355551.813	.000	.	>0.999
Primary	-22.213	.000	.000	.	0.999
Secondary	-.838	.433	.058	3.204	0.412
Tertiary		1			
Father's occupation (ILO skill level)					
Skill Level 1	1.674	5.332	0.137	207.517	0.370
Skill Level 2	0.922	2.515	0.815	7.757	0.109
Skill Level 3	0.816	2.262	0.365	14.027	0.381
Skill Level 4*		1			
Mother's occupation (ILO skill level)					
Skill Level 1	-0.644	0.525	0.018	15.200	0.708
Skill Level 2	-0.191	0.826	0.244	2.795	0.759
Skill Level 3	19.948	460535232.691	0.000		0.999
Skill Level 4		1			
Guardian's occupation (ILO skill level)					
Skill Level 1	21.308	1794232184.517	0.000	.	>0.999
Skill Level 2	0.277	1.320	0.152	11.442	0.801
Skill Level 3	-0.986	0.373	0.036	3.850	0.408
Skill Level 4		1			
Knowledge category					
Poor	-0.776	0.460	0.136	1.562	0.213
Good*		1			

*Reference category; R^2 = 48.3-66.5

Table 4.10 shows the predictors of positive attitudes towards WASH. The logistic regression analysis was conducted to identify independent predictors of positive attitudes towards WASH practices among respondents. Several socio- demographic and parental factors were examined, with results expressed in terms of regression coefficients (β), odds ratios (OR), confidence intervals (CI), and p- values.

Age was not a significant predictor (β = 0.145, OR = 1.156, 95% CI = 0.883–1.513, p = 0.291). Although bivariate analysis had shown strong associations, age did not independently influence attitudes once other factors were controlled.

Sex emerged as a significant predictor. Female respondents were more than twice as likely as males to have positive attitudes (β = 0.944, OR = 2.572, 95% CI = 1.107–5.976, p = 0.028). This confirms that gender differences persist even after adjusting for confounders, with females consistently demonstrating more favorable attitudes towards hygiene and sanitation.

Religion was also significant. Christian respondents were far more likely to have positive attitudes compared to Muslims (β = 2.808, OR = 16.578, 95% CI = 1.582–173.703, p = 0.019). African Traditional respondents also showed higher odds (OR = 3.260), though this was not statistically significant (p = 0.061). This suggests that religious affiliation may shape perceptions of hygiene practices, with Christianity showing the strongest positive influence.

Class level was a highly significant predictor. Junior secondary students (JSS) were far less likely to have positive attitudes compared to senior secondary students (SSS) (β = –3.227, OR = 0.040, 95% CI = 0.010–0.159, p < 0.001). This confirms that curriculum exposure and age progression are critical determinants of WASH attitudes.

Ethnicity showed a modest but significant effect. Edo respondents were more than twice as likely to have positive attitudes compared to non-Edo respondents (β = 0.828, OR = 2.288, 95% CI = 1.029–5.087, p = 0.042). This suggests that cultural background may influence attitudes, though the effect size was moderate.

Father's education was significant in one category. Respondents whose fathers had secondary education were less likely to have positive attitudes compared to those with tertiary education (β = –1.307, OR = 0.271, 95% CI = 0.098–0.748, p = 0.012). Other categories (none, primary) were not significant. This indicates that higher paternal education is associated with more favorable attitudes.

Mother's education did not show significant predictive effects overall, though primary education approached significance (β = –1.257, OR = 0.285, p = 0.060). This suggests that maternal education may play a role, but its independent effect was weaker than paternal education.

Father's occupation (ILO skill level) did not significantly predict attitudes. Although skill levels 1–3 showed higher odds compared to skill level 4, none reached statistical significance (p > 0.1).

Mother's occupation (ILO skill level) also did not significantly predict attitudes. Skill level 3 showed an extremely high odds ratio due to statistical instability (OR = 460,535,232.691, p = 0.999), but this result is not interpretable. Other categories were non-significant.

Knowledge category was not a significant predictor in the regression model (β = –0.776, OR = 0.460, 95% CI = 0.136–1.562, p = 0.213). Although bivariate analysis showed strong associations, knowledge did not independently predict attitudes once other variables were controlled, suggesting that the relationship between knowledge and attitudes may be mediated by other socio-demographic factors.

SECTION D:

PREVALENCE OF WASH PRACTICE AMONG RESPONDENTS

Table 4.11: Prevalence of WASH Practice among respondents

Domain	Yes n (%)	No n (%)
Water related practices		
Is there a source of drinking water in your school?	349 (65.8)	181 (34.2)
Main source of drinking water in school (n = 349)		
Borehole	190 (54.4)	159 (45.6)
Sachet	86 (24.6)	263 (75.4)
Pipe-borne water	43 (12.3)	306 (87.7)
Bottled water	16 (4.6)	333 (95.4)
Protected well	6 (1.7)	343 (98.3)
Rainwater	6 (1.7)	343 (98.3)
River	2 (0.6)	347 (99.4)
Do you drink water provided by the school?	79 (14.9)	451 (85.1)
Do you use a personal cup for drinking water?	117 (22.1)	215 (40.6)
If No, what do you use? (n = 215)		
Buy sachet water	174 (80.9)	41 (19.1)
Drink directly from tap	25 (11.6)	190 (88.4)
Shared cup	8 (3.7)	207 (96.3)
Borrow bottle from friend	7 (3.3)	208 (96.7)
Disposable cup	1 (0.5)	214 (99.5)
Do you feel safe drinking water at school?	201 (37.9)	329 (62.1)
Sanitation practices		
Is there a toilet facility available in your school?	299 (56.4)	231 (43.6)
Type of toilet facility (n = 299)		
Flush toilet	299 (100.0)	0 (0.0)
Do you use the school toilet whenever you need to?	120 (40.1)	179 (59.9)
Are school toilets separated for boys and girls?	138 (46.2)	161 (53.8)
Are handwashing facilities located near school toilets?	171 (57.2)	128 (42.8)
Hygiene practices		
Do you wash your hands with soap after using the toilet at school?	294 (55.5)	236 (44.5)
Do you wash your hands before eating in school?	290 (54.7)	240 (45.3)
Have you received education on WASH practices in school?	319 (60.2)	211 (39.8)
Do school authorities encourage good WASH practices?	397 (74.9)	133 (25.1)
Overall, would you say you practice good WASH behaviours in school?	319 (60.2)	211 (39.8)

Table 4.11 shows the prevalence of WASH practices among respondents. The assessment of WASH practices in schools revealed important insights into the availability of facilities and the behaviors of students.

Water-related practices showed mixed results. About two-thirds of respondents (65.8%) reported that their schools had a source of drinking water, while 34.2% indicated otherwise. Among schools with water sources, boreholes were the most common (54.4%), followed by sachet water (24.6%), pipe-borne water (12.3%), bottled water (4.6%), protected wells (1.7%), rainwater (1.7%), and rivers (0.6%). Despite this availability, only 14.9% of students reported drinking water provided by the school, while the vast majority (85.1%) did not.

Personal water handling practices were concerning. Only 22.1% of students reported using a personal cup, while 40.6% did not. Among those without personal cups, the majority (80.9%) bought sachet water, 11.6% drank directly from taps, 3.7% used shared cups, 3.3% borrowed bottles from friends, and 0.5% used disposable cups. These practices highlight risks of contamination and disease transmission. Furthermore, only 37.9% of students felt safe drinking water at school, while 62.1% did not, underscoring widespread concerns about water safety.

Sanitation practices were also inadequate. Just over half (56.4%) reported the availability of toilet facilities in their schools, while 43.6% had none. Where toilets were available, all were flush toilets (100%). However, usage was low, with only 40.1% of students reporting that they used school toilets whenever needed, while 59.9% did not. Gender separation was limited, with only 46.2% reporting toilets separated for boys and girls, while 53.8% did not. Handwashing facilities near toilets were present in 57.2% of schools but absent in 42.8%, reflecting gaps in integrated sanitation infrastructure.

Hygiene practices showed moderate adherence. Just over half of respondents reported washing hands with soap after toilet use (55.5%) and before eating (54.7%), while large proportions (44.5% and 45.3% respectively) did not. Encouragingly, 60.2% had received education on WASH practices in school, though 39.8% had not. School authorities were reported to encourage good WASH practices by 74.9% of students, while 25.1% did not perceive such encouragement. Overall, 60.2% of respondents considered themselves as practicing good WASH behaviors in school, while 39.8% did not.

Table 4.12: Practice levels of WASH among respondents (n=530)

WASH Domain	Practice Level	Frequency (n)	Percent (%)
Water related component	Unsatisfactory	182	34.3
	Satisfactory	348	65.7
Sanitation related component	Unsatisfactory	312	58.9
	Satisfactory	218	41.1
Hygiene related component	Unsatisfactory	198	37.4
	Satisfactory	332	62.6

Table 4.12 shows the level of practice of each WASH domains in schools. The assessment of practice levels across the three domains of WASH—water, sanitation, and hygiene—revealed varying degrees of adequacy among respondents.

Water practices were relatively satisfactory. About two-thirds of respondents (65.7%) demonstrated satisfactory water practices, while 34.3% had unsatisfactory practices. This suggests that most students engage in safe water behaviors, such as using appropriate sources and handling water correctly, though a significant minority still adopt unsafe practices.

Sanitation practices were the weakest domain. A majority of respondents (58.9%) demonstrated unsatisfactory sanitation practices, while only 41.1% reported satisfactory practices. This reflects challenges such as inadequate toilet facilities, poor usage, lack of gender separation, and limited handwashing stations near toilets. The predominance of unsatisfactory sanitation practices underscores infrastructural gaps and behavioral resistance that compromise school sanitation.

Hygiene practices were moderately satisfactory. About 62.6% of respondents reported satisfactory hygiene practices, while 37.4% had unsatisfactory practices. This indicates that while many students adhere to recommended hygiene behaviors such as handwashing with soap and maintaining personal cleanliness, a substantial proportion still neglect these practices, leaving room for improvement.

Table 4.13: Overall WASH practice among respondents (n=530)

Overall WASH Practice	Frequency (n)	Percent (%)
Poor	393	74.2
Good	137	25.8

Table 4.13 shows the over-all WASH practice level in schools. The overall assessment of WASH practices among respondents revealed that the majority demonstrated poor WASH practice. Specifically, 393 students (74.2%) had poor WASH practices, while only 137 students (25.8%) reported good overall WASH practices.

Table 4.14:Factors associated with prevalence of WASH practice among respondents (n=530)

Variable	Practice Freq (%)		Test Statistic	p-value
	Good	Poor	(χ^2)	
Age (years)			8.391	**0.015**
10–13	47 (21.6)	171 (78.4)		
14–16	69 (26.4)	192 (73.6)		
≥17	21 (41.2)	30 (58.8)		
Sex			4.351	**0.037**
Female	93 (29.1)	227 (70.9)		
Male	44 (21.0)	166 (79.0)		
Class			30.707	**<0.001**
JSS	54 (17.1)	261 (82.9)		
SSS	83 (38.6)	132 (61.4)		
Ethnicity			0.257	0.612
Edo	81 (25.1)	242 (74.9)		
Non- Edo	56 (27.1)	151 (72.9)		
Religion			2.980	0.225
African Traditional	7 (41.2)	10 (58.8)		
Christianity	113 (26.1)	320 (73.9)		
Islam	17 (21.3)	63 (78.8)		
Residence			9.267	**0.026**
Both Parents	96 (28.3)	243 (71.7)		
Father	13 (31.7)	28 (68.3)		
Guardian	12 (40.0)	18 (60.0)		
Mother	19 (15.8)	101 (84.2)		
Father's education			1.732	0.630
None	4 (26.7)	11 (73.3)		
Primary	22 (22.7)	75 (77.3)		
Secondary	55 (28.1)	141 (71.9)		
Tertiary	32 (22.5)	110 (77.5)		
Mother's education			4.097	0.251
None	4 (23.5)	13 (76.5)		
Primary	36 (27.5)	95 (72.5)		
Secondary	53 (28.6)	132 (71.4)		
Tertiary	32 (19.8)	130 (80.2)		
Guardian's education			0.779*	0.855
None	0 (0.0)	1 (100.0)		
Primary	1 (25.0)	3 (75.0)		
Secondary	4 (33.3)	8 (66.7)		
Tertiary	5 (38.5)	8 (61.5)		
Father's occupation (ILO skill level)			2.683*	0.443
Skill Level 1	0 (0.0)	4 (100.0)		
Skill Level 2	83 (23.8)	266 (76.2)		
Skill Level 3	10 (31.3)	22 (68.8)		
Skill Level 4	19 (28.4)	48 (71.6)		
Mother's occupation (ILO skill level)			2.447*	0.485
Skill Level 1	1 (12.5)	7 (87.5)		
Skill Level 2	106 (25.5)	310 (74.5)		
Skill Level 3	1 (9.1)	10 (90.9)		
Skill Level 4	17 (27.9)	44 (72.1)		
Guardian's occupation (ILO skill level)			2.600*	0.457
Skill Level 1	0 (0.0)	1 (100.0)		
Skill Level 2	5 (33.3)	10 (66.7)		
Skill Level 3	3 (60.0)	2 (40.0)		
Skill Level 4	2 (22.2)	7 (77.8)		
Knowledge category			39.022	**<0.001**
Poor	25 (12.3)	179 (87.7)		
Good	71 (40.1)	106 (59.9)		
Attitude category			24.137	**<0.001**
Negative	65 (19.0)	278 (81.0)		
Positive	72 (38.5)	115 (61.5)		

*Fisher's Exact Test.

Table 4.14 shows the factors associated with the prevalence of WASH practices among respondents. The analysis of socio-demographic and background variables revealed several significant associations with respondents' WASH practice levels.

Age was significantly associated with practice ($\chi^2 = 8.391$, $p = 0.015$). Younger students aged 10–13 years had the lowest proportion of good practices (21.6%), while 78.4% demonstrated poor practices. Among those aged 14–16 years, 26.4% reported good practices, while 73.6% had poor practices. The oldest group (≥17 years) showed the highest proportion of good practices (41.2%), with only 58.8% reporting poor practices. This pattern suggests that maturity and prolonged exposure to WASH education improve practice levels.

Sex also showed a significant association ($\chi^2 = 4.351$, $p = 0.037$). Female students were more likely to demonstrate good practices (29.1%) compared to males (21.0%). Conversely, poor practices were more prevalent among males (79.0%) than females (70.9%). This highlights gender differences, possibly reflecting greater involvement of females in hygiene-related activities.

Class level was highly significant ($\chi^2 = 30.707$, $p < 0.001$). Junior secondary students (JSS) had very low levels of good practices (17.1%), while 82.9% reported poor practices. In contrast, senior secondary students (SSS) demonstrated much higher practice levels, with 38.6% reporting good practices compared to 61.4% poor practices. This underscores the role of curriculum exposure and age progression in shaping WASH behaviors.

Ethnicity was not significantly associated with practice ($\chi^2 = 0.257$, $p = 0.612$). Both Edo (25.1% good) and non-Edo (27.1% good) respondents showed similar distributions.

Religion was not significantly associated with practice ($\chi^2 = 2.980$, $p = 0.225$). African Traditional respondents had the highest proportion of good practices (41.2%), followed by Christians (26.1%), while Muslims had the lowest (21.3%). Although differences were observed, they were not statistically significant.

Residence showed a significant association ($\chi^2 = 9.267$, $p = 0.026$). Students living with guardians had the highest proportion of good practices (36.4%), followed by those living with both parents (28.3%) and fathers only (26.3%). Those living with mothers only had the lowest proportion of good practices (15.8%), with 84.2% reporting poor practices. This suggests that family structure influences WASH behaviors, with maternal-only households showing weaker practice levels.

Parental education was not significantly associated with practice. Fathers' education ($\chi^2 = 1.732$, $p = 0.630$) and mothers' education ($\chi^2 = 4.097$, $p = 0.251$) showed no clear trends, with good practices distributed fairly evenly across educational levels. Guardian's education also showed no significant association ($\chi^2 = 0.779$, $p = 0.855$).

Table 4.15: Predictors of prevalence of good WASH practices among respondents

Factors	β	Odds Ratio	95% Confidence Interval		p- value
			Lower Limit	Upper Limit	
Age (last birthday)	-0.041	0.960	0.756	1.219	0.738
Sex					
Female	-0.055	0.947	0.470	1.907	0.878
Male*		1			
Religion					
African Traditional	0.888	2.430	0.367	16.070	0.357
Christianity	-0.008	0.992	0.366	2.689	0.988
Islam*		1			
Residence					
Both Parents	.742	2.100	1.219	3.619	0.008
Father	.641	1.898	.793	4.544	0.150
Guardian	1.111	3.038	1.283	7.194	0.012
Mother		1			
Class					
JSS	-0.273	0.761	0.224	2.584	0.661
SSS*		1			
Ethnicity					
Edo	-0.574	0.563	0.287	1.105	0.095
Non-Edo		1			
Father's education					
None	-1.215	0.297	0.022	4.053	0.362
Primary	-1.474	0.229	0.057	0.917	**0.037**
Secondary	0.273	1.315	0.573	3.017	0.519
Tertiary		1			
Mother's education					
None	2.158	8.657	0.718	104.325	0.089
Primary	0.589	1.803	0.593	5.485	0.299
Secondary	-0.026	0.974	0.416	2.282	0.952
Tertiary		1			
Guardian's education					
None	-20.842	0.000	0.000	.	>0.999
Primary	-0.738	0.478	0.026	8.851	0.620
Secondary	-0.064	0.938	0.137	6.403	0.948
Tertiary		1			
Father's occupation (ILO skill level)					
Skill Level 1	0.404	1.498	0.620	3.617	0.369
Skill Level 2	1.049	2.854	0.805	10.123	0.105
Skill Level 3	-19.830	0.000	0.000		0.999
Skill Level 4		1			
Mother's occupation (ILO skill level)					
Skill Level 1	-0.283	0.753	0.283	2.002	0.570
Skill Level 2	-1.800	0.165	0.014	1.886	0.147
Skill Level 3	-20.927	0.000	0.000		0.999
Skill Level 4		1			
Guardian's occupation (ILO skill level)					
Skill Level 1	-19.907	1.000	0.000	0.000	>0.999
Skill Level 2	0.871	0.425	2.389	0.281	0.425
Skill Level 3	1.650	0.177	5.207	0.476	0.177
Skill Level 4		1			
Knowledge category					
Good		1			
Poor	-1.897	0.150	0.050	0.447	**0.001**
Attitude category					
Negative	-0.792	0.453	0.212	0.967	**0.041**
Positive		1			

*Reference category; R^2 =22.8-34.5

Table 4.15 shows the predictors on the prevalence of good WASH practices. The logistic regression analysis was conducted to identify independent predictors of good WASH practices among respondents. Several socio-demographic, parental, and attitudinal factors were examined, with results expressed in terms of regression coefficients (β), odds ratios (OR), confidence intervals (CI), and p-values.

Age was not a significant predictor (β = –0.041, OR = 0.960, 95% CI = 0.756–1.219, p = 0.738). Although younger students had poorer practices in bivariate analysis, age did not independently influence practice once other factors were controlled.

Sex was also not significant (β = –0.055, OR = 0.947, 95% CI = 0.470–1.907, p = 0.878). Female respondents were slightly less likely than males to report good practices, but the difference was not statistically meaningful after adjustment.

Religion did not significantly predict practice. African Traditional respondents had higher odds (OR = 2.430, p = 0.357), while Christians had nearly equal odds compared to Muslims (OR = 0.992, p = 0.988). None of these associations reached statistical significance.

Class level was not significant in the regression model (β = –0.273, OR = 0.761, p = 0.661). Although bivariate analysis showed strong associations, class level did not independently predict practice once confounders were controlled.

Ethnicity approached significance (β = –0.574, OR = 0.563, 95% CI = 0.287–1.105, p = 0.095). Edo respondents were less likely to report good practices compared to non-Edo respondents, but the effect was marginal.

Father's education showed one significant effect. Respondents whose fathers had primary education were less likely to report good practices compared to those with tertiary education (β =

–1.474, OR = 0.229, 95% CI = 0.057–0.917, p = 0.037). Other categories (none, secondary) were not significant. This suggests that paternal education at the primary level may be insufficient to positively influence WASH practices.

Mother's education did not significantly predict practice, though maternal lack of education approached significance (β = 2.158, OR = 8.657, p = 0.089). Other categories (primary, secondary) were non- significant.

Father's occupation (ILO skill level) was not significant. Although skill level 2 showed higher odds (OR = 2.854, p = 0.105), none of the occupational categories reached statistical significance.

Mother's occupation (ILO skill level) was also not significant. Skill levels 1–3 showed varying odds ratios, but none were statistically meaningful (p > 0.1).

Knowledge category was a strong and significant predictor. Respondents with poor knowledge were far less likely to report good practices compared to those with good knowledge (β = –1.897, OR = 0.150, 95% CI = 0.050–0.447, p = 0.001). This confirms that knowledge directly influences practice levels.

Attitude category was also significant. Respondents with negative attitudes were less likely to report good practices compared to those with positive attitudes (β = –0.792, OR = 0.453, 95% CI = 0.212–0.967, p = 0.041). This highlights the importance of attitudinal change in shaping WASH behaviors.

SECTION E:

OTHER FACTORS INFLUENCING THE PRACTICE OF WASH BEHAVIOURS IN SCHOOLS

Table 4.16: Other factors influencing WASH practices among respondents (n=530)

Variable	Yes n (%)	No n (%)
Factors encouraging use of school toilets		
Cleanliness	237 (44.7)	293 (55.3)
Gender separated toilets	134 (25.3)	396 (74.7)
Teacher encouragement	30 (5.7)	500 (94.3)
Privacy with lock	182 (34.3)	348 (65.7)
Factors preventing use of school toilets		
Dirty Toilet	284 (53.6)	246 (46.4)
Factors preventing regular handwashing		
Available Soap	131 (24.7)	399 (75.3)
Available water	131(24.7)	399 (75.3)

Table 4.16 shows other factors that influence WASH practices of respondents. The analysis of factors influencing WASH practices revealed both enabling and constraining conditions that shape student's behaviors.

Encouraging factors for toilet use were limited. Less than half of respondents (44.7%) reported that cleanliness encouraged them to use school toilets, while a majority (55.3%) did not. Only 25.3% identified gender separation of toilets as an encouraging factor, while 74.7% did not. Teacher encouragement was rarely reported, with just 5.7% acknowledging it compared to 94.3% who did not. Privacy, such as having locks on toilet doors, was cited by 34.3% as encouraging, while 65.7% did not consider it a factor. These findings suggest that the absence of cleanliness, privacy, and gender separation reduces students' willingness to use school toilets, while teacher involvement in promoting toilet use is minimal.

Preventing factors for toilet use were more pronounced. More than half of respondents (53.6%) reported that dirty toilets prevented them from using school facilities, while 46.4% did not. This highlights poor maintenance and cleanliness as a major barrier to effective sanitation practices.

Preventing factors for regular handwashing were also significant. Only 24.7% of respondents reported that soap and water was available, while the majority (75.3%) indicated that lack of soap and water prevented them from washing hands regularly. This underscores the importance of consistent provision of soap as a critical determinant of hygiene practices

Table 4.17: Association between Other Factors and WASH practices in schools

Variable	Practice Freq (%)		Test Statistic	p- value
	Good	Poor	(χ^2)	
Facility cleanliness			1.562	0.211
No	82 (28.0)	211 (72.0)		
Yes	55 (23.2)	182 (76.8)		
Facility privacy			8.502	**0.004**
No	76 (21.8)	272 (78.2)		
Yes	61 (33.5)	121 (66.5)		
Separated toilet			3.644	0.056
No	94 (23.7)	302 (76.3)		
Yes	43 (32.1)	91 (67.9)		
Teacher encouragement			1.399	0.237
No	132 (26.4)	368 (73.6)		
Yes	5 (16.7)	25 (83.3)		
Dirty toilet			0.770	0.380
No	68 (27.6)	178 (72.4)		
Yes	69 (24.3)	215 (75.7)		
Available soap			0.521	0.470
No	100 (25.1)	299 (74.9)		
Yes	37 (28.2)	94 (71.8)		
Available water			0.521	0.470
No	100 (25.1)	299 (74.9)		
Yes	37 (28.2)	94 (71.8)		

Table 4.17 shows the association of other factors influencing WASH and WASH practices. The analysis of facility-related variables revealed mixed associations with students' WASH practice levels.

Facility cleanliness was not significantly associated with practice ($\chi^2 = 1.562$, $p = 0.211$). Among students in schools with clean facilities, 23.2% reported good practices compared to 76.8% poor practices. In schools without clean facilities, 28.0% reported good practices and 72.0% poor practices. This suggests that cleanliness alone did not independently influence practice levels.

Facility privacy showed a significant association ($\chi^2 = 8.502$, $p = 0.004$). Students with access to private facilities (with locks) were more likely to report good practices (33.5%) compared to those without privacy (21.8%). This highlights the importance of privacy in encouraging consistent toilet use and better sanitation behaviors.

Separated toilets approached significance ($\chi^2 = 3.644$, $p = 0.056$). Students with gender-separated toilets reported higher proportions of good practices (32.1%) compared to those without separation (23.7%). Although not statistically significant, this trend suggests that gender separation may positively influence sanitation practices by improving comfort and dignity.

Teacher encouragement was not significantly associated with practice ($\chi^2 = 1.399$, $p = 0.237$). Students who reported teacher encouragement had lower proportions of good practices (16.7%) compared to those without encouragement (26.4%). This counterintuitive finding may reflect the limited role of teachers in actively promoting WASH behaviors.

Dirty toilets were not significantly associated with practice ($\chi^2 = 0.770$, $p = 0.380$). Students in schools without dirty toilets reported 27.6% good practices, while those with dirty toilets

reported 24.3%. Although cleanliness was a barrier in descriptive analysis, it did not independently predict practice levels here.

Availability of soap was not significantly associated with practice ($\chi^2 = 0.521$, $p = 0.470$). Students with soap available reported 28.2% good practices compared to 25.1% among those without soap. Similarly, availability of water showed no significant association ($\chi^2 = 0.521$, $p = 0.470$), with identical distributions (28.2% vs. 25.1%). These findings suggest that while soap and water are essential for hygiene, their mere presence did not guarantee improved practices, possibly due to inconsistent usage or behavioral barriers.

Table 4.18: Predictors of other factors influencing WASH practices among students

Factors	B	Odds Ratio	95% Confidence Interval		p-value
			Lower Limit	Upper Limit	
Available water					
Yes		1			
No	-0.153	0.858	0.539	1.367	0.520
Facility cleanliness					
Yes		1			
No	0.000	1.000	0.634	1.579	0.999
Facility privacy					
Yes		1			
No	-0.836	0.433	0.267	0.704	**0.001**
Separated toilet					
Yes		1			
No	-0.691	0.501	0.314	0.801	**0.004**
Teacher encouragement					
Yes		1			
No	0.478	1.613	0.579	4.494	0.360
Dirty toilet					
Yes		1			
No	0.309	1.362	0.896	2.070	0.149

R^2 = 3.8-5.5

Table 4.18 shows predictors of other factors influencing WASH pactices in schools. The regression analysis was conducted to determine which facility-related factors independently predicted good WASH practices among respondents.

Availability of water was not a significant predictor (β = –0.153, OR = 0.858, 95% CI = 0.539–1.367, p = 0.520). This indicates that whether water was available or not did not independently influence practice levels once other factors were controlled.

Facility cleanliness also showed no significant effect (β = 0.000, OR = 1.000, 95% CI = 0.634–1.579, p = 0.999). Although cleanliness was reported as an encouraging factor in descriptive analysis, it did not independently predict practice in the regression model.

Facility privacy emerged as a significant predictor (β = –0.836, OR = 0.433, 95% CI = 0.267–0.704, p = 0.001). Students without privacy (locks on toilet doors) were less than half as likely to demonstrate good practices compared to those with privacy. This highlights privacy as a critical determinant of sanitation behaviors, reinforcing the importance of dignity and comfort in encouraging toilet use.

Separated toilets were also significant (β = –0.691, OR = 0.501, 95% CI = 0.314–0.801, p = 0.004). Students without gender-separated toilets were about half as likely to report good practices compared to those with separated facilities. This finding underscores the importance of gender-sensitive infrastructure in promoting WASH behaviors.

Teacher encouragement was not significant (β = 0.478, OR = 1.613, 95% CI = 0.579–4.494, p = 0.360). Although teacher involvement is often considered important, it did not independently predict practice levels in this model.

Dirty toilets were also not significant (β = 0.309, OR = 1.362, 95% CI = 0.896–2.070, p = 0.149). While dirty toilets were reported as a barrier in descriptive analysis, cleanliness did not independently predict practice once other factors were controlled.

SECTION F:

OBSERVATIONAL ASSESSMENT OF WASH FACILITIES AMONG SELECTED PUBLIC SECONDARY SCHOOLS IN EGOR LOCAL GOVERNMENT AREA, BENIN CITY

Table 4.19: Population Size of Selected Schools (n=6)

Name of Schools	Number of Students
Egor Secondary school	2020
Uselu Secondary school	1145
Edo Boys Secondary School	1073
Iyoba Girls Secondary School	975
Ohonre Secondary school	511
Eweka Secondary school	360

Table 4.19 shows the population size of the six selected schools. The analysis of student enrolment across the six schools revealed significant disparities in population size, which has implications for WASH infrastructure demand and resource allocation.

Egor Secondary School had the largest student population, with 2,020 students, accounting for nearly double the enrolment of any other school. This high enrolment places considerable pressure on existing WASH facilities, particularly toilets and water supply, and underscores the need for proportionate infrastructural investment.

Uselu Secondary School followed with 1,145 students, while Edo Boys Secondary School had 1,073 students. These two schools also represent large populations, requiring robust WASH systems to meet daily sanitation and hygiene needs.

Iyoba Girls Secondary School had 975 students, a moderately large enrolment that still demands adequate facilities, especially given the gender- specific needs of female students for menstrual hygiene management (MHM).

Eweka Secondary School had a smaller population of 511 students, while Ohonre Secondary School had the lowest enrolment at 360 students. Although these schools have fewer students, their WASH indicators were among the weakest, suggesting that smaller enrolment does not necessarily translate into better facility provision or maintenance

Table 4.20 : Wash in School Indicator Score for Public Secondary Schools in Egor Local Government Area, Benin City

Wash Indicator	Iyoba Girls	Egor	Edo Boys	Uselu	Eweka	Ohonre
WATER						
Safe drinking water is provided for free in the school at all times	0	0	0	0	0	0
Water quality is tested more than once every calendar year with relevant agency	0	0	0	0	0	0
Water for cleaning is available daily in all school hours	0	1	1	1	1	0
Water is treated in the school by boiling	0	0	0	0	0	0
Water is treated in the school by filtration	0	0	0	0	0	0
Water is treated in the school by chlorination	0	0	0	0	0	0
Presence of rain catchment for water storage reservoir(s)	0	0	0	0	0	0
Presence of water tank for water storage	0	1	0	1	0	0
Presence of water reservoir for water storage	0	0	0	0	0	1
SANITATION						
1:40 toilet seat to learners' ratio in the school	1	1	1	1	0	0
Toilets are secure, private, with door, lock, lighting, adequate ventilation	0	0	0	0	0	0
Gender-segregated toilets available	0	0	0	0	0	0
Hand washing facility with soap within or near the toilets	0	0	0	0	0	0
Facility for washing in female toilets for menstrual hygiene management (MHM)	0	0	0	0	0	0
Detached toilets located within view of school building and people	0	0	0	0	0	0
Toilet accessible to persons with limited mobility	0	0	0	0	0	0
Daily cleaning of toilets, hand washing stations and other water facilities	0	0	0	0	0	0
Funding for maintenance from regular school budget	0	0	0	0	0	0
Funding for maintenance from other Governmental funds	0	0	0	0	0	0
Funding for maintenance from Non-Governmental organization bodies	0	0	0	0	0	0
No burning of waste	1	1	1	1	1	0
Segregated trash bins with cover in all classrooms, toilets, canteens, etc.	0	0	1	0	1	1
Policies in place for effective waste segregation practices	0	0	1	0	1	1
Facilities in place for effective waste segregation practices	0	1	1	1	1	1
Sanctions in place for non-compliance to waste segregation policies	0	0	1	0	1	1
Garbage is collected at least twice a week	0	0	0	0	0	0
School has compost facility for biodegradable waste	0	0	0	0	0	1
School has refuse facility for non-biodegradable waste	0	0	0	0	0	1
School has materials recovery facility (MRF) for recyclable waste	0	0	0	0	0	
Functional septic tank is available for all toilets	0	0	0	0	0	0
Functional drainage system from kitchen and wash areas	0	0	0	0	0	0
Policies to ensure no stagnant water (if in flood prone area)	0	0	0	0	0	0
Practices to ensure no stagnant water (if in flood prone area)	0	0	0	0	0	0
People in place to ensure no stagnant water (if in flood prone area)	0	0	0	0	0	0
Structures in place to ensure no stagnant water (if in flood prone area)	0	0	0	0	0	1
All food handlers have health certificate	0	0	1	0	1	0
School canteens have updated sanitary permit	0	0	0	0	0	0
HYGIENE						
Group hand washing facilities with soap	0	0	1	0	1	0
Regular supply of soap for hand washing	0	0	1	0	1	0
Individual hand-washing facilities with soap in strategic areas	0	0	1	0	1	0
Hand washing stations with soap installed near entrance gate	0	0	0	0	0	0
Physical distancing of at least 1 meter in group hand washing areas	0	0	1	0	1	0
Soap, toothbrush, toothpaste provided through Governmental funds	0	0	0	0	0	0
Sanitary pads are accessible in the school	0	0	0	0	1	0
Information on proper disposal of sanitary pads in girls toilet	0	0	0	0	1	0
FMOH approved IEC materials on menstrual hygiene management available	0	0	0	0	0	0
Rest space/changing room for MHM that is secure, private and comfortable	0	0	0	0	0	0

Table 4.20 shows the WASH in school indicator scoring. The assessment of WASH indicators across the six schools (Iyoba Girls, Egor, Edo Boys, Uselu, Eweka, and Ohonre) revealed widespread deficiencies in water, sanitation, and hygiene infrastructure, with only isolated strengths in a few schools.

Water indicators were generally poor. None of the schools provided safe drinking water for free at all times, nor did any conduct regular water quality testing with relevant agencies. Treatment of water by boiling, filtration, or chlorination was absent across all schools. Rain catchment systems were not present, and only Egor and Uselu reported having water tanks, while Ohonre had a reservoir. Daily availability of water for cleaning was reported in Egor, Edo Boys, Uselu, and Eweka, but not in Iyoba Girls or Ohonre. These findings highlight severe gaps in safe water provision and quality assurance.

Sanitation indicators showed limited compliance. All schools except Ohonre met the recommended 1:40 toilet seat to learner ratio, but none had secure, private toilets with locks, lighting, or ventilation. Gender-segregated toilets were absent across all schools, as were handwashing facilities with soap near toilets and menstrual hygiene management (MHM) facilities. Waste management practices were inconsistent: while all schools except Ohonre reported no burning of waste, only Edo Boys, Eweka, and Ohonre had segregated trash bins and policies for waste segregation. Facilities for waste segregation were present in Egor, Edo Boys, Uselu, Eweka, and Ohonre, but not in Iyoba Girls. Compost and refuse facilities were reported only in Ohonre, while structures to prevent stagnant water were also limited to Ohonre. Food safety indicators were weak, with only Edo Boys and Eweka reporting health certificates for food handlers. Overall, sanitation infrastructure was inadequate, with most schools lacking privacy, gender sensitivity, and consistent waste management systems.

Hygiene indicators were similarly deficient. Group handwashing facilities with soap were reported only in Edo Boys and Eweka, alongside regular soap supply and individual handwashing stations. These two schools also had facilities for physical distancing in group handwashing areas,. In contrast, Iyoba Girls, Egor, Uselu, and Ohonre lacked all hygiene indicators assessed. Menstrual hygiene management facilities, IEC materials, and rest spaces were absent across all schools. This highlights stark disparities, with Edo Boys and Eweka showing relative strengths while others had no functional hygiene infrastructure.

Table 21: Overall Wash Practice Percentage Scores for Schools

PRACTICE	IYOBA GIRLS	EGOR	EDO BOYS	USELU	EWEKA	OHONRE
WATER (%)	0.0	22.2	11.1	22.2	11.1	11.1
SANITATION (%)	7.1	10.7	21.4	10.7	25.0	25.0
HYGIENE (%)	0.0	0.0	40.0	0.0	60.0	0.0
TOTAL SCORE (%)	**2.4**	**10.6**	**24.2**	**10.6**	**29.8**	**12.0**

Table 4.21 shows over-all WASH practice percentage for schools. The comparative analysis of WASH practice scores across the six schools revealed marked variations in performance across the domains of water, sanitation, and hygiene.

Water practices were generally weak. Iyoba Girls reported no satisfactory water practices (0.0%), while Egor and Uselu each recorded 22.2%, and Edo Boys and Eweka both had 11.1%. Ohonre also recorded 11.1%. This indicates that access to and use of safe water sources was limited across all schools, with Iyoba Girls showing the poorest outcome.

Sanitation practices varied more widely. Edo Boys and Eweka had the highest satisfactory sanitation scores (25.0% each), while Egor and Uselu recorded 10.7% each, and Iyoba Girls had the lowest at 7.1%. Ohonre matched Edo Boys and Eweka with 25.0%, suggesting that sanitation infrastructure and usage were relatively better in Edo Boys, Eweka, and Ohonre compared to the other schools.

Hygiene practices showed stark contrasts. Eweka reported the highest satisfactory hygiene scores (60.0%), Followed by Edo boys at 40% while all other schools (Iyoba Girls, Egor, Uselu, and Ohonre) recorded 0.0%. This highlights significant disparities, with hygiene practices concentrated in only two schools.

Total scores reflected these differences. Eweka had the highest overall WASH practice scores 29.8%, followed by Edo boys at 24.2% Ohonre comes next at (12.0%), before Egor and Uselu (10.6% each), while Iyoba Girls had the lowest (2.4%). This ranking demonstrates that Edo Boys and Eweka were relatively stronger in WASH practices, Ohonre performed moderately, while Iyoba Girls lagged far behind.

Table 4.22: Categorization of Overall Wash Practice Levels among School Visited

School	Water-related practice	Sanitation-related practice	Hygiene-related practice	Overall WASH practice
Egor	Poor	Poor	Poor	Poor
Uselu	Poor	Poor	Poor	Poor
Edo Boys	Poor	Poor	Poor	Poor
Iyoba Girls	Poor	Poor	Poor	Poor
Ohonre	Poor	Poor	Poor	Poor
Eweka	Poor	Poor	Poor	Poor

The assessment of WASH practices across the six selected schools in Egor Local Government Area revealed consistently poor outcomes. Water- related practices were lowest in Iyoba Girls (0.0%) and relatively higher in Egor and Uselu (22.2% each), though still far below the threshold for good practice. Sanitation practices ranged from 7.1% in Iyoba Girls to 25.0% in both Eweka and Ohonre, while hygiene practices were particularly weak, with most schools recording 0.0% except Edo Boys (40.0%) and Eweka (60.0%). When total scores were considered, values ranged from 2.4% in Iyoba Girls to 29.8% in Eweka, yet none of the schools attained the 71% benchmark required for categorization as good practice. Consequently, all six schools—Egor, Uselu, Edo Boys, Iyoba Girls, Ohonre, and Eweka—were classified as having poor overall

WASH practice. This uniform pattern underscores widespread deficiencies in water, sanitation, and hygiene among the student populations surveyed.

CHAPTER FIVE

DISCUSSION

The sociodemographic profile of the students provides important background for understanding their WASH practices in Benin City. About half of the respondents were aged 14–16 years, while two-fifths were between 10–13 years, and the remaining one tenth were 17 years or older. The mean age of 14.05 ± 1.85 years reflects the typical age range of junior and senior secondary school students in Nigeria. This closely aligns with findings from a study in Ibadan, Nigeria which reported a mean age of 13.7 ± 2 years among secondary school students[36]. The similarity in age profiles across different Nigerian settings highlights that WASH practices are shaped by developmental stage. Younger adolescents often rely on teachers, parents, or peers to remind them about hygiene, while older students tend to take more responsibility for their own practices. This suggests that interventions targeting hygiene behavior in secondary schools should be age-sensitive, reinforcing habits in early adolescence and promoting self-responsibility in older students.

The sex distribution of the students showed that about three-fifths were females compared to two-fifths males. This female majority reflects enrolment patterns in some Nigerian secondary schools, especially in urban areas where female education has received stronger emphasis. The gender balance is important because female students face unique WASH challenges, particularly with menstrual hygiene management, which requires adequate facilities and privacy. This is similar to a study done in which reported that female students constituted the majority of respondents and emphasized the need for adequate WASH facilities to meet gender-specific hygiene needs[4].

The class distribution of the students was fairly balanced between junior and senior secondary levels, with about three- fifths in junior classes compared to two- fifths in senior classes. This balance is important because it ensures that the study captures perspectives across different stages of adolescence, as WASH practices may evolve with age, maturity, and curriculum exposure. A similar study done in India also assessed WASH practices across class levels[3]. Religion among the students was dominated by Christianity, been practiced by over four-fifths of respondents followed by Islam and African Traditional Religion which were both practiced by less than one-fourth of respondents. This reflects the religious composition of Benin City, where Christianity is the predominant faith. Religious affiliation may influence hygiene practices, as some faiths emphasize ritual cleanliness and regular washing. This is similar to a study done on Sanitation Practices Among Students in Selected Public Secondary Schools in Port Harcourt, Nigeria which also reported Christianity as the dominant religion among respondents and noted that cultural and religious values can shape sanitation and hygiene behaviors in schools[2].

Ethnic composition showed that Benin students formed the largest group which was about two-fifth of total respondents followed by Esan making up about one fifth of respondents and then Igbo, Urhobo, Yoruba which made up about one - tenth respectively, and smaller groups such as Etsako, Hausa, and Efik. This distribution reflects the University of Benin's catchment area and Edo State's ethnic diversity. The predominance of Edo ethnic groups is expected given the study location, but the presence of other groups underscores the multicultural nature of urban schools

Residential status revealed that about two- thirds of respondents lived with both parents, while about one fifth lived with their mothers, less than one-tenth lived with fathers, and guardians respectively. This pattern highlights the predominance of nuclear family structures, though a

significant minority live in single-parent or guardian households. Family structure is relevant to WASH practices, as parental supervision and support often influence hygiene behaviors

Parental education revealed about than two-fifth of fathers and mothers had secondary education, with about one-third attaining tertiary education. Only small proportions had primary or no education. Guardian education followed a similar pattern, with most having secondary or tertiary qualifications. These findings suggest that the majority of respondents come from households with at least moderate educational attainment, which is important because parental education is often linked to better health and hygiene practices.

Parental occupation (ILO skill levels) showed that about four-fifths of fathers and mothers were in skill level 2 occupations, typically semi-skilled or routine jobs. Smaller proportions were in skill levels 3 and 4, while very few were in skill level 1. Guardian occupations followed a similar distribution. This suggests that most respondents come from households with modest socioeconomic status, which may constrain access to WASH resources.

In this study, about three-quarters of respondents reported having heard of the term WASH (Water, Sanitation, and Hygiene). This relatively high level of awareness is encouraging, as it suggests that most students are at least familiar with the concept, which is critical for shaping hygiene behaviors in school environments.

Teachers were the main source of WASH awareness, making up about half of all responses. Parents were the next most common source, accounting for roughly one quarter. School health clubs also played a role, reaching about one sixth of the students. Smaller numbers mentioned mass media, digital platforms like social media, television, radio, friends, and other channels.

This pattern shows that schools and families are the strongest drivers of WASH awareness, while digital and peer networks are not yet widely used for spreading hygiene information.

Teachers were the most common source of WASH awareness, accounting for about half of all responses, followed by parents who contributed roughly one quarter. School health clubs also played a role, reaching about one sixth of the students, while smaller numbers mentioned mass media, digital platforms such as social media, television, radio, friends, and other channels. These findings are similar to a study done in Wa Municipality, Ghana, which also identified teachers and parents as the main sources of WASH knowledge, with mass media and peer networks playing secondary roles[25]. The reliance on teachers highlights the importance of integrating WASH education into school curricula, while the relatively low contribution of digital platforms points to missed opportunities for using online communication channels that are highly influential among adolescents. For public health and institutional programming, this has important implications. Schools should not only strengthen teacher- based WASH education but also develop clear, student- friendly online resources and promote them through the digital platforms students already use. In addition, peer educator programs could be introduced, training selected students to deliver short, evidence- based WASH sessions in clubs and classrooms. This would harness peer influence in a positive way, ensuring that informal networks actively support and spread correct hygiene practices.

Among students who were aware of WASH, knowledge levels varied considerably. Slightly less than half demonstrated good knowledge, while slightly more than half showed poor knowledge. This finding indicates that awareness alone does not necessarily translate into a deeper understanding of hygiene and sanitation standards. A similar pattern was observed in Ogun State, Nigeria, where secondary school students exhibited high awareness but limited depth of WASH

knowledge, particularly in hygiene practices [28]. This comparison underscores a broader challenge that while many adolescents are familiar with WASH concepts, fewer possess the detailed knowledge required to consistently practice safe hygiene and sanitation.

Knowledge of hygiene practices was uneven. While about two-thirds correctly identified handwashing after toilet use, about half correctly identified washing hands before eating, and covering the mouth when coughing, less than two-fifths acknowledged maintaining personal cleanliness through regular bathing and wearing clean clothes and over four-fifths believed that using water alone without soap was sufficient for hand hygiene. These misconceptions highlight the risk of superficial awareness translating into poor hygiene behaviors. Similar findings were reported in Ogun State, reinforcing the concern that high awareness does not equate to comprehensive knowledge[28].

Sanitation knowledge reflected notable gaps. While over four- fifths of respondents correctly rejected open defecation and about two- thirds recognized flush toilets connected to septic tanks as appropriate facilities, less than half identified gender- segregated toilets, toilets with nearby handwashing facilities, or ventilated improved pit latrines as suitable standards. This limited grasp of infrastructural requirements is consistent with findings from Cross River State, Nigeria, where students reported awareness of sanitation but struggled to correctly identify key facility standards[57].

Encouragingly, about three- fifths of respondents linked poor WASH to disease outcomes such as cholera and diarrhoea, while two- fifths associated it with typhoid. More than four- fifths recognized the benefits of good WASH practices, including improved student health, increased school attendance, and better concentration in class

The disparity between high awareness and limited depth of knowledge carries significant public health implications. Superficial knowledge may lead to poor hygiene practices, perpetuating risks of diarrhoeal disease, absenteeism, and reduced academic performance. Inadequate WASH knowledge among adolescents contributes directly to public health burdens and undermines educational outcomes [42]. To bridge this gap, schools must move beyond awareness campaigns to skills-based, scenario-driven education. Orientation programs should include small group workshops demonstrating correct handwashing, safe water handling, and menstrual hygiene management. Teachers should be trained to consistently model WASH behaviors, while peer educator programs can harness student influence to reinforce correct practices. Finally, integrating WASH standards into school policies and amplifying them through social media platforms would ensure that awareness is translated into sustained, practical knowledge

Analysis of knowledge of WASH and sociodemographic characteristics revealed that older students were more likely to have good knowledge compared to younger respondents, particularly those in the early years of secondary school. This aligns with findings from a Nigerian study among secondary school students in Ogun State, which observed that older adolescents reported higher awareness of hygiene practices than younger ones, who were still adapting to school routines and institutional norms [28]. The agreement suggests that age often reflects maturity and accumulated exposure to health education. However, in the multivariate analysis, age was not a significant predictor, indicating that once other factors were controlled for, chronological age alone did not independently influence WASH knowledge.

Sex differences were also observed. Female students were more likely to have good knowledge of WASH compared to their male counterparts, possibly reflecting cultural expectations around caregiving and attentiveness to hygiene-related messages. Social norms may also play a role, as

male students might underreport familiarity due to peer expectations. This contrasts with findings from Imo State, Nigeria, where no significant gender differences were reported[42]. In the multivariate model, sex was not statistically significant, though females had 1.78 times the odds of good knowledge compared to males. This suggests that gender differences may exist but are not consistent across contexts.

Class level emerged as the strongest predictor of WASH knowledge. Senior Secondary School students demonstrated markedly better knowledge compared to Junior Secondary School students. In the multivariate analysis, junior students had dramatically lower odds of good knowledge, underscoring the vulnerability of younger students who have had less exposure to repeated health education, school regulations, and practical experiences. This finding is consistent with earlier reports from Ogun State, where junior students showed poorer WASH practice despite moderate awareness [28]. The evidence highlights the importance of early intervention, as unsafe practices adopted at formative stages may persist into adulthood.

Religion showed some variation, with students practicing Christianity and African Traditional religion having slightly higher odds of good knowledge compared to Muslim students. However, these associations were not statistically significant, suggesting that religious affiliation alone does not independently predict WASH knowledge. Institutional exposure and socioeconomic background likely play a greater role.

Parental occupation was another important determinant. Students whose fathers were in lower skill-level occupations were significantly less likely to have good knowledge compared to those in higher skill-level occupations. Specifically, students with fathers in Skill Level 1 occupations had only 0.22 times the odds of good knowledge compared to those in Skill Level 4. This finding highlights the role of socioeconomic background, reflecting differences in access to resources,

exposure to health information, and parental emphasis on education. Mother's occupation did not show significant associations in the multivariate model, though descriptive analysis suggested that higher skill-level maternal occupations were linked with better knowledge.

Parental education showed mixed results. Father's primary education was associated with higher odds of good knowledge), though this was only marginally significant. Other levels of paternal and maternal education did not show significant associations. Ethnicity also did not significantly predict WASH knowledge, with Edo students having slightly higher compared to non-Edo peers.

Taken together, the findings suggest that class level and father's occupation are the most robust predictors of WASH knowledge. Junior students and those from households with fathers in low-skill occupations are particularly vulnerable to poor hygiene practices. If unsafe practices become normalized at these formative stages, they can translate into long-term health risks and perpetuate inequities. Furthermore, the role of socioeconomic resources implies that students from disadvantaged households may be disproportionately affected, both in access to hygiene facilities and in their ability to develop the skills required to maintain safe practices.

Addressing these gaps requires a multifaceted strategy. Schools should integrate compulsory, credit-bearing modules on WASH early in secondary education, ensuring that all students, including those in junior classes, are equipped with practical knowledge on hygiene practices. Socioeconomic disparities should be addressed by providing free access to clean water, soap, and sanitation facilities, so that students from less affluent backgrounds are not left behind. Targeted interventions for junior students, such as mandatory first- and second-year hygiene workshops, would help establish strong foundations before poor practices become ingrained. Parental engagement programs should also be strengthened to ensure that families across occupational levels reinforce hygiene practices at home.

The overall attitude score of respondents revealed that about two-thirds of the study sample demonstrated negative attitudes toward WASH, while only about one-third showed positive attitudes. This pattern indicates broad tolerance or acceptance of unsafe hygiene behaviours. A plausible explanation is social norming and peer influence, where students may personally judge poor hygiene as problematic in principle yet still tacitly accept or tolerate it in practice because of peer pressure, inadequate facilities, and perceived weak enforcement of school rules. A similar gap between knowledge and attitudes was reported among secondary school students in Nepal, India. where many rationalised unsafe practices despite awareness of risks [3].

Looking at specific items, about three-fifths of students believed that open defecation was acceptable if school toilets were dirty. This reflects a rationalisation of unsafe sanitation, where poor infrastructure leads students to justify harmful practices. A study in Port Harcourt, Nigeria, found comparable results, with students tolerating unsafe sanitation practices due to inadequate facilities and poor maintenance[2].

Attitudes toward handwashing were also concerning. Only about one-half of students agreed that proper handwashing in school is essential to prevent diseases, while nearly the same fraction did not. Even more worrying, about three-fifths of students considered regular handwashing with soap and water a waste of time. This mirrors findings from Saudi Arabia, where students showed poor attitudes toward handwashing despite moderate knowledge[22].

Ownership of WASH responsibilities was weak. About three-fifths of students believed maintaining facilities was only the responsibility of cleaners, while fewer than two-fifths agreed that students themselves had a role to play. This shows a lack of accountability and shared responsibility, which undermines sustainability of hygiene programs. A study in Cameroon

similarly reported that students often viewed WASH maintenance as the duty of staff rather than a shared responsibility, highlighting the challenge of instilling ownership[4].

Cultural beliefs also played a role, with about two-thirds of students agreeing that traditions can make it difficult to practice good hygiene. This finding resonates with evidence from Ghana, where cultural norms were shown to influence hygiene attitudes among schoolchildren, often conflicting with modern hygiene expectations[25].

The predominance of inappropriate attitudes toward WASH among secondary school students has serious implications for both school health and future community practices. When students normalise unsafe behaviours such as open defecation, neglect of handwashing, or reliance on cleaners alone, the risk is that such attitudes will persist into adulthood, perpetuating poor hygiene practices in communities. This erodes the effectiveness of public health interventions and contributes to the spread of preventable diseases such as diarrhoea and cholera. A systematic review confirmed that poor attitudes toward hygiene directly undermine the effectiveness of WASH interventions in reducing disease burden[12]. To address these gaps, schools must implement multi-pronged interventions. They should strengthen institutional enforcement by applying hygiene rules consistently and create safe and supportive channels for reporting poor practices. Equally important is tackling the root causes of negative attitudes, including inadequate facilities and lack of student involvement, through improved infrastructure, peer-led hygiene clubs, and integration of WASH education into the curriculum. Evidence from Morocco shows that embedding WASH education into school programs significantly improves attitudes and practices[34]. These approaches are more likely to shift attitudes away from tacit approval toward genuine commitment to safe practices, thereby protecting both student wellbeing and long-term public health.

Analysis of attitudes toward WASH revealed that class level was a major determinant. Senior Secondary School students were more likely to demonstrate appropriate attitudes compared to junior students. This was confirmed on multivariate analysis, showing that juniors were 20 times less likely to hold appropriate attitudes to seniors. This reflects the level of exposure students gain as they progress, since advancing through school brings stricter enforcement of hygiene rules, more structured health education, and clearer connections between sanitation and overall wellbeing. Similar findings were reported in Cameroon, where senior students displayed stronger commitment to hygiene practices than juniors[4].

Sex also emerged as a significant predictor. Female students were more likely than males to hold appropriate attitudes toward WASH, and multivariate analysis confirmed this, showing that females were more than two and a half times as likely as males to reject unsafe practices. This difference may reflect gendered socialisation, with females often more receptive to health messages and more engaged in hygiene-related responsibilities. Comparable results were observed in Saudi Arabia, where female students demonstrated better attitudes toward handwashing compared to males[22].

Religion influenced attitudes both in bivariate and multivariate analysis. Students identifying with Christianity were significantly more likely to hold appropriate attitudes compared to their Muslim peers. Regression showed that Christians were more than sixteen times as likely as Muslims to demonstrate positive attitudes toward WASH. Students practicing African Traditional religion also showed higher odds, though marginally significant. This underscores the role of religious affiliation in shaping moral and behavioural perspectives toward hygiene. A study in Tanzania similarly found that religious background influenced students' tolerance of poor hygiene practices[26].

Ethnicity was also significant. Students of Edo origin were more likely to hold appropriate attitudes compared to non-Edo peers. Multivariate analysis also confirmed this, showing that Edo students were more than twice as likely to hold positive attitudes. This suggests cultural or institutional influences specific to the region, where local norms and community expectations may reinforce hygiene values. Similar cultural variations in hygiene attitudes have been documented in Ghana, where local traditions shaped students' acceptance or rejection of sanitation practices[25].

Parental education was important, particularly fathers' education. Students whose fathers had tertiary education were more likely to hold appropriate attitudes compared to those whose fathers had only secondary education. This relationship was further validated through multivariate analysis, showing that students with fathers educated to secondary level were significantly less likely to hold positive attitudes, with their odds reduced to about one-quarter compared to those with tertiary-educated fathers. This suggests that higher parental education instills stricter values of accountability and hygiene. Evidence from Nepal supports this, linking parental education to stricter attitudes toward sanitation among adolescents [58].

Knowledge showed the strongest association on bivariate analysis as students with good knowledge of WASH were more likely to hold appropriate attitudes, while those with poor knowledge were more permissive. However, multivariate analysis did not retain knowledge as an independent predictor. This suggests that while knowledge shapes attitudes, its effect may be mediated by other sociodemographic factors such as class level and parental background. A Nigerian study confirmed this, noting that students with poor knowledge were more tolerant of unsafe practices, while those with clearer knowledge strongly disapproved of them [28].

Overall, the findings highlight that class level, sex, religion, ethnicity, and father's education are the most robust predictors of attitudes toward WASH. Junior students, male students, Muslim students, non-Edo students, and those with fathers of lower educational attainment are particularly vulnerable to permissive attitudes toward poor hygiene.

Targeted interventions should therefore focus on junior classes and male students, where tolerance of poor hygiene is highest. Faith-based and cultural programs can reinforce hygiene values in diverse student populations. Parental engagement is crucial, especially in families with lower educational attainment, to strengthen accountability values at home. Curriculum integration of WASH modules should be intensified early to reduce permissiveness before it becomes entrenched.

This study revealed that overall WASH practice among students was unsatisfactory, with nearly three-quarters reporting poor practice and only about one-quarter demonstrating satisfactory behaviours. The high level of unsatisfactory practice reflects the earlier finding that more than half of respondents had inadequate knowledge and about two-thirds demonstrated inappropriate attitudes toward WASH. Weak knowledge and permissive attitudes appear to translate directly into poor practice, reinforcing unsafe behaviours such as neglecting handwashing, avoiding toilets, and rationalising open defecation.

Similarly findings India, reported that government school students had stronger theoretical knowledge but struggled to translate this into consistent practice[30]. These findings align with the present study, where knowledge and attitudes did not consistently translate into safe behaviours.

Water-related practices were relatively better compared to other domains. Most schools had a source of drinking water, primarily boreholes, yet trust in school water systems was low. Few

students drank water provided by the school, with many preferring sachet water or drinking directly from taps. Shared cups and borrowed bottles were also common, reflecting risky behaviours. This is consistent a study in Ogun state which who observed that students on sachet water, despite concerns about its microbiological safety [10].

Sanitation practices were the weakest domain. Although more than half of schools had toilet facilities, usage was low, and many students avoided toilets even when needed. Alarmingly, open defecation was reported around school premises. This is typically linked to poor infrastructure quality, lack of privacy, inadequate maintenance, and negative student attitudes toward school toilets. When toilets are dirty, unsafe, or lack essentials like locks, lighting, or nearby handwashing stations, students often avoid them, rationalizing open defecation as a better option. Peer influence and weak enforcement of hygiene rules also reinforce these unsafe behaviors. Similar associations between poor sanitation and infrastructure availability was noted in a study conducted in imo state Nigeria[42].

Hygiene Practices

Hygiene practices were somewhat better but still inconsistent. Just over half of students reported washing hands with soap after toilet use and before eating, yet overall practice remained unsatisfactory for a large minority. This highlights the gap between encouragement and actual behaviour. Similar patterns was seen in Ghana, where handwashing was more consistent in schools with better infrastructure [25].

The comparisons show that unsatisfactory WASH practice is not unique to this study but reflects a broader pattern across African and Asian school contexts. Knowledge and attitudes often fail to translate into safe behaviours when infrastructure is weak or enforcement is inconsistent.

WASH education should be strengthened so that knowledge consistently translates into safe practice, while peer-led campaigns can reshape attitudes to make hygiene socially desirable. Infrastructure must be improved with reliable water, clean gender-separated toilets, and functional handwashing stations, and behaviours reinforced through monitoring by school authorities. Finally, parents and communities should be engaged to extend WASH practices beyond the school environment, ensuring continuity at home and in society.

Overall, about three-quarters of students demonstrated poor WASH practice, while only about one-quarter reported good practice. The strongest predictors were knowledge and attitude. Just over one-tenth of students with poor knowledge practiced WASH satisfactorily, compared to about two-fifths of those with good knowledge. Multivariate analysis confirmed this, showing that poor knowledge reduced the likelihood of good practice by almost seven times. This indicates that knowledge is a critical protective factor. Similarly a study done among adolescents in Nigerian found that those with lower knowledge were significantly more likely to neglect proper hygiene practice[36].

Attitude was also a strong predictor. Only about one-fifth of students with negative attitudes practiced WASH satisfactorily, compared to nearly two-fifths of those with positive attitudes. This was further confirmed on multivariate analysis, showing that those with negative attitudes are about two times less likely to have good practice. This shows that when students view unsafe behaviours as acceptable, they are less likely to follow hygiene rules. A study in Sokoto, Nigeria, demonstrated that students with negative attitudes were significantly less likely to engage in safe sanitation and hygiene behaviours, underscoring the role of attitude as a critical determinant of WASH practice [59].

Age was significance on bivariate analysis as about two-fifths of students aged 17 years and above practiced WASH satisfactorily, compared to about one-fifth of those aged 10–13 years but this was not significant on multivariate analysis. This suggests that maturity and exposure strengthen accountability. Comparable findings were reported in Ghana, where older students were more consistent in hygiene behaviours than younger peers [60].

Sex was significant on bivariate analysis as greater than one-fourth the number of female students practiced WASH satisfactorily, compared to about one-fifth of males but this was not significant on multivariate analysis. This reflects gender differences, where females are often more receptive to hygiene messages. A study in Sub-saharan Africa similarly found that female students demonstrated stricter handwashing practices compared to [61].

Class level although highly significant on bivariate analysis as about two-fifths of senior secondary students practiced WASH satisfactorily, compared to less than one-fifth of junior students, was not significant on multivariate analysis but indidviduals in senior secondary class had higher odds of better WASH practices than those in junior secondary schools . This highlights the role of exposure and stricter enforcement at higher levels. Similar findings were reported in Cameroon, with senior students showing stronger hygiene practices than juniors [4].

Parental education showed mixed effects. Father's primary education was significant in regression, reducing the likelihood of good practice to less than one-quarter compared to tertiary education. This highlights the role of parental background in shaping values. Similar findings were reported in Nigeria, where lower parental education was linked to weaker hygiene behaviours among students[9].

Strengthening WASH education in schools is essential to closing knowledge gaps, and this must be done through practical, everyday reinforcement rather than occasional lessons. Peer-led campaigns can make safe hygiene behaviors socially desirable, turning them into norms that students actively want to follow. Introducing WASH education early in junior classes ensures that good habits are formed before unsafe practices become routine, while targeted interventions for male students can address specific gaps in hygiene behavior.

Practical monitoring should be intensified in junior classes, with teachers and health clubs consistently checking and reinforcing hygiene practices. Families also need to be engaged in WASH programs so that the support students receive at school is mirrored at home. At the community level, sensitization efforts should reach parents with lower levels of education, ensuring that safe practices are reinforced across households. By combining classroom instruction, peer influence, family involvement, and community outreach, WASH education becomes a lived practice rather than a theoretical concept, embedding hygiene behaviors into daily routines.

This study revealed that both enabling and constraining conditions shaped how students practiced WASH.

Just over half of respondents reported the availability of toilet facilities in their schools, while nearly half had none. Where toilets were available, all were flush toilets, yet usage was low, with only about two-fifths of students reporting that they used them whenever needed. Gender separation was limited, with less than half of those that had toilets reporting toilets separated for boys and girls. These findings suggest that even when infrastructure exists, barriers such as lack of gender-sensitive design and poor maintenance reduce effective use. Similar findings were reported in Bangladesh, where a study of high school students highlighted that sanitation

facilities were often inadequate and poorly maintained, limiting consistent use and undermining hygiene practices[31].

More than half of the respondents who reported having toilets in their schools indicated that dirty facilities prevented them from using them. This highlights poor maintenance and lack of cleanliness as major barriers to effective sanitation practices. Preventing factors for regular handwashing were also significant. Only about one- quarter of respondents reported that soap was available, while three- quarters indicated that lack of soap prevented them from washing hands regularly. Together, these findings underscore how inadequate upkeep and limited provision of essential hygiene materials undermine effective WASH practices in schools, discouraging students from using available facilities and preventing regular handwashing. Such infrastructural and maintenance deficits have been shown to compound sanitation inequalities and weaken hygiene outcomes in Nigerian schools[9].Limited encouragement and widespread barriers mean that safe WASH behaviours are not yet normalized in schools. Without adequate facilities, students are forced into unsafe practices, which can spread disease, reduce attendance, and undermine learning outcomes. The lack of soap and clean toilets also signals institutional weaknesses in maintenance and resource provision, which directly affect student health and wellbeing.

This study revealed that facility-related variables showed mixed associations with students' WASH practice levels. Facility cleanliness was not significantly associated with practice. Among students in schools with clean facilities, about one-quarter reported good practices, while three-quarters reported poor practices. In schools without clean facilities, slightly more than one-quarter reported good practices. This suggests that cleanliness alone did not independently influence practice levels. Although cleanliness was reported descriptively as an encouraging

factor, multivariate analysis confirmed it was not a significant predictor. Similar findings were reported in Nigeria, where cleanliness alone did not guarantee consistent sanitation behaviours[29].

Facility privacy showed a significant association. Students with access to private facilities (locks on toilet doors) were more likely to report good practices (about one-third) compared to those without privacy (about one-fifth). Regression confirmed privacy as a strong predictor, with students lacking privacy less than half as likely to demonstrate good practices. This highlights privacy as a critical determinant of sanitation behaviours, reinforcing the importance of dignity and comfort in encouraging toilet use.

Separated toilets approached significance in descriptive analysis and emerged as a significant predictor in multivariate analysis. Students with gender-separated toilets were about one-third likely to report good practices compared to about one-quarter of those without separation. Multivariate analysis further showed that students without gender separation were about twice less likely to practice good WASH behaviours. This underscores the importance of gender-sensitive infrastructure in promoting comfort and dignity. Comparable findings were reported in Uganda, where secondary school students emphasized that the absence of gender-sensitive and private sanitation facilities discouraged use and reinforced the need for dignity-focused WASH infrastructure to improve uptake and wellbeing[33].

Teacher encouragement was not significantly associated with practice. Interestingly, students who reported teacher encouragement had lower proportions of good practices compared to those without encouragement. Multivariate analysis confirmed that teacher involvement did not independently predict practice levels. This counterintuitive finding may reflect the limited or inconsistent role of teachers in actively promoting WASH behaviours. A study done among secondary schools in Port Harcourt, Nigeria, similarly observed that infrastructure and resources

such as consistent availability of soap and water, were stronger determinants of hygiene compliance than teacher encouragement alone [62].

Dirty toilets were not significantly associated with practice. However students in schools with dirty toilets reported slightly lower proportions of good practices compared to those without dirty toilets. However, regression analysis confirmed that cleanliness did not independently predict practice once other factors were controlled. This suggests that while dirty toilets discourage use on bivariate analysis, they are not strong independent predictors of overall WASH practice.

Availability of soap and water showed no significant association with practice. Students with soap and water available reported about one-quarter good practices, similar to those without. Multivariate analysis confirmed that neither soap nor water availability independently predicted practice levels. This finding suggests that while soap and water are essential for hygiene, their mere presence does not guarantee improved practices, possibly due to inconsistent usage or behavioural barriers. A study in Nigeria similarly found that provision of WASH facilities alone was insufficient to improve hygiene outcomes without behavioural reinforcement and maintenance support [9].

These findings carry important implications. While infrastructure such as soap, water, and clean toilets is necessary, it is privacy and gender separation that most strongly predict consistent WASH practice. This highlights that dignity, comfort, and cultural sensitivity are as important as physical resources.

Strengthening WASH practice is not only about providing soap, water, and clean toilets, but about ensuring that students feel safe, respected, and comfortable when using them. Privacy features such as locks on toilet doors should be standard, giving children the confidence to use

facilities without fear of intrusion. Gender-separated toilets are equally important, as they uphold dignity and cultural expectations while encouraging consistent use. Cleanliness must be maintained, but schools should recognize that hygiene behavior depends on more than spotless facilities but it also requires reliable access to soap and water, reinforced through structured programs that build habits. Teachers play a central role here as their responsibilities should extend beyond academic instruction to include daily WASH promotion, woven into routines such as handwashing before meals or after play. By embedding dignity, privacy, and behavioral reinforcement into the school environment, WASH practices become sustainable and part of everyday learning.

The assessment of WASH facilities and practices across the six schools revealed significant disparities shaped by student enrolment size, infrastructural provision, and practice outcomes.

Enrolment disparities were notable. Egor Secondary School had the largest population (2,020 students), nearly double that of any other school, followed by Uselu (1,145) and Edo Boys (1,073). Iyoba Girls had 975 students, while Eweka (511) and Ohonre (360) had much smaller enrolments. These differences have direct implications for WASH demand: larger schools face greater pressure on toilets, water supply, and hygiene facilities, while smaller schools might theoretically manage better but often lack investment, as seen in Ohonre and Eweka.

Water indicators were weak across all schools. None provided safe drinking water consistently, nor did they conduct water quality testing. Treatment methods such as boiling or chlorination were absent. Only Egor and Uselu had water tanks, while Ohonre had a reservoir. Daily water availability was reported in Egor, Edo Boys, Uselu, and Eweka, but not in Iyoba Girls or Ohonre. This aligns with practice scores, where Egor and Uselu recorded relatively higher water practice

scores (22.2%), while Iyoba Girls had none (0.0%), reflecting the absence of reliable water provision.

Sanitation indicators showed partial compliance. Most schools met the recommended toilet-to-student ratio except Ohonre, but none had private, gender-segregated, or well-ventilated toilets. Handwashing facilities near toilets were absent, and menstrual hygiene management (MHM) facilities were missing across all schools. Waste segregation was inconsistent, with Edo Boys, Eweka, and Ohonre reporting better systems. This explains why Edo Boys, Eweka, and Ohonre achieved the highest sanitation practice scores (25.0%), while Iyoba Girls lagged at 7.1%.

Hygiene indicators revealed stark contrasts. Only Edo Boys and Eweka had group handwashing facilities with soap, regular soap supply, and individual handwashing stations. They also had provisions for physical distancing in group handwashing areas, and Eweka further supported sanitary pad distribution with disposal information in girls' toilets. In contrast, Iyoba Girls, Egor, Uselu, and Ohonre lacked all assessed hygiene indicators, including soap availability and MHM support. None of the schools provided IEC materials or rest spaces for girls. This directly mirrors the hygiene practice scores: Eweka reported the highest (60.0%), Edo Boys followed with 40.0%, while all other schools scored 0.0%.

Total WASH practice scores reflected these differences but however they were all poor in terms of individual WASH domains and over all WASH practices. Eweka had the highest overall score (29.8%), followed by Edo Boys (24.2%). Ohonre came next (12.0%), before Egor and Uselu (10.6% each), while Iyoba Girls had the lowest (2.4%). This ranking demonstrates that Eweka was the strongest in WASH practices, Edo Boys was the second strongst but below Eweka, Ohonre came next in performance, while Iyoba Girls lagged far behind.

CONCLUSION

Slightly less than half of the students demonstrated good knowledge, while more than half showed poor knowledge. Class level and father's occupation emerged as the strongest predictors of knowledge, with junior students and those from low-skill households being most vulnerable.

About two-thirds of students expressed inappropriate attitudes, while only one-third held appropriate attitudes. Class level, sex, religion, ethnicity, and father's education were significant predictors, with junior students, males, and those from less educated households showing more permissive attitudes.

Nearly three-quarters of students reported poor practice, while only one-quarter demonstrated satisfactory behaviours. Knowledge and attitude were the strongest predictors of practice, with poor knowledge reducing the likelihood of good practice by almost seven times.

Senior class level, positive attitudes, higher parental education, and stronger socioeconomic background were associated with better practices. Teacher influence and parental support were also critical drivers of awareness and behaviour.

RECOMMENDATIONS

The following recommendations were made based on the findings from this study with the hope that if implemented, they will improve WASH practices in schools thus aiding better learning environment for students.

RECOMMENDATIONS TO THE GOVERNMENT

1. Integrate WASH education into national school health policy and curriculum standards.
2. Provide funding for improved school infrastructure, including clean water supply, gender- segregated toilets, and functional handwashing stations.
3. Launch nationwide campaigns highlighting the health and educational consequences of poor WASH practices.
4. Support research and innovation in adolescent hygiene education and behaviour change strategies.

RECOMMENDATIONS TO THE MINISTRY OF EDUCATION

1. Make WASH modules compulsory at all secondary school levels, with emphasis on junior classes.
2. Train teachers to model and reinforce correct WASH behaviours.
3. Develop digital learning resources and peer- education programs to strengthen student engagement.
4. Monitor and evaluate WASH integration in schools regularly.

RECOMMENDATIONS TO THE STATE UNIVERSAL BASIC EDUCATION BOARD

1. Ensure provision and maintenance of adequate WASH facilities in all public schools.
2. Establish hygiene clubs and peer- led initiatives to promote positive attitudes.
3. Conduct periodic assessments of WASH practices to identify gaps and target interventions.
4. Provide free or subsidized hygiene materials (soap, sanitary pads) to disadvantaged students.

RECOMMENDATIONS TO SCHOOL HEADS

1. Enforce hygiene rules consistently and create safe reporting mechanisms for poor practices.
2. Organize regular workshops and demonstrations on handwashing, safe water handling, and menstrual hygiene.
3. Encourage student ownership of WASH responsibilities through clubs and peer monitoring.
4. Collaborate with parents and communities to sustain WASH practices beyond school.

RECOMMENDATIONS TO PARENTS AND GAURDIANS

1. Engage actively with schools to support WASH programs and encourage accountability.
2. Serve as role models by practicing and promoting safe hygiene behaviours.
3. Educate children on the health risks of unsafe practices and the importance of responsibility.

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APPENDIX I

PARENT/GUARDIAN CONSENT FORM

TITLE OF STUDY:

Assessment of Knowledge, Attitude, and WASH (Water, Sanitation, and Hygiene) Practices Among Secondary School Students in Egor LGA, Edo State

INSTITUTION:

Department of Public Health and Community Medicine, College of Medical Sciences, University of Benin, Benin City

PRINCIPAL INVESTIGATOR:

Ehimen Osemudiamen Kizito

SUPERVISOR:

Prof. A.I. Obi

FINANCIAL SPONSORSHIP:

This study is self-sponsored by the researcher; no external funding is involved.

PROCEDURES:

Your child is invited to participate in a research study conducted by Ehimen Osemudiamen Kizito under the supervision of Prof. A.I. Obi.

The study aims to assess the knowledge, attitudes, and WASH practices of secondary school students. The findings will help improve school health programs and support students in adopting proper hygiene practices.

Participation will involve completing a questionnaire that takes approximately **15–20 minutes**. Some questions may ask about personal hygiene habits, water use, and sanitation practices. No identifying information will be collected.

Participation is voluntary. You do not need to actively sign this consent form for your child to participate. Your child will only be included if you do not withdraw them. If you do not want your child to participate, please notify the school by returning this letter marked **"Opt-Out."** Otherwise, your child will be asked to provide assent before participating.

Your child can withdraw at any time without any consequences on her academic performance or school relationships.

CONFIDENTIALITY:

All information collected will be kept strictly confidential. Data will be used only for this study, and individual responses will not be shared with teachers or other students.

ACKNOWLEDGEMENT:

I understand the purpose of the study and my right to withdraw my child at any time.

☐ I do not object to my child participating (passive consent)

Parent/Guardian Name: _____

Signature: _____

Date: _____

STUDENT ASSENT FORM

TITLE OF STUDY:

Water, Sanitation, and Hygiene Practices Among Secondary School Students in Egor LGA, Edo State

INSTITUTION:

Department of Public Health and Community Medicine, College of Medical Sciences, University of Benin, Benin City

PRINCIPAL INVESTIGATOR:

Ehimen Osemudiamen Kizito

SUPERVISOR:

Prof. A.I. Obi

FINANCIAL SPONSORSHIP:

This study is self-sponsored by the researcher; no external funding is involved.

PURPOSE OF STUDY:

The study aims to:

1. Determine students knowledge about water, sanitation, and hygiene (WASH) practices.
2. Ascertain students attitudes toward WASH practices.
3. Assess Prevalence of WASH practices amongst students
4. Identify Factors Influencing WASH Practices.
5. Provide recommendations to improve school WASH programs and facilities.

PROCEDURES:

- You will complete a questionnaire about your WASH knowledge, attitudes, and practices.
- Completing the questionnaire will take about **15–20 minutes**.
- Some questions may ask about your habits or experiences.
- You may skip any question you do not want to answer.

VOLUNTARY PARTICIPATION:

- Participation is entirely your choice.
- You can refuse to participate or stop at any time without any penalty.
- Your decision will not affect your grades or your relationship with teachers or the school.

PARENTAL/GUARDIAN INVOLVEMENT:

- Your parents or guardians have been informed about the study.
- If your parent or guardian does not want you to participate, you will not be included.

CONFIDENTIALITY:

- Your answers will be strictly confidential.
- Your name will not appear in the report.
- Only the research team will see your responses.
- Data will be securely stored and used only for this study.

BENEFITS:

- There may be no direct benefit to you.
- Your participation can help schools improve WASH education and facilities.
- Findings can guide local authorities in providing necessary hygiene facilities.

POSSIBLE RISKS:

- There are no known risks from participating.
- Some questions may make you think about personal habits; if you feel uncomfortable, you may skip questions or stop participation.

INSTRUCTIONS:

- Read each question carefully.
- Answer honestly based on your own experiences.
- If you don't know an answer or do not want to answer, leave it blank.
- Avoid discussing answers with other students while completing the questionnaire.

ACKNOWLEDGEMENT:

I have read (or had read to me) and understood the information above. I have had the opportunity to ask questions. I agree to participate in this study voluntarily.

☐ Yes, I agree to participate

☐ No, I do not want to participate

Student Name (optional): _____

Signature / Thumbprint: _____

Date: _____

APPENDIX II

WATER SANITATION AND HYGIENE PRACTICES AMONG PUBLIC SECONDARY SCHOOL STUDENTS IN EGOR LOCAL GOVERNMENT,BENIN-CITY, EDO STATE.

I am a 600 level Medical student of the University Of Benin and this study aims to assess the knowledge of WASH practices, attitude towards WASH practices Prevalence and Factors

Influencing WASH practices among secondary school students in Egor Local Government Area, Benin City. All information given will be treated as confidential. Please mark and fill all areas as appropriate. Thank you.

SECTION A [SOCIO DEMOGRAPHICS]

1. Age as at last birthday:
   _____
2. Sex: Male [ ] Female [ ]
3. Ethnic Group: Benin [ ] Esan [ ] Etsako [ ] Igbo [ ] Yoruba [ ] Hausa [ ] Urhobo [ ] Others [ ]
4. Religion: Christianity [ ] Islam [ ] African Traditional Religion [ ] Others [ ]
5. Class: _____
6. What is your birth position amongst your sibling _____
7. How many siblings do you have
   _____
8. Who do you reside with? Father [ ] Mother [ ] Both Parents [ ] Guardian [ ] Others [ ]
9. Father`s level of education: None [ ] Primary [ ] Secondary [ ] Tertiary [ ]
10. Father`s occupation:
    _____
11. Mother`s level of education: None [ ] Primary [ ] Secondary [ ] Tertiary [ ]
12. Mother`s occupation:
    _____
13. Guardian's Level of Education
    _____
14. Guardians Occupation
    _____

SECTION B: KNOWLEDGE OF WATER, SANITATION AND HYGIENE (WASH)

Instructions: Please tick (✓) the option that best describes your answer. Some questions allow more than one answer.

15. Have you heard of the term Water, Sanitation and Hygiene (WASH) before? If No, skip to question 29
    Yes [ ] No [ ]
16. If Yes, what is your main source of information about WASH? (Select all that apply)
    • School Teachers [ ] • School health clubs [ ] • Parents [ ] • Guardians [ ]
    • Television [ ] • Radio [ ] • Social media [ ] • Internet [ ] • Friends [ ]
    Others (Specify) _____
17. Water, Sanitation and Hygiene (WASH) refers to: (Single response question)

- A critical, interrelated set of practices, infrastructure, and services aimed at ensuring safe water access, proper waste disposal, and hygiene to prevent infectious diseases [ ]
- Focused teaching of students on how to wash their hands only [ ]
- the construction of toilets in schools without hygiene education [ ]
- the cleaning of classrooms and school compounds every morning [ ]
- Activities done only by health workers [ ]

18. According to safe water standards, drinking water should be: (Single response question)
    - Colourless, odourless, tasteless and Free from harmful germs and chemicals [ ]
    - Clear in colour only [ ] • Odourless only [ ] •Tasteless only [ ]
    - Collected from any available source [ ]
19. Which of the following are examples of improved water sources in schools? (Select all that apply)
    - Borehole [ ] • Protected well [ ] • Pipe-borne water [ ] • River or stream [ ]
    - Rainwater harvesting system [ ] • Unprotected open well [ ]

20. Which of the following are good hygiene practices recommended in schools? (Select all that apply)
    - Washing hands with soap and water after using the toilet [ ]
    - Washing hands before eating [ ] •Using water only without soap [ ]
    - Covering mouth and nose when coughing or sneezing [ ]
    - Regular bathing and wearing clean clothes [ ]
21. Which of the following sanitation facilities are considered appropriate for school use? (Select all that apply)
    - Flush toilet connected to a septic tank or sewer [ ]
    - Ventilated Improved Pit (VIP) latrine [ ]
    - Clean and private school toilets separated for boys and girls [ ]
    - Open defecation areas [ ] •Toilets with handwashing facilities nearby [ ]
22. A major benefit of good WASH practices in schools is: (Single response question)
    - Prevention of water- and sanitation-related diseases [ ]
    - Increased absenteeism [ ] •Poor academic performance [ ]
    - Spread of infections [ ]
23. Poor WASH practices in schools can lead to: (Multiple response question)
    - Diarrhoea diseases [ ] • Typhoid Disease [ ] •Cholera Disease [ ]

- Improved student health [ ] • Better concentration in class [ ]
- Increased school attendance [ ]

24. What should students do if school toilets are dirty or not functioning properly? (Single response question)
    - Report to a teacher or school authority [ ] • Practice open defecation [ ]
    - Ignore the problem [ ] • Stop using toilets completely [ ]

25. Which of the following diseases can be prevented by good WASH practices? (Select all that apply)
    - Diarrhoea [ ] • Cholera [ ] • Typhoid fever [ ]
    - Malaria [ ] • Worm infestations [ ]
26. Which of the following actions helps to keep drinking water safe in schools? (Select all that apply)
    - Covering water storage containers [ ] • Using clean cups or ladles to fetch water [ ]
    - Dipping hands directly into water containers [ ] • Treating water when necessary [ ]
    - Leaving containers open at all times [ ]
27. What is the recommended action after coughing or sneezing in school? (Single response question)
    - Wash hands with soap and water [ ] •Wipe hands on clothes [ ]
    - Do nothing [ ] •Shake hands with friends [ ]
28. Poor maintenance of school toilets can result in: (Single response question)
    - Increased spread of diseases [ ] •Improved student hygiene [ ]
    - Better learning environment [ ] •Increased toilet use [ ]

SECTION C: ATTITUDE TOWARD WATER, SANITATION AND HYGIENE (WASH) PRACTICES

Instructions: Please indicate your level of agreement with each statement by ticking (✓) the appropriate option.

[SA] Strongly Agree [A] Agree [N] Neutral [D] Disagree [SD] Strongly Disagree

SN	Question	SA	A	N	D	SD

29.	Clean and safe water is essential for maintaining good health.					
30.	Drinking water in school should come only from safe and approved sources.					
31.	Sharing drinking cups or bottles with class-mates is safe.					
32.	Proper Hand-washing in school is essential to prevent diseases.					
33.	Open defecation is acceptable if school toilets are Dirty.					
34.	Clean, private, and gender-separated toilets are important for students' comfort and dignity					
35.	Poor sanitation in schools does not affect student's health.					
36.	Using soap and water to wash hands regularly in school is a waste of time					
37.	Good personal hygiene improves Students comfort and confidence in school.					
38.	Using open bushes instead of toilets is harmful to students' health.					
39.	Maintaining clean water, sanitation, and hygiene facilities is only the responsibility of school cleaners.					
40.	Students have a role to play in keeping school WASH facilities clean and functional.					
41.	Cultural beliefs can make it difficult for students to practice good hygiene in school.					
42.	I am willing to support school programs and campaigns that promote good WASH practices.					

SECTION D: PREVALENCE OF WATER, SANITATION AND HYGIENE (WASH) PRACTICES

43. Is there a source of drinking water in your school?

•Yes [ ] •No [ ] If No Skip to question 48a

44. If Yes, what is the main source of drinking water in school?

- Pipe-borne water [ ] •Borehole [ ] •Protected well [ ] •Rainwater [ ]
- Sachet [ ] •Bottled water [ ] •River [ ] • Stream [ ]

45. Do you drink water provided by the school?

•Yes [ ] •No [ ] If yes go to question 47a

46. If No, what is the reason?

- Water is not available [ ] •Water is not clean/safe [ ]
- I prefer bringing my own water [ ] Taste or smell is unpleasant [ ]
- Others (Specify):

_____

47a. Do you use a personal cup for drinking water in school?

•Yes [ ] •No [ ] If yes skip to question 48a

47b If No, what do you use?

- Shared cup [ ] •Drink directly from tap [ ]
- Buy sachet water daily [ ] •Borrow a bottle from friends [ ]
- Use disposable cup [ ] •Others (Specify) _____

48a. Is there toilet Facility Available in Your School

•Yes [ ] •No [ ] If No Skip to question 53a

48b. If Yes What type of toilet facility is available?

- Flush toilet [ ] •VIP latrine [ ] •Pit latrine without slab [ ]
- Others Specify _____

49a. Do you use the school toilet whenever you need to?

•Yes [ ] •No [ ] If Yes Skip to question 50a

49b. If No, what is the reason?

- Toilet is dirty [ ] •No privacy [ ] •Toilets are locked [ ] •Toilets are far [ ]
- Fear [ ]

50a. Are school toilets separated for boys and girls?

•Yes [ ] •No [ ] If Yes skip to question 51a

50b. If No, how does this affect you? (Select all that apply)

- I avoid using the toilet completely [ ] •I feel uncomfortable using the toilet [ ]
- I wait until I get home before using the toilet [ ] •I use the toilet only in emergencies [ ]
- It affects my concentration in class [ ]
- It makes menstrual hygiene difficult [ ] (for girls only)
- It does not affect me [ ] •Others (Specify) _____

51a. Are handwashing facilities located near school toilets?

•Yes [ ] •No [ ]. If yes skip to question 52a

51b If No, what challenge does this cause?

- I do not wash hands after toilet use [ ] •It wastes time [ ] •No major challenge [ ]

52a. Do you wash your hands with soap after using the toilet at school?

•Yes [ ] •No [ ] If yes skip to question 53a

52b. If No, what is the reason?

- No soap availability [ ] • No water availability [ ] • I do forget [ ]
- I am usually in a hurry [ ] • Handwashing point is too far [ ]
- I do not think Handwashing is necessary [ ]
- I am embarrassed to wash hands in front of others [ ]
- Others(Specify) _____

53a. Do you wash your hands before eating in school?

•Yes [ ] •No [ ]

53b. If No, why? (Tick all that apply)

- No handwashing point nearby [ ] •No time [ ] •Not a habit [ ]
- No water availability [ ] •No soap availability [ ]

54a. Have you received education on WASH practices in school?

•Yes [ ] •No [ ]

54b. If Yes, who provided it?

- Teachers [ ] •Health workers [ ] •Non-Governmental organization [ ]
- Others (Specify) _____

54c. If No, would you like to receive WASH education?

•Yes [ ] •No [ ]

55. Do School authorities encourage good WASH practices?

•Yes [ ] •No [ ]

56. Overall, would you say you practice good WASH behaviours in school?

•Yes [ ] •No [ ]

57. If No, what is the main reason?

- Lack of facilities [ ] •Lack of knowledge [ ] • Personal habits [ ]
- Cultural beliefs [ ]

SECTION E: FACTORS INFLUENCING WASH PRACTICES

58a. Do you feel safe drinking water at school.

•Yes [ ] •No [ ]

59b. If Yes What Factors encourages you to drink water at school: (Select all that apply)

- Availability [ ] • Good taste [ ] • Perceived safety [ ]
- Teacher/authority guidance [ ] •Peer influence [ ] •Others (Specify) _____

60. What challenges prevents you from drinking water at school: (Select all that apply)

- Water is not available [ ] •Water is dirty/unsafe [ ] •Taste or smell is unpleasant [ ]
- I forget to drink water [ ] •Water point is far from classroom [ ]
- Reliance on bottled/sachet water [ ] Others (Specify) _____

61a. School toilets are usually clean and usable.

- Yes [ ] •No[ ] If No Skip to question 62

61b. If yes, what supports this?

- Regular cleaning by school staff [ ] •Availability of water for flushing/cleaning [ ]
- Student cooperation [ ] •School supervision/monitoring [ ]
- Others (Specify) _____

62 Factors that encourage me to use school toilets: (Select all that apply)

- Cleanliness [ ] •Privacy/doors with locks [ ] •Gender-separated toilets [ ]
- Toilets are close to classrooms [ ] •Teacher encouragement [ ]
- Others (Specify) _____

63. What prevents you from using school toilets? (Select all that apply)

- Toilets are dirty [ ] •Lack of privacy [ ] •Toilets are locked or overcrowded [ ]
- Bad smell [ ] •Fear of teasing or bullying [ ] •Distance from classroom [ ]
- Others (Specify) _____

64. Factors that encourage me to wash my hands at school: (Select all that apply)

- Availability of soap and water [ ] •Knowledge of disease prevention [ ]
- Teacher supervision [ ] •Peer influence [ ] •Personal habit [ ]
- Others (Specify) _____

65. What prevents you from washing your hands regularly at school? (Select all that apply)

- No soap available [ ] •No water available [ ] •Hand-washing point is far [ ]
- Lack of time [ ] •I forget [ ] •I do not see it as important [ ]
- Others (Specify) _____

66a. My school promotes good WASH practices.

•Yes [ ] •No [ ]

66b. If Yes, how?

- Health talks and lessons [ ] •Posters and reminders [ ]
- Provision of WASH facilities [ ] •School rules on hygiene [ ]
- Others (Specify) _____

67a. If No What school-related factors make good WASH practices difficult? (Select all that apply)

- Poor maintenance of facilities [ ] •Lack of school rules or enforcement [ ]
- Overcrowding [ ] •Lack of funds/materials [ ] • Limited health education [ ]
- Others (Specify) _____

67b. Overall, what is the biggest factor affecting your WASH practices at school?

- Availability of facilities [ ] •Knowledge and awareness [ ]
- School support and supervision [ ] •Personal habits [ ]
- Cultural or religious beliefs [ ]

APPENDIX III

WATER SANITATION AND HYGIENE ASSESSMENT CHECK LIST FOR SECONDARY SCHOOLS IN EGOR LOCAL GOVERNMENT AREA, BENIN CITY, EDO STATE.

School Profile			
Name of School:		School Year:	

Schools District:							Level:	
Respondent Title							Date Monitored	
Student population:	Male:		Female:		Total			

WASH in Schools Indicators		**Compliance**		**Remarks**
		YES	**NO**	
A.	**Water**			
1.	Safe drinking water is provided for free in the school at all times.			
2.	The quality of water is tested more than once every calendar year in coordination with the relevant agency/office.			
3.	Regardless of source, water for cleaning is available on a daily basis in all school hours. Please, indicate water source:			
4.	Water is Treated in the school by boiling school			
5.	Water is Treated in the School by Filtration			
6.	Water is Treated in the School by Chlorination			
7.	Presence of rain catchment for Water storage reservoir).			
8.	Presence of Water tank for Water Storage			
9.	Presence of Water reservoir for Water Storage			
B.	**Sanitation**			
1.	1:40 Toilet seat to learners' ratio in the school (Toilets for teachers are not included). Please, indicate total no. of toilet bowl:			
2.	Toilets are secure, private, with door and lock, have lighting, adequate ventilation and wrapping materials for used pads.			
3.	Gender-segregated toilets available. Please, indicate total no, if any.			

4.	There is a hand washing facility with soap within or near the toilets.			
5.	There is a facility for washing in female toilets for menstrual hygiene management (MHM).			
6.	Detached toilets are located within view of school building and people.			
7.	There is a toilet accessible to persons with limited mobility. Please, indicate total no., if any.			
8.	Daily cleaning of toilets, hand washing stations and other water facilities.			
9.	Funding for regular maintenance and repair of toilets, hand washing and other water facilities comes from the regular school budget			
10.	Funding for regular maintenance and repair of toilets, hand washing and other water facilities comes from other Governmental funds.			
11.	Funding for regular maintenance and repair of toilets, hand washing and other water facilities comes from Non-Governmental organization bodies.			
12.	No burning of waste.			
13.	Segregated trash bins with cover are available in all classrooms, toilets, canteens, offices, clinics, play areas, gardens and hallways.			
14.	Policies are in place for effective waste segregation. practices			
15.	Facilities are in place for effective waste segregation practices			
16.	Sanctions are in place for non-compliance to waste segregation Policies			
17.	Garbage is collected at least twice a week.			
18.	The school has compost facility for biodegradable waste.			
19.	The school has refuse facility for non-biodegradable waste.			

20.	The school has materials recovery facility (MRF) for recyclable waste.			
21.	Functional septic tank is available for all toilets.			
22.	Functional drainage system from kitchen and wash areas is in place to ensure that there is no stagnant water in the school.			
23.	In case the school is in a flood prone area, Policies are in place to ensure that there is no stagnant water in the school.			
24.	In case the school is in a flood prone area, practices are in place to ensure that there is no stagnant water in the school.			
25.	In case the school is in a flood prone area, People are in place to ensure that there is no stagnant water in the school.			
26.	In case the school is in a flood prone area, Structures are in place to ensure that there is no stagnant water in the school.			
27.	All food handlers have health certificate.			
28.	School canteens have updated sanitary permit.			
C	**HYGIENE**			
1.	Group hand washing facilities with soap are available with at least 10 faucets or punched holes for elementary and at least 4 faucets or punched holes for secondary. Please, indicate total no. of functional group hand washing facilities:			
2.	Regular supply of soap for hand washing.			
3.	There are individual hand washing facilities with soap in strategic areas in the school (e.g. near canteen/eating areas, play areas and toilets).			
4.	Hand washing stations with soap are installed near the entrance gate.			
5.	Physical distancing of at least one meter apart is observed in group hand washing areas.			
6.	Soap, toothbrush and toothpaste are provided by the school through Governmental funds complemented by external partners.			
7.	Sanitary pads are accessible in the school.			

8.	There is information on proper disposal of sanitary pads in the girls toilet.			
9	FMOH approved IEC materials on menstrual hygiene management for teachers and students are available.			
10.	There is a rest space/changing room for MHM that is secure, private and comfortable (not necessarily in the Class Room).			

Best WASH practices (If Any)	1.
	2.
	3.
	4.
	5.

APPENDIX IV

ETHICAL APPROVAL

Department of Public Health and Community Medicine

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

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NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/1486549127298

PROPOSAL TITLE: "ASSESSMENT OF WATER SANITATION AND HYGIENE PRACTICES AMONG SECONDARY SCHOOL STUDENTS IN EGOR LOCAL GOVERNMENT AREA BENIN-CITY, EDO STATE"

PRINCIPAL INVESTIGATOR(S): EHIMEN OSEMUDIAMEN KIZITO

DEPARTMENT/INSTITUTION: DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA

DATE CONSIDERED: MARCH 3RD, 2026

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 3/03/2026 TO 2/03/2027. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY
REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI SIGNATURE & DATE 3/3/2026

UNIVERSITY OF BENIN TEACHING HOSPITAL ETHICS & RESEARCH COMMITTEE Sign..... Date..... BENIN CITY P.M.B. 1111

SUPERVISOR (S): PROF A.I. OBI

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates and **you are to furnish the committee with the research activities at the completion of the study.** All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual report to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification.

Signature & Date..... 3/3 2026

Department of Public Health and Community Medicine,
University of Benin,
Benin City.

5th March, 2026.

Edo State Universal Basic Education Board
RECEIVED
10 MAR 2026
Open Registry
BENIN CITY

The Executive Chairman,
State Universal Basic Education Board,
Edo State.

LETTER OF INTRODUCTION FOR DATA COLLECTION

This is to introduce **Ehimen Osemudiamen Kizito**, a final year student of the Department of Public Health and Community Medicine, University of Benin, Benin City.

He is currently carrying out a research titled "Assessment of Water Sanitation and Hygiene practices among secondary school students in Egor Local Government Area." This study is in partial fulfillment of the requirements for the award of the MBBS degree.

In collecting relevant data for this study, we kindly request your permission for him to pretest his questionnaire in Oredo Local Government Area, specifically Ogbe secondary school, and Edokpolor Grammer school.

We also kindly request your permission for him to visit selected secondary schools within Egor Local Government Area, specifically Ohonre Secondary School, Egor Secondary School, Uselu Secondary School, Uwelu Secondary School, Edo Boys High School, Iyoba Girls Secondary School and Eweka Secondary School.

We assure you that the information obtained will be strictly used for academic purposes, and all ethical standards, including confidentiality and voluntary participation, will be strictly adhered to.

We will appreciate any assistance granted to him.

Thank you.

Yours faithfully,

Dr. E. O. Obarisiagbon
MBBS; FMCPH, MPH, FWACP
Associate Professor / Consultant
Department of Public Health and Community Medicine,
University of Benin,
Benin City, Edo State.

DEPT OF COMMUNITY HEALTH
COLL OF MED SCIENCES
DATE 10-03-26
SCH OF MEDICINE, UNIBEN

EDO STATE MINISTRY OF EDUCATION,
EDUCATION HUB, IYARO
P.M.B. 1058 BENIN CITY, NIGERIA
Email: min.edu@edostate.gov.ng
Hotline: 08182737088

Our Ref.: PRS/DF/200/155 **27th March, 2026.**

The Principals,
Public Senior Secondary Schools,
Egor & Oredo LGA,
Edo State.

Dear Sir/Madam,

INTRODUCTION AND REQUEST FOR SCHOOL VISIT IN EGOR & OREDO LGA

The Ministry hereby introduces **Ehimen Osemudiamen Kizito**, a final year student, who has requested permission to visit selected public senior secondary schools within Egor and Oredo Local Government Area.

2. The purpose of the visit is to engage students in connection with his research project titled, **"Assessment of Water Sanitation and Hygiene Practices among Secondary School Students in Egor LGA."** This involves administering his pretest questionnaires in Ogbe and Edokpolor secondary schools in Oredo LGA. Also, administering questionnaires in the specified schools in Egor LGA:

   i. Ohonre secondary school,
   ii. Egor secondary school,
   iii. Uselu secondary school,
   iv. Uwelu secondary school,
   v. Edo Boys High school,
   vi. Iyoba Girls secondary school, and
   vii. Eweka secondary school.

3. You are kindly requested to grant him the necessary access and cooperation required to obtain relevant information for this academic research. Please note that the exercise is strictly for research purposes.

4. The Ministry appreciates your usual cooperation. Please accept the assurances of our highest regards.

Orire G. O.
Director, Planning, Research and Statistics
For: Honourable Commissioner for Education

PUBLIC JUNIOR SECONDARY SCHOOL

LGA	School Name	Junior Secondary School 1		Junior Secondary School 2		Junior Secondary School 3		Grand Total
		F	M	F	M	F	M	
Egor	ASORO SEC.-EG-ED	244	337	404	383	219	228	1815
Egor	EDO BOYS SEC.-EG-ED		176		255		171	602
Egor	EGOR SEC.-EG-ED	173	167	224	253	199	231	1247
Egor	EVBAREKE SEC.-EG-ED	100	130	132	156	62	119	699
Egor	EVBUOTUBU SEC.-EG-ED	118	106	198	202	116	126	866
Egor	EWEKA SEC.-EG-ED	45	116	33	87	26	65	372
Egor	IYOBA SEC.-EG-ED	188		222		209		619
Egor	OHONRE SEC.-EG-ED	35	11	38	27	39	17	167
Egor	OKHOKHUGBO SEC.-EG-ED	25	34	45	45	43	51	243
Egor	USEH SEC.-EG-ED	108	95	151	127	96	98	675
Egor	USELU SEC.-EG-ED	112	125	193	140	94	101	765
Egor	UWELU SEC.-EG-ED	85	54	68	67	43	43	360

PUBLIC SENIOR SECONDARY SCHOOL

	EGOR LGA			M	F	M	F	M	F	
1	ASORO S/S/S, B/C	Mixed	Urban	268	235	155	182	76	73	989
2	EDO BOYS H/S/S, EGOR, B/C	Male Only	Urban	186	0	160	0	125	0	471
3	EGOR S/S, EGOR B/C	Mixed	Urban	152	174	144	177	66	60	773
4	EVBAREKE S/S, B/C	Mixed	Urban	96	87	80	74	100	85	522
5	EVBUOTUBU S/S, B/C	Mixed	Urban	121	100	66	66	50	48	451
6	EWEKA S/S/S, B/C	Mixed	Urban	40	39	25	21	2	12	139
7	IYOBA GIRLS S/S/S, B/ C	Female Only	Urban	0	128	0	138	0	90	356
8	OHONRE S/S/S, B/C	Mixed	Urban	24	43	18	57	15	36	193
9	OKHOKHUGBO S/S /S, B/C	Mixed	Semi-Urban	44	47	47	47	50	49	284
10	USE S/S/S, USE B/C	Mixed	Urban	77	85	56	120	34	53	425
11	USELU S/S/S, B/C	Mixed	Urban	81	108	57	73	14	47	380
12	UWELU S/S/S, B/C	Mixed	Semi-Urban	35	65	36	64	47	40	287
			Total	1124	1111	844	1019	579	593	5270

EDO STATE UNIVERSAL BASIC EDUCATION BOARD (SUBEB)

Our Ref: SUBEB/A/2023 T5/39 **4th May, 2026**

Department of Public Health and Community Medicine,
University of Benin,
Benin City.

Attention:
Ehimen Osemudiamen Kizito

RE: LETTER OF INTRODUCTION FOR DATA COLLECTION

With reference to your letter dated 5th March, 2026, I am directed to convey the approval of the Executive Chairman for you to carry out the proposed research in some selected Schools at Egor Local Government Area.

2. Kindly note the specific details below:
   - . The programme should not disrupt learning activities
   - The time for the exercise is during break

3. Thank you for contributing to the overall health and well-being of learners and collaborating with us to fulfil our mandate of providing quality Basic Education to the Edo child.

4. Kindly liaise with the Board's focal person assigned to work with you for this programme-Irabor Josephine (08067685544) and Egor Ag. Education Secretary, Mr. Jonathan Ihueghian (08051119829) for the success of this programme.

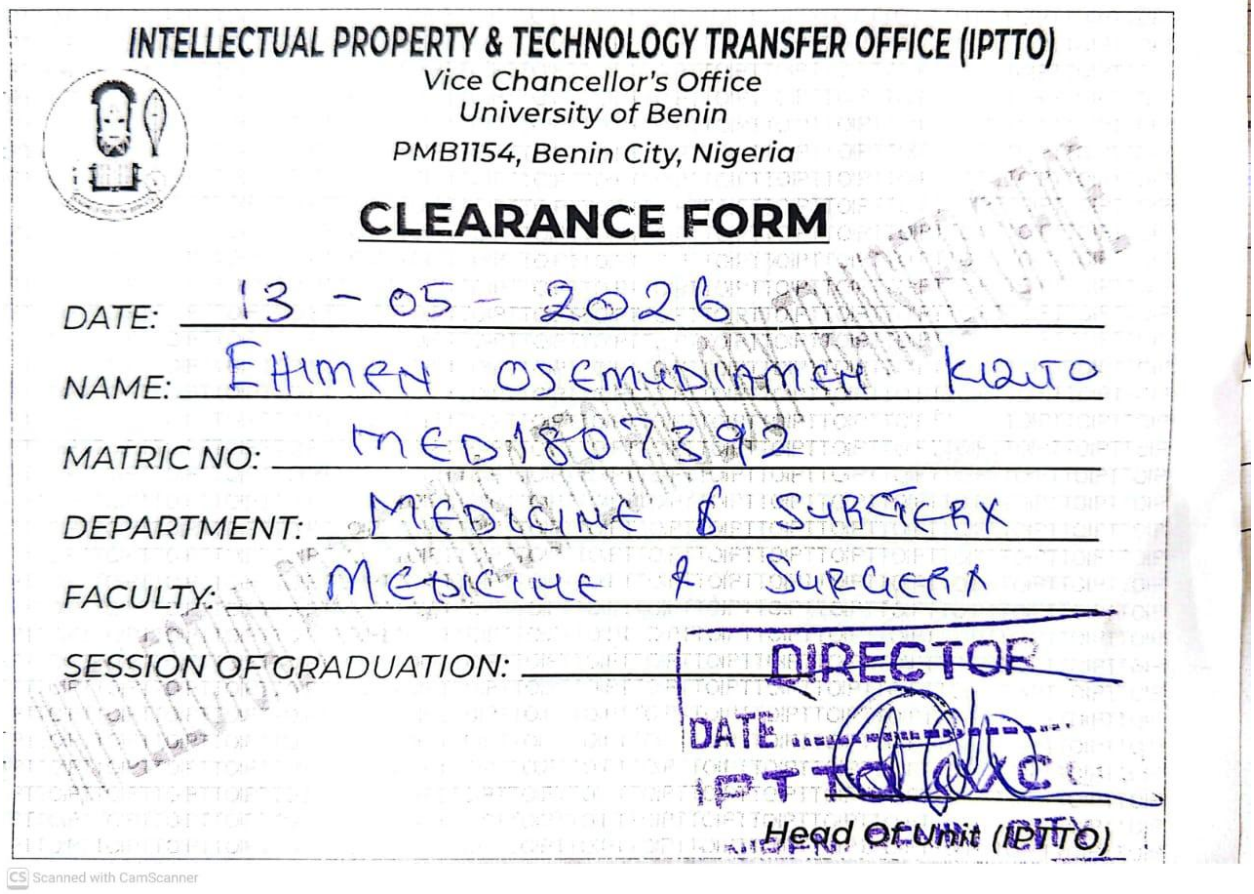
5. Accept the assurances of the Executive Chairman best regards.

Mrs. E .O Onoabhagbe,
Director Social Mobilization,
For: Executive Chairman.

Block D, Secretariat Building, Sapele Road, Benin City, Edo State
0809 184 9777 www.subeb.edostate.gov.ng e.chairmansubeb@edostate.gov.ng

APPENDIX V

PLAGIARISM TEST



INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)

Vice Chancellor's Office
University of Benin
PMB1154, Benin City, Nigeria

CLEARANCE FORM

DATE: 13 - 05 - 2026

NAME: ETHIMEN OSEMUDIAMEN KUTO

MATRIC NO: MED1807392

DEPARTMENT: MEDICINE & SURGERY

FACULTY: MEDICINE & SURGERY

SESSION OF GRADUATION:

DIRECTOR
DATE .....
IPTTO
Head Of Unit (IPTTO)

Scanned with CamScanner