

**KNOWLEDGE, ATTITUDES AND PRACTICES OF SANITATION AMONG  
LEARNERS AT THE PRIMARY SCHOOLS OF SEKHUKHUNE DISTRICT,  
LIMPOPO PROVINCE, SOUTH AFRICA.**

BY

**Choshane Julia Motlakaladi**

**MINI-DISSERTATION**

Submitted in (partial) fulfilment of the  
requirements for the degree of

**MASTER OF PUBLIC HEALTH**

In the

**FACULTY OF HEALTH SCIENCES**

**(School of Health Care Sciences)**

at the

**UNIVERSITY OF LIMPOPO**

**Supervisor: Dr TJ Mashamba**

2024

## **Dedication**

To my mother Mrs Choshane Dorcus Makhukhwane and my grandmother whom I was named after, Maphutha Julia Motlakaladi.

## Declaration

I declare that the **KNOWLEDGE, ATTITUDES AND PRACTICES OF SANITATION AMONG LEARNERS AT THE PRIMARY SCHOOLS OF SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA** hereby submitted to the University of Limpopo, for the degree of **Master of Public Health** has not previously been submitted by me for a degree at this or any other university; that it is my work in design and in execution, and that all material contained herein has been duly acknowledged.

Choshane JM (Miss)

September 2024

Surname, Initials (title)

Date

## **Acknowledgements**

I want to thank the following persons for their respective contributions to this dissertation:

My mother, Mrs D.M. Choshane, for her unconditional love, support, and encouragement.

My supervisor, Dr T.J. Mashamba, for her guidance, support, and encouragement.

The Nurse Manager, T.M. Malatji, at Burgersfort Clinic, for her support.

Grade 6 learners at the primary schools of Sekhukhune District, for participating in the study.

The Limpopo Province: Department of Basic Education, for giving me permission to conduct the study.

Dr Moffat Sebola for editing the manuscript.

## Abstract

**Background:** Sufficient sanitation knowledge, positive attitude towards sanitation, and good sanitation practices among learners play a significant role in the prevention of sanitation related diseases and maintenance of good health and wellbeing. The study intended to examine and close gaps in the literature of sanitation in schools.

**Objectives:** This study aimed at assessing and describing the knowledge, attitudes, and practices of sanitation among learners in the selected primary schools of Sekhukhune District, Limpopo Province, South Africa.

**Methods:** A quantitative methodology and a descriptive research design was employed on this study. The study was conducted in primary schools of Sekhukhune District with 661 learners, and grade six learners were targeted. Simple random sampling was applied to select nine (9) primary schools and a sample size of 249 learners. Data was collected using a structured and validated questionnaire. Statistical Package for Social Sciences version 29 was used for data analysis. Pearson Chi-square test set at a 5% level significance was used.

**Results:** The overall results of the study were found to be satisfactory. The highest percentage of learners had adequate knowledge of sanitation, positive attitude towards sanitation, and good sanitation practices. There was a significant difference between the learners' age, sanitation knowledge, and sanitation practices ( $P$ -value $<0.05$ ). Learners who did not have adequate knowledge were older learners 14 years of age.

**Conclusions:** knowledge, attitudes and practices of sanitation among learners in the primary schools was satisfactory, but still lacking among other learners. The results underscore the need to strengthen education on sanitation. Learners' knowledge and attitudes on sanitation determine the actual practice towards it. Much effort should be directed towards improving learner's understanding. Sanitation knowledge has to be imparted to learners early in life to ensure that learners have understanding which will influence their attitude and practices.

**Keywords:** sanitation, primary school learners, knowledge, attitudes, practices

## TABLE OF CONTENTS

DEDICATION.....	I
DECLARATION .....	II
ACKNOWLEDGEMENTS .....	III
ABSTRACT.....	IV
TABLE OF CONTENTS.....	V
LIST OF TABLES.....	X
DEFINITION OF CONCEPTS.....	XI
LIST OF ABBREVIATIONS .....	XII
CHAPTER 1: OVERVIEW OF THE STUDY .....	1
1.1 INTRODUCTION.....	1
1.2 PROBLEM STATEMENT .....	5
1.3 PURPOSE OF THE STUDY.....	6
1.4 RESEARCH OBJECTIVES.....	6
1.5 RESEARCH QUESTION.....	7
1.6 SIGNIFICANCE OF THE STUDY .....	7
1.7 OUTLINE OF CHAPTERS .....	8
1.7.1 Chapter 1: Introduction and Background.....	8
1.7.2 Chapter 2: Literature review .....	8
1.7.3 Chapter 3: Research Methodology .....	8
1.7.4 Chapter 4: Results of the study.....	8
1.7.5 Chapter 5: Discussion, Recommendations and Conclusion.....	9
1.8 CONCLUSION .....	9
CHAPTER 2: LITERATURE REVIEW .....	10
2.1 INTRODUCTION.....	10
2.2. OVERVIEW OF SANITATION PRACTICES .....	10
2.2.1. BENEFITS OF PROPER SANITATION .....	13
2.2.1.1. HEALTH BENEFITS.....	14

2.2.1.2.	ENVIRONMENTAL BENEFITS .....	16
2.2.1.3.	ECONOMIC BENEFITS.....	17
2.2.2.	FACTORS INFLUENCING SANITATION.....	18
2.2.2.1.	SOCIOECONOMIC FACTORS .....	19
2.2.2.2.	CULTURAL BELIEFS .....	20
2.2.2.3.	INFRASTRUCTURE .....	22
2.2.3	CONTEMPORARY POLICIES FOR PROPER SANITATION.....	23
2.3.	GLOBAL PERSPECTIVE OF KNOWLEDGE, ATTITUDES, AND PRACTICES OF SANITATION AMONG LEARNERS IN PRIMARY SCHOOLS.....	25
2.3.1.	SANITATION KNOWLEDGE.....	26
2.3.2.	ATTITUDE TOWARDS SANITATION .....	27
2.3.3.	SANITATION PRACTICES .....	28
2.4.	SUB-SAHARAN PERSPECTIVE OF KNOWLEDGE, ATTITUDES, AND PRACTICES OF SANITATION AMONG LEARNERS IN THE PRIMARY SCHOOLS.....	29
2.4.1.	KNOWLEDGE OF LEARNERS REGARDING SANITATION .....	30
2.4.2.	ATTITUDE OF LEARNERS REGARDING SANITATION.....	30
2.4.3.	SANITATION PRACTICES IN SCHOOL.....	31
2.5.	SOUTHERN AFRICAN PERSPECTIVE OF KNOWLEDGE, ATTITUDES, AND PRACTICES OF SANITATION AMONG LEARNERS IN THE PRIMARY SCHOOLS.....	32
2.5.1.	KNOWLEDGE AND ATTITUDE OF LEARNERS REGARDING SANITATION .....	33
2.5.2.	SANITATION FACILITIES AT SCHOOL.....	33
2.5.3.	BEHAVIOR CHANGES AMONG LEARNERS .....	34
2.6.	CONCLUSION .....	34
CHAPTER 3: RESEARCH METHODOLOGY.....		36
3.1	INTRODUCTION.....	36
3.2	RESEARCH APPROACH.....	36
3.3	STUDY DESIGN.....	36
3.4	STUDY SETTING .....	37
3.5	STUDY POPULATION .....	38
3.6.	TARGET POPULATION .....	38
3.6	SAMPLING .....	38
3.6.1	Sampling of schools.....	39
3.6.2	Sample size. ....	39

3.6.3	Sampling of respondents .....	40
3.7	DATA COLLECTION.....	40
3.7.1	Recruitment Strategy .....	40
3.7.2	Data collection instrument.....	41
3.7.3	Pre-test of Instrument.....	42
3.7.4	Data Collection Procedure .....	42
3.8	DATA ANALYSIS .....	43
3.9	VALIDITY .....	43
3.10	RELIABILITY .....	43
3.11	ETHICAL CONSIDERATIONS.....	44
3.11.1	Ethical Clearance .....	44
3.11.2	Voluntary Informed consent.....	44
3.11.3	Privacy.....	44
3.11.4	Confidentiality.....	44
3.11.5	Anonymity.....	45
3.11.6	Beneficence.....	45
3.11.7	Harm.....	45
3.12	BIAS.....	45
3.13	CONCLUSION .....	46
CHAPTER 4: RESULTS OF THE STUDY .....		47
4.1	INTRODUCTION.....	47
4.2	DEMOGRAPHIC PROFILE OF PARTICIPANTS.....	47
4.3	KEY RESULTS OF THE LEVEL OF SANITATION KNOWLEDGE, SANITATION ATTITUDE AND SANITATION PRACTICE.....	49
4.3.1	Sanitation knowledge .....	49
4.3.2	Sanitation Attitude .....	51
4.3.3	Sanitation Practices .....	52
4.4	ASSOCIATION BETWEEN PARTICIPANTS SANITATION KNOWLEDGE, SANITATION ATTITUDE, SANITATION PRACTICE, AND DEMOGRAPHIC CHARACTERISTICS .....	53
4.4.1	Association between participants sanitation knowledge and demographic.....	53

4.4.2 Association between participants sanitation Attitude and demographics .....	54
4.4.3 Association between participants sanitation practice and demographics .....	55
4.5 CONCLUSION .....	56
CHAPTER 5: DISCUSSION, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION .....	57
5.1 INTRODUCTION.....	57
5.2 DEMOGRAPHIC PROFILE OF LEARNERS .....	57
5.3 LEVEL OF SANITATION KNOWLEDGE, SANITATION ATTITUDES AND SANITATION PRACTICES .....	58
5.3.1 Level of Sanitation Knowledge .....	58
5.3.2 Level of Sanitation Attitudes.....	60
5.3.3 Level of sanitation practices .....	61
5.4 ASSOCIATION BETWEEN SANITATION KNOWLEDGE, SANITATION ATTITUDES, SANITATION PRACTICES, AND DEMOGRAPHICS .....	62
5.5 LIMITATIONS .....	63
5.6 RECOMMENDATIONS.....	64
5.7 CONCLUSION .....	64
REFERENCES.....	66
ANNEXURES.....	80
ANNEXURE 1: APPROVAL FROM UNIVERSITY .....	80
ANNEXURE 2: LETTER SEEKING CONSENT FROM THE DEPARTMENT OF EDUCATION: LIMPOPO PROVINCE .....	81
ANNEXURE 3: LETTER OF APPROVAL: DEPARTMENT OF EDUCATION: LIMPOPO PROVINCE .....	82
ANNEXURE 4: LETTER SEEKING CONSENT FROM THE DEPARTMENT OF EDUCATION: SEKHUKHUNE DISTRICT.....	83
ANNEXURE 5: LETTER OF APPROVAL: DEPARTMENT OF EDUCATION: SEKHUKHUNE DISTRICT.....	84
ANNEXURE 6: QUESTIONNAIRE (ENGLISH).....	85
ANNEXURE 7: QUESTIONNAIRE (SEPEDI) .....	87
ANNEXURE 8: PARENT/GUARDIAN CONSENT FORM.....	89

ANNEXURE 9: CHILD ASSENT FORM.....	90
ANNEXURE 10: PARTICIPANT INFORMATION SHEET .....	91
ANNEXURE 11: PARENT INFORMATION SHEET.....	93
ANNEXURE 12: OBSERVED SANITATION PRACTICES IN SCHOOLS. ....	95
ANNEXURE 13: EDITORIAL LETTER .....	96

## LIST OF TABLES

Table 3.1: Calculated proportions of participating schools.....	40
Table 4.1: Demographic profile of participants.....	48
Table 4.2: Participants responses to sanitation knowledge questions .....	49
Table 4.3: Participants responses to sanitation attitude questions.....	51
Table 4.4: Participants responses to sanitation practice questions.....	52
Table 4.5: Association between sanitation knowledge, age, and gender .....	53
Table 4.6: Association between sanitation attitude, age, and gender .....	54
Table 4. 7: Association between sanitation practices, age, and gender.....	55

## DEFINITION OF CONCEPTS

### **Knowledge**

Dugard, Langford & Anderson (2017) define knowledge as the target population's understanding and skills about sanitation and hygiene-related issues. For instance, in the current study, knowledge referred to information, understanding and skills of learners at a primary school about sanitation.

### **Attitudes**

Attitudes refer an evaluation of psychological object, represented in dimensions such as good versus bad, pleasant versus unpleasant or likable versus dislikeable (Svenningsson, Host, Hulten & Hallstrom, 2021). In the current study, attitudes referred to the way learners at a primary school level feel about sanitation.

### **Practice**

Alemu (2017) defines (sanitation) practices as the conditions affecting health or measures for guarding against infection or disease. Therefore, in the current study, practice referred to the way learners at a primary school do sanitation.

### **Sanitation**

Sanitation refers to providing facilities and services for the safe disposal of human urine and faeces related to clean drinking water and adequate treatment (World Health Organisation, 2020). In this study, sanitation referred to services rendered to the primary school learners to maintain a clean water supply and disposal of wastes.

**Primary school Learners** mean any person receiving education or is obliged to receive education according to the South African School Act (1996:84). In this study, the term "learners" referred to youths attending primary schools between the ages of 10 and 15 in Tubatse Municipality, Sekhukhune District.

## LIST OF ABBREVIATIONS

COVID-19	:	Coronavirus Disease 2019
CHW	:	Community Health Care Workers
DoBE	:	Department of Basic Education
EEA	:	European Environmental Agency
ISHP	:	Integrated School Health Program
KAP	:	Knowledge, Attitude, Practice
MNSP	:	Malawi National Sanitation Policy
MRC	:	Medical Research Council
PLoS	:	Public Library of Science
SDG	:	Sustainable Development Goal
SPSS	:	Statistical Package for the Social Sciences
TREC	:	Turfloop Research Ethics Committee
UNICEF	:	United Nations International Children's Emergency Fund
UL	:	University of Limpopo
WASH	:	Water, Sanitation and Hygiene
WHO	:	World Health Organization

## **CHAPTER 1: OVERVIEW OF THE STUDY**

### **1.1 Introduction**

Sanitation knowledge, attitude, and practices of learners in schools are crucial for a positive academic environment and by extension, for the health environment of the communities that learners live in. Sanitation knowledge and practices in primary schools play a significant role in learning, and health-reduced illnesses related to poor hygiene and poor water supply (Shilunga, Amukugo & Mitonga, 2018). The Sustainable Development Goal (SDG 6) target for the year 2030 includes achieving universal and equitable access to safe and affordable drinking water, sanitation, and hygiene (WASH) for all and end open defecation (Guppy, Mehta & Qadir, 2019). To achieve these requires adequate knowledge on sanitation, positive attitude towards sanitation, and proper hygiene practices, which will lead to the prevention of spread of sanitation related diseases. In the SDG agenda, Sanitation monitoring is to extend beyond homes to cover schools (World Health Organization, 2018). Centre for Disease Control and Prevention (2022) has highlighted that human feces are an important source of germs that cause diarrhea, when germs get onto hands and are not washed off, they can make people sick, and that hand washing with soap and clean running water is a simple protection against communicable disease. Schools are obliged to implement the WASH school policies, and standards in place which are enabling factors for good and improved hygiene practices (Deroo, Walter & Graham, 2015).

There is a strong need for schools to ensure good sanitation practices for their pupils as this will protect them from sanitation related diseases and ensure good health and better performance in school (Amadi, Yakubu, Iro et al, 2020). In the State of the World's Children Report in 2020, United Nations International Children's Emergency Fund (UNICEF) reported that more than 5.4 million school children all over the globe were faced with inadequate access to sources for drinking water (UNICEF, 2021). This then proved worrisome because this large population is exposed to undignified and unhealthy sources of drinking water. According to UNICEF & WHO (2020), the impact of good sanitation attitudes among primary school learners has improved grades with fewer sick days and absenteeism. Other benefits for good sanitation knowledge and practices at primary schools included self-worth, convenience, privacy, security for

women and girls, as well as an increase in school enrolments for girls (Mombberg, Ngandu, Voth-Gaeddert, Ribeiro, May, Norris & Said-Mohamed, 2017).

Various countries reported a lack of adequate sanitation knowledge in primary schools as a concern that needed urgent attention (Nhamo & Muchuru, 2019). Amegah (2020) argues that learners are more likely to have improved attendance and school performance if they have positive attitudes towards hygienic learning environments. Hutton and Chase (2017) noted that sanitation through toilets provision, and good hygiene are significant in maintaining the dignity and privacy for learners. Anthoni, Githinji, Hoser, Stein, Blanford and Grossi (2021) stated that the risk of infections is lower in children with knowledge of hygiene and sanitation practices, as a results, health education on sanitation practices is important to promote and multiply learner healthy behavior related to sanitation. Irehovbude and Okeye (2022) highlighted that while there is increasing awareness in correct handhygiene, empirical evidence suggests that there are no concurrent increases in correct hand hygiene practice in sub-Saharan Africa. Furthermore, children and adolescents consistently assume poor hand hygiene compliance levels resulting in unpleasant health consequences, and fecal-oral diseases remain common among schoolchildren, leading to schools' absenteeism and disease specific mortality in sub-Saharan Africa (Morgan, Bowling, Bartram & Kayser, 2017).

Ritchie & Roser (2019) conducted the study on barriers to Water, Sanitation and Hygiene (WASH) practices and the results of the review showed that Southern Africa is among the regions with the lowest basic sanitation coverage of homes that have access to clean and safe drinking water. Further, the review has shown that the WASH conditions in Southern Africa do not equate to the improved WASH standards described in the SDG 6 on ensuring access to water and sanitation for all (Sibiya & Gumbo, 2013). Furthermore, the review identified inadequate knowledge of water-borne illnesses linked to poor WASH practices and inadequate financing of WASH infrastructure in schools and homes, as the key barriers amongst others (Jasper, Le & Bartram, 2012). To address the barriers, the government needs to strengthen their efforts to increase investments targeted to improve WASH infrastructures.

Hand washing is a simple, convenient, and cost-effective means to limit the transmission of communicable diseases, and the availability of standardized latrines,

sufficient water-supply systems, and antimicrobial soap in the schools play an important role to enhance proper hand-washing practices (Eshetu, Kifle & Hirogo, 2020). The study of Knowledge, Attitude and Practices (KAP) on hand washing conducted among primary schools' learners in Southern Ethiopia revealed that many learners reported not washing their hands after defecation, few learners had good practices. The results of the study showed that there is a huge gap between KAP of hand wash in primary schools (Eshetu et al, 2020).

Sanitation facilities in rural primary schools in Limpopo often face significant challenges. Many schools lack access to basic amenities such as clean water sources, functioning toilets, and handwashing facilities. Inadequate infrastructure not only hinders proper hygiene practices but also contributes to the spread of diseases among learners (Sibiya & Gumbo, 2013). The absence of proper sanitation facilities can lead to increased absenteeism due to illnesses caused by poor hygiene conditions (Setati, 2019). It is crucial for school learners to have knowledge about sanitation as it directly impacts their health outcomes and overall well-being. Understanding proper hygiene practices can help prevent the spread of infectious diseases such as diarrhoea, cholera, and respiratory infections among learners (Eshetu, Kifle, & Hirigo, 2020). Good sanitation habits also promote regular attendance at school by reducing illness-related absenteeism. By instilling proper hygiene practices early on, children can develop lifelong habits that contribute to their long-term health (Morgan, Bowling, Bartram, & Kayser, 2017).

Several factors influence the level of knowledge about sanitation among school learners in rural areas. Setati (2019) donate that, access to resources plays a significant role, as schools with limited funds may struggle to maintain adequate sanitation facilities or provide hygiene education materials. Additionally, educational levels among both students and teachers can impact awareness about proper hygiene practices (Jasper, Le, & Bartram, 2012). Cultural beliefs and societal norms may also influence attitudes towards cleanliness and personal hygiene. Existing programs and initiatives aimed at improving knowledge of sanitation among rural primary school learners in Limpopo are crucial for promoting better hygiene practices within communities (Setati, 2019; Sibiya & Gumbo, 2013). These programs often involve educating learners on proper handwashing techniques, toilet usage guidelines, and

waste disposal methods (Mamafha, 2022). By engaging with local communities and stakeholders, these initiatives help raise awareness about the importance of good sanitary practices.

Despite efforts to promote sanitation knowledge among school learners in rural areas, several challenges persist. Mapatse, Sabeta, Fafetine and Abernethy (2022) argue on limited resources and prove that it poses a major obstacle when trying to implement effective hygiene education programs or improve infrastructure within schools. Furthermore, Xilumani (2023) attest that cultural barriers also hinder behaviour change regarding cleanliness habits if traditional beliefs conflict with modern hygiene standards. Inadequate infrastructure further complicates efforts to ensure access to clean water sources or functional toilets within school premises (Mamafha, 2022).

Sekhukune District is in the Limpopo province of South Africa with a diverse population facing various socio-economic challenges. The district is known for its rich cultural heritage but also grapples with issues related to inadequate infrastructure and resources (Moagi, 2021 ). One specific challenge that stands out is the lack of access to proper sanitation facilities in many schools within the district. Poor sanitation not only poses health risks but also hinders learners' attendance and academic performance. When examining attitudes towards sanitation among primary school learners in Sekhukune District, it is important to consider cultural or societal factors that may influence these attitudes. Cultural beliefs around cleanliness or traditional practices related to hygiene can shape how learners perceive and prioritize sanitation behaviours. Understanding these dynamics is crucial for designing effective interventions that resonate with local communities and drive positive behaviour change.

Current practices of sanitation among primary school learners vary within Sekhukune District, with some schools implementing positive hygiene habits while others struggle due to limited resources or infrastructure constraints (Hofstetter, Bolding & van Koppen, 2020). Highlighting successful initiatives that promote handwashing or proper waste disposal can serve as models for other schools looking to improve their sanitary conditions. However, addressing areas needing improvement such as maintenance of facilities or access to clean water remains a pressing issue that requires collaborative efforts from stakeholders at all levels (Moagi, 2021). Therefore, this study argued that

there is a gap in sanitation knowledge, attitudes, and practices among learners in the primary schools, as evidenced by the researcher's lived experiences and practices on sanitation during the school visit as part of the researcher's work. The background herein encouraged the researcher to formulate the following question: What knowledge, attitude, and practices do primary school learners have when it comes to sanitation?

The theoretical contribution of the study is to identify the gaps on sanitation knowledge, attitudes, and practices among learners in primary schools. Undertaking the research on this ground is significant as it may alert the learners regarding acceptable sanitation practices. The study aimed at investigating the knowledge, attitudes, and practices of sanitation among learners in primary schools, in the Sekhukhune District, Limpopo Province.

## **1.2 Problem statement**

The problem addressed by this study entailed the knowledge, attitudes, and practices of sanitation among primary school learners in the Sekhukhune District. There are gaps in literature about sanitation attitudes, lived experiences and practices among learners in the Limpopo Province (Dugard, Langford & Anderson, 2017). The researcher observed that primary school learners lacked information on sanitation practices and have negative attitude towards sanitation practices. After visiting the primary schools in the Sekhukhune area and despite the availability of sanitation facilities, learners at public primary schools were not using the sanitation facilities correctly. Consequently, the researcher decided to conduct the study to research about the sanitation knowledge attitudes and practices among learners in the primary schools of Sekhukhune District, Limpopo Province.

WHO (2018) reported that in low and middle-income countries, about 842,000 people annually die due to inadequate sanitation, representing 58% of deaths by diarrhoea. WHO (2018) further reported that the highest number of deaths amongst children under the age of five, wealth disparities, malnutrition and poverty predominate in countries where open defecation is prevalent, and deaths of about 361 000 children under the age of five years could be saved through better sanitation. This showed that sanitation is a crucial global problem.

A study conducted by Dugard et al (2017) revealed that there is a need to conduct more research on sanitation and hygiene in schools to assess safe sanitation. If this problem is left unattended, it will have a negative impact on learners' health, the hygiene of the school environment and the community. Given the recent public health challenges related to Coronavirus Disease 2019 and its different strains, neglecting sanitation could be detrimental. Public health problems that could arise due to poor sanitation include the outbreaks and spread of endemics such as diarrhoea, cholera, malaria, and dysentery waterborne diseases and spread of Covid-19 pandemic due to poor hand washing practices, contaminated surfaces, and poor waste management.

According to the observations of UNICEF (2018), institutions such as World Bank has argued that the school environment characterised by lack of safe drinking water and other sanitation facilities, will be exposed to increased occurrences of cataclysmic illnesses among learners. This will lead to a high rate of absenteeism, declining classroom performance and an increased rate of early school dropouts. McFarlane, Ford, & Bukenya (2018) found that most of the schools surveyed in South Africa, had insufficient hand washing knowledge and learners did not have a routine usage of sanitation facilities.

The research assessed the problem by investigating the knowledge, attitudes, and practices of sanitation among learners in primary schools. The hope herein was that this study's findings would provide a better comprehension of the knowledge, attitudes, and practices of learners with regards to sanitation.

### **1.3 Purpose of the study**

The purpose of this study was to investigate the knowledge, attitudes, and practices of sanitation among learners in primary schools in the Sekhukhune District, Limpopo Province.

### **1.4 Research objectives.**

- To assess the knowledge, attitudes, and practices of sanitation among learners in the primary schools of Sekhukhune District, Limpopo Province.
- To describe the knowledge, attitudes, and practices of sanitation among learners in the primary schools of Sekhukhune District, Limpopo Province.

### **1.5 Research question.**

- What is the knowledge, attitude, and practice of sanitation among learners in the primary schools of Sekhukhune District, Limpopo Province?

### **1.6 Significance of the study**

This study may contribute to the body of knowledge in relation to the sanitation knowledge, attitudes, and practices among learners in a primary school context of Sekhukhune District. The findings may be used to develop indicators for monitoring and evaluating sanitation in primary schools. Sanitation knowledge and practices of learners in schools are crucial as they create a positive and an enabling academic environment. The study's findings may assist schools to identify sanitation needs and provide necessary teaching and training to encourage an efficient use of sanitation among learners, thus, fostering a positive learning environment, which will yield health benefits. The study may be beneficial to the Department of Health as they can use the findings to improve the strategic goals for sanitation at schools. The gaps identified might provide direction and strengthen operational plans on how the school can respond to sanitation challenges.

The findings might also assist the Department of Education to be aware of the gaps on literature about sanitation and so they can strengthen the school-based curriculum on health promotion. Gaps identified may serve as a source of information to alert the policy and decision-makers on the status of sanitation in the primary schools. The Department of Education can engage with the other stakeholders to come up with strategies to implement programmes directed towards combatting sanitation backlogs in the school setting. Schools have the obligation to follow schools' standard procedures.

It was evident that the learners may be empowered with knowledge and information but fail to practice the sanitation skills based on the information provided. They cannot transfer the information and good sanitation practice to the community where they live to provide a better quality of life which is measured by low morbidity and mortality rates, improving the health status of the community. Therefore, this study will assist the program implementers to develop learner's personal skills which encourage proper utilisation of sanitation for improved health outcomes among learners.

## **1.7 OUTLINE OF CHAPTERS**

### **1.7.1 Chapter 1: Introduction and Background**

This is the introductory chapter of the research report. It addresses various aspects of information revealing why the topic is important. The chapter first presents the background of the study, followed by the problem statement. Other aspects covered in this chapter include the purpose of the study, research objectives and the research question. Lastly, the chapter presents a section on the outline of the chapters for the mini dissertation.

### **1.7.2 Chapter 2: Literature review**

This chapter provides a review of literature related to knowledge, attitudes, and practices of sanitation among primary school learners to establish how the study fits within the existing body of knowledge. The first section reviews literature on knowledge, attitudes, and practices of sanitation among learners in primary schools from a global perspective, the Sub-Saharan perspectives on the knowledge, attitudes, and practices of sanitation among learners in primary schools whereas the third section reviews literature on knowledge, attitudes, and practices of sanitation among learners in primary schools from the South African perspective.

### **1.7.3 Chapter 3: Research Methodology**

The chapter elucidates procedures and methods followed when conducting the research study. The study used the quantitative research approach, a descriptive research design, a simple random sampling technique, the Slovin formula to calculate the appropriate sample and to select the sample size. Inclusion and exclusion criteria, recruitment strategy, issues of validity and reliability, data analysis, ethical considerations, and pre-test of data collection instrument conducted is also discussed in this chapter.

### **1.7.4 Chapter 4: Results of the study**

Chapter 4, presents and discusses the key results of the study. The results were obtained using the research data collection methods and instruments discussed in Chapter 3. It outlines and examines the findings relative to the objectives and the research questions. A descriptive statistical analysis was used, and the results are presented in tables.

### **1.7.5 Chapter 5: Discussion, Recommendations and Conclusion**

This last chapter of the report presents the summary of the findings in relation to the research objectives and research questions, recommendations to address the issues of sanitation among learners in the primary schools and the conclusion about the major findings. This chapter also provides an insight into areas for further research.

### **1.8 Conclusion**

Chapter 1 provides an overview of the study pertaining to the knowledge, attitudes, and practices of sanitation among learners in the primary schools in Sekhukhune District, Limpopo Province. It introduces the research problem upon which all the chapters are based to support the background to the study. Other areas discussed in chapter 1, include the purpose of the study and the research objectives. The division of the different chapters is also highlighted in this chapter.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter provides a review of the literature concerning the knowledge, attitudes, and practices of sanitation among learners in primary schools globally, internationally, and nationally. The literature reviewed emanated from all the written sources relevant to the topic, recommendations of different and relevant studies related to the research area. The search used different databases and resources, including Pubmed; South African Medical Research Council (MRC) database; Google Scholar; Public Library of Science (PLoS); University of Limpopo (UL) Library; UL Health Sciences Librarians; and the Limpopo Department of Health Reports. Publications released after 2017 were preferred and restricted selection gravitated towards those published or translated into English. The researcher read through, explored, and developed conclusions about the published research, theories, and policy documents (Brink, Van der Walt & Van Rensburg, 2018).

### **2.2. Overview of sanitation practices**

The historical perspective of sanitation practices dates to ancient civilizations where rudimentary methods such as waste disposal systems were developed to maintain cleanliness and prevent diseases (Harris & Helgertz, 2019). Throughout history, the evolution of sanitation practices has been marked by significant developments and changes aimed at improving living conditions and reducing the spread of diseases (Rosenqvist, Mitchell & Willetts, 2016). Organisations such as the Indus Valley Civilization, are known for their sophisticated sewage and drainage systems dating back to 2600 BCE (Khan, Angelakis & Rose, 2014). Similarly, the ancient Romans constructed aqueducts and public baths which reflected their understanding of the importance of clean water supply and hygiene (Roccaro, Santamaria & Vagliasindi, 2014).

Sanitation practices play a vital role in maintaining public health, environmental sustainability, and overall well-being in different settings including schools. Sanitation practices encompass a wide range of measures that are essential for creating healthy communities, ranging from basic hygiene promotion to advanced water treatment technologies (Rose, Angelakis & Rose, 2014).

As societies progressed through time, advancements in science and technology led to improved sanitation practices. The Industrial Revolution brought about urbanization on a large scale which necessitated better waste management systems to combat overcrowding and pollution issues (Roccaro, Santamaria, & Vagliasindi, 2014). The invention of the flush toilet by John Harrington in 1596 revolutionized personal hygiene habits, while the development of water treatment plants in the late 19th century significantly reduced waterborne diseases (Abellán, 2017). Sanitation practices are crucial for various reasons including public health protection by preventing the spread of infectious diseases such as cholera, typhoid fever, and diarrhoea (Deroo, Walter, & Graham, 2015). Proper waste management helps reduce environmental pollution and contamination of water sources which are essential for sustaining ecosystems and biodiversity (Jasper, Le, & Bartram, 2012). Furthermore, promoting good hygiene behaviours like handwashing can significantly reduce illness rates especially in vulnerable populations such as children under five years old (Sibiya & Gumbo, 2013).

Angelakis and Rose (2014) provides numerous types of sanitation practices that contribute to maintaining clean environments and ensuring public health safety. One of the major practices includes water treatment which encompasses processes like filtration, chlorination, and desalination to remove impurities from drinking water sources making them safe for consumption (Abellán, 2017). Waste management includes collection, disposal or recycling of solid waste materials generated from households or industries to prevent landfills from overflowing or causing air pollution (Angelakis, et al., 2023). Hygiene promotion campaigns educate communities on adopting good personal hygiene habits like regular handwashing with soap before meals or after using toilets to prevent infections transmission through contaminated hands (Sibiya & Gumbo, 2013). Sanitation facilities such as latrines or toilets provide safe disposal mechanisms for human waste thereby reducing open defecation rates which can lead to soil contamination with pathogens (Jasper, Le, & Bartram, 2012).

Despite numerous benefits associated with proper sanitation practices there are a plethora of challenges faced globally that hinder effective implementation strategies (Rose, Angelakis, & Rose, 2014). Limited access to clean drinking water sources particularly affects rural areas where infrastructure development is inadequate resulting in high morbidity rates from preventable diseases due lack safe drinking

water supply (Brown, Cavill, Cumming, & Jeandron, 2012). According to the World Health Organization (WHO) (2022), inadequate sanitation is responsible for 432 000 diarrheal deaths annually. Good sanitation not only improves individual health but also has broader socio-economic benefits by reducing healthcare costs and increasing productivity levels. Lack of infrastructure such as toilets or sewage systems remains a significant issue in many developing countries where open defecation is still practiced due to limited access to facilities (an der Voorden, 2013). Moreover, funding constraints hinder investments in upgrading existing infrastructure or building new sanitary facilities, especially in rural areas with poor resources.

In the contemporary society, government policies and initiatives play a central role in promoting good sanitation practices. For example, many countries have established regulatory frameworks for water quality standards and waste disposal guidelines to protect public health (Ezeudu, 2020). Mehta (2018) provides successful programs like India's Swachh Bharat Mission which have demonstrated how targeted government interventions can lead to tangible improvements in sanitation coverage and hygiene awareness among communities. Despite these efforts, governments face various challenges in implementing effective sanitation practices. For example, Hueso and Bell (2013) examined policy failure on sanitation and discovered that limited funding for infrastructure development, especially in low-resource settings, often hinders progress towards achieving universal access to basic sanitation services.

By reducing exposure to contaminated water sources and inadequate sanitary conditions, government-led initiatives contribute significantly to disease prevention efforts. Ferreira, et al. (2021); Whittington and Hanemann (2006); Louis and Magpili (2007) studies have shown that investments in sanitation infrastructure result in lower rates of diarrheal diseases and other water-borne illnesses, ultimately enhancing overall well-being among populations. International organizations also play a vital role in supporting governmental efforts to improve sanitation practices globally (Heidler, Nesi, Nikiema, & Lüthi, 2023). Collaborative partnerships between governments, NGOs, and multilateral agencies help leverage resources and expertise towards common goals such as expanding access to clean water and promoting proper hygiene behaviours in underserved regions (Banerjee & Morella, 2011).

### **2.2.1. Benefits of proper sanitation**

Throughout history, sanitation practices have evolved significantly in response to the growing understanding of the link between hygiene and health. According to You, et al. (2020), the implementation of improved sanitation measures has had a profound impact on public health by reducing the transmission of diseases through contaminated water and waste. From ancient civilizations' rudimentary sewage systems to modern wastewater treatment plants, advancements in sanitation have saved countless lives and improved overall quality of life (Abellán, 2017). One of the most significant benefits of proper sanitation is its direct impact on health outcomes. By providing access to clean water for drinking and bathing, as well as safe disposal of human waste, proper sanitation greatly reduces the spread of waterborne illnesses (Moagi, 2021). For example, according to the World Health Organization (WHO) (2022), improvements in water quality and sanitation could prevent around 842,000 deaths each year.

In addition to promoting public health, Banerjee, and Morella (2011) attest that, proper sanitation plays a critical role in protecting the environment. Inadequate sanitation practices can contaminate water sources with pathogens and pollutants, posing risks to ecosystems and biodiversity (Daramola & Olowoporoku, 2016). By investing in sustainable wastewater treatment systems and promoting responsible waste management practices, Ekong (2015) argue that societies can safeguard natural resources for future generations. Furthermore, according to Seetharam (2015), there are substantial economic benefits associated with investing in proper sanitation infrastructure. Preventing diseases through improved hygiene practices not only reduces healthcare costs but also leads to significant cost savings related to increased productivity and reduced absenteeism (Banerjee & Morella, 2011). A study by WHO and UNICEF (2023) found that every dollar invested in water supply and sanitation yields an average return of \$4.30 in saved healthcare costs and increased productivity.

Access to proper sanitation is not only a matter of health or economics but also one of social justice. Unequal distribution of sanitary facilities often results in marginalized communities bearing the brunt of inadequate hygiene conditions (Azqueta & Montoya, 2017). Lack of access to toilets or clean water perpetuates cycles of poverty and

inequality by limiting educational opportunities for children who fall ill due to poor sanitation (Eshetu, Kifle, & Hirigo, 2020). Living in unsanitary conditions can have severe psychological effects on individuals as well. The stress and stigma associated with inadequate hygiene practices can lead to feelings of shame and low self-esteem among those living without basic sanitary amenities (Mehta, 2018; Mamafha, 2022). Conversely, promoting good hygiene habits can improve mental well-being by instilling a sense of dignity and self-respect. Morgan, et al. (2017) and Ezeudu (2020) studies demonstrate the positive outcomes associated with implementing proper sanitation solutions. For instance, Singapore's holistic approach to wastewater management has transformed its once polluted rivers into thriving ecosystems while ensuring a reliable source of clean water for its residents (Luan, 2013). Similarly, community-led total sanitation initiatives in countries like India have successfully mobilized local populations towards building their own toilet facilities, resulting in improved health outcomes at the grassroots level (Hueso & Bell, 2013).

#### **2.2.1.1. Health Benefits**

According to the WHO and UNICEF (2023), approximately 2.2 billion people worldwide lack access to safely managed drinking water services, leading to increased risks of waterborne illnesses. Improved sanitation infrastructure has been shown to significantly reduce disease transmission rates related to poor water quality. For instance, a study by Ghosh and Cairncross (2014) conducted in India found that areas with better sanitation coverage had lower incidences of diarrheal diseases compared to regions with inadequate facilities. Furthermore, promoting good personal hygiene through access to clean water and sanitation facilities leads to reduced risks of infections or illnesses (Patil et al., 2018). Handwashing with soap after using the toilet or before handling food can prevent the spread of pathogens that cause various infectious diseases (Sibiya & Gumbo, 2013). Curtis and Cairncross, 2003 and Burton, et al. (2011) studies have demonstrated that simple hygiene interventions like handwashing can reduce respiratory infections by up to 16% and diarrheal diseases by almost half. Therefore, integrating personal hygiene promotion within broader sanitation initiatives is critical for improving overall public health outcomes.

Communities stand to benefit greatly from improved sanitation practices through reduced illness rates and overall well-being enhancement. Access to proper sanitation facilities results in fewer cases of infectious diseases within populations, leading to healthier individuals and stronger communities (Harris & Helgertz, 2019). Moreover, promoting good hygiene behaviors fosters a culture of cleanliness that extends beyond personal health to societal well-being. As a result, investing in community-wide sanitation initiatives not only saves lives but also improves the quality of life for residents (Jasper, Le, & Bartram, 2012). Improved sanitation facilities contribute to the reduction of respiratory infections by minimizing exposure to indoor air pollution and airborne pathogens (an der Voorden, 2013). Inadequate sanitation conditions can lead to the accumulation of pollutants indoors, increasing the likelihood of respiratory issues such as asthma and bronchitis (Seetharam, 2015). By implementing proper sanitation measures like ventilation systems and waste disposal mechanisms, the prevalence of respiratory infections can be lowered, promoting better respiratory health among individuals (Azqueta & Montoya, 2017). Proper waste management and sanitation infrastructure play a vital role in controlling vector-borne diseases such as malaria and dengue fever.

Stagnant water bodies resulting from poor waste disposal practices create breeding grounds for disease-carrying vectors like mosquitoes (Safo-Adu, 2019). Through effective waste management strategies and regular cleaning efforts, the proliferation of these vectors can be mitigated, reducing the incidence of vector-borne illnesses within communities (Huuhtanen & Laukkanen, 2009). Access to clean water and adequate sanitation facilities also contributes to improved nutrition absorption and overall growth, particularly among children (Omambia, 2010). Poor sanitation conditions can lead to contamination of food sources and water supplies, compromising nutritional intake and hindering growth development (Curtis & Cairncross, 2003). By ensuring hygienic living environments with safe drinking water sources, individuals are better equipped to maintain good nutrition levels essential for healthy growth outcomes (Banerjee & Morella, 2011). Moreover, living in a hygienic environment with proper sanitation facilities has psychological benefits that promote mental well-being (Huuhtanen & Laukkanen, 2009). A clean-living space instills a sense of security and comfort among individuals, reducing stress levels associated with unhygienic conditions. Additionally, having access to basic amenities like toilets

enhances dignity and self-esteem, contributing positively to mental health outcomes within communities (Safo-Adu, 2019; Seetharam, 2015).

#### **2.2.1.2. Environmental Benefits**

Proper sanitation plays a crucial role in maintaining environmental health by ensuring the safe disposal of waste and preventing pollution. One significant environmental benefit of proper sanitation is the reduction in water pollution (Daramola & Olowoporoku, 2016). By effectively managing human waste and wastewater, proper sanitation practices help prevent contamination of water sources such as rivers, lakes, and groundwater (Olowoporoku, 2016). Inadequate sanitation, on the other hand, can lead to the discharge of untreated sewage into water bodies, introducing harmful pathogens and pollutants. For instance, Duru, et al. (2017) discuss that open defecation near water sources can contaminate them with fecal matter, posing serious health risks to both humans and aquatic life. Furthermore, proper sanitation contributes to preserving ecosystems and biodiversity by preventing the release of harmful substances into the environment (Poortvliet, Sanders, Weijma, & De Vries, 2018). When waste is disposed of improperly, it can leach chemicals and toxins that disrupt local ecosystems. For example, dumping hazardous waste or plastic materials into natural habitats can have devastating effects on wildlife populations and vegetation (Inah, Uwadiogwu, Eko, & Inah, 2017; Daramola & Olowoporoku, 2016). Thus, proper implementing of waste management practices safeguards ecosystems from degradation and supports biodiversity conservation efforts.

Another important environmental benefit of proper sanitation is its contribution to mitigating climate change (World Health Organization, 2023). Effective waste management systems help reduce greenhouse gas emissions by promoting recycling, composting, and controlled incineration processes (Kohlitz & Iyer, 2021). Improper waste disposal methods such as open burning or landfilling generate methane gas which is a potent greenhouse gas that significantly contributes to global warming (Hyde-Smith, Zhan, Roelich, Mdee, & Evans, 2022). By adopting sustainable sanitation practices, communities can minimize their carbon footprint and combat climate change impacts associated with improper waste handling (Masoud, Alfarrar, & Sorlini, 2022). Proper sanitation plays a vital role in protecting marine life from pollution

caused by inadequate waste disposal practices. Pollutants like plastics, chemicals, and sewage runoff pose serious threats to marine ecosystems and species inhabiting oceans and seas (Daramola & Olowoporoku, 2016). For instance, marine animals often ingest plastic debris mistaken for food or become entangled in discarded fishing gear leading to injuries or death (Inah, Uwadiogwu, Eko, & Inah, 2017). By ensuring proper disposal of wastes on land before they reach water bodies through runoff or direct dumping at seashores helps safeguard marine environments from contamination (Olowoporoku, 2016).

### **2.2.1.3. Economic benefits**

Proper sanitation is a fundamental aspect of any society that plays a critical role in promoting public health, economic growth, and overall well-being. By providing access to clean water and adequate sanitation facilities, the spread of diseases can be effectively reduced (Banerjee & Morella, 2011). This leads to lower healthcare costs as fewer resources are required to treat preventable illnesses. Additionally, with better public health comes increased productivity among the population since individuals are less likely to fall ill or miss work due to waterborne diseases or poor sanitation conditions (Van Minh & Hung, 2011). Increased Tourism and Investment is another crucial economic benefit associated with proper sanitation infrastructure. Areas that prioritize cleanliness and hygiene attract more tourists who seek a safe and healthy environment during their travels (Hans, 2023). Moreover, businesses are more inclined to invest in regions where basic amenities such as clean water and sanitation facilities are readily available (Whittington & Hanemann, The economic costs and benefits of investments in municipal water and sanitation infrastructure: a global perspective., 2006). This influx of tourism and investment boosts the local economy by creating jobs and generating revenue for the community.

Higher Agricultural Productivity is closely linked to proper sanitation practices as well. Access to clean water for irrigation purposes and hygienic conditions for fertilization play a vital role in enhancing agricultural output (Olowoporoku, 2016). When farmers have reliable access to water sources free from contamination, they can increase their crop yields which in turn contributes to overall economic growth through food security, surplus production for trade, and increased income for farming communities

(Daramola & Olowoporoku, 2016). Cost Savings for Businesses highlight how enterprises benefit economically from investing in proper sanitation measures within their premises (Cisneros, 2011). By providing employees with clean restroom facilities, handwashing stations, and waste management systems businesses can reduce absenteeism rates due to illness thus improving worker productivity levels significantly while also cutting down on healthcare expenses related to poor hygiene practices at work (Setati, 2019). Job Creation Opportunities arise from investments made in sanitation infrastructure projects leading not only construction but also maintenance-related positions along with other sectors involved such as wastewater treatment plants or recycling facilities which contribute significantly towards job creation avenues within communities fostering local economies sustainability over time (Azqueta & Montoya, 2017; Cisneros, 2011; Hans, 2023).

### **2.2.2. Factors influencing sanitation.**

Factors influencing sanitation practices are multifaceted and interconnected, encompassing historical, socioeconomic, cultural, infrastructural, governmental, health-related, educational, and awareness dimensions (Nyambe, Agestika, & Yamauchi, 2020). Understanding these factors is essential for addressing challenges related to improving global sanitation standards. Socioeconomic factors play a crucial role in determining access to proper sanitation facilities. Individuals with higher socioeconomic status tend to have better access to clean water sources and adequate toilet facilities compared to those living in poverty (Kabir, Roy, Begum, Kabir, & Miah, 2021). Disparities in sanitation services based on income levels are further exacerbated by geographical locations, with rural areas often facing greater challenges than urban centres in terms of infrastructure development (Akter & Ali, 2014).

Cultural influences also impact attitudes towards sanitation practices. Cultural beliefs and norms shape individuals' perceptions of hygiene and cleanliness, affecting their adherence to recommended sanitary behaviours (Muhele, 2016). Traditional practices related to hygiene vary across cultures, highlighting the importance of considering cultural contexts when promoting improved sanitation standards (Bankole, et al., 2023). Infrastructure and technology play pivotal roles in enhancing sanitation conditions. Access to clean water and proper waste disposal systems relies heavily

on robust infrastructure development and technological innovations (Daniel, Djohan, & Nastiti, 2021). Innovative solutions such as water purification technologies and sustainable waste management practices are instrumental in improving sanitation outcomes worldwide (Ferreira, Grazielle, Marques, & Gonçalves, 2021). Government policies and regulations play a significant role in promoting better sanitation practices at both local and global levels (Hofstetter, Bolding, & van Koppen, 2020).

Regulations related to public health standards, waste management protocols, and water quality guidelines help ensure compliance with sanitary requirements (Ezeudu, 2020). Government interventions can drive investments in sanitation infrastructure development while fostering community-wide behavioural changes towards more hygienic practices (Guppy, Mehta, & Qadir, 2019). Education plays a vital role in promoting good hygiene habits within communities. By raising awareness about the importance of proper sanitation practices through targeted education campaigns, individuals can be empowered to adopt healthier behaviours that reduce disease transmission risks associated with poor hygiene (Setati, 2019).

#### **2.2.2.1. Socioeconomic Factors**

Socioeconomic factors play a crucial role in determining access to sanitation facilities, which in turn significantly impacts public health and well-being. Income levels are one of the primary socioeconomic factors that play a crucial role in determining access to proper sanitation facilities (Rotowa, Olujimi, Omole, & Olajuyigbe, 2015). Lower income levels often correlate with limited access to improved sanitation services. According to data from the World Health Organization (WHO) (2022), individuals living in poverty are more likely to lack access to basic sanitation, such as toilets or clean water sources. For example, in sub-Saharan Africa, where poverty rates are high, millions of people still practice open defecation due to inadequate resources for constructing latrines (Huuhtanen & Laukkanen, 2009). Education levels also have a profound impact on sanitation practices within communities. Higher education levels tend to be associated with better hygiene practices and awareness regarding the importance of sanitation for public health (Kong, et al., 2020). Educated individuals are more likely to understand the link between poor sanitation and disease transmission,

leading to improved behaviours around waste disposal and personal hygiene (Ouma, Okeyo, & Onyango, 2018).

Urbanization is another critical factor influencing sanitation infrastructure, particularly in rapidly growing cities across the globe. As urban populations continue to expand, there is an increasing strain on existing sanitation systems and services (Abellán, 2017). Challenges such as overcrowding, informal settlements, and insufficient funding make it difficult for urban areas to provide adequate sanitation facilities for all residents (Heidler, Nesi, Nikiema, & Lüthi, 2023). Employment opportunities can also shape access to improved sanitation within communities. Stable employment can increase household incomes, enabling families to invest in better sanitary facilities at home (Hofstetter, Bolding, & van Koppen, 2020). Moreover, workplaces with proper restroom facilities contribute to overall hygiene standards among employees. On the other hand, unemployment or underemployment may limit individuals' ability to afford or maintain adequate sanitation resources (Mapatse, Sabeta, Fafetine, & Abernethy, 2022).

Cultural beliefs and practices play a significant role in shaping attitudes towards sanitation within different societies. Deep-rooted cultural norms around cleanliness, privacy, or taboos related to waste disposal can either facilitate or hinder efforts towards improving sanitation practices (Kabir, Roy, Begum, Kabir, & Miah, 2021). Promoting cultural change through community engagement programs or targeted messaging campaigns can help shift perceptions and behaviours towards more hygienic practices (Luan, 2013). The interplay of these multiple socioeconomic factors creates complex disparities in access to proper sanitation worldwide. For instance, low-income urban dwellers with limited education may face compounded challenges in securing adequate sanitary conditions compared to wealthier households in rural areas with higher educational attainment levels (Kong, et al., 2020).

#### **2.2.2.2. Cultural Beliefs**

Cultural beliefs play a significant role in shaping individuals' behaviors and practices, including those related to sanitation. In the context of African cultures, various beliefs influence how communities perceive and engage with sanitation practices (Akpabio,

Water meanings, sanitation practices and hygiene behaviours in the cultural mirror: a perspective from Nigeria, 2012). In many African cultures, there is a strong belief in spiritual purity being interconnected with physical cleanliness (Eliud, Kiriimi, Mburugu, & Kiogora, 2022). For instance, among the Yoruba people of Nigeria, it is believed that maintaining cleanliness not only promotes good health but also wards off evil spirits (Akpabio, Water meanings, sanitation practices and hygiene behaviours in the cultural mirror: a perspective from Nigeria, 2012). As a result, there are specific rituals and taboos associated with sanitation practices to ensure spiritual well-being alongside physical health (Akpabio & Takara, Understanding and confronting cultural complexities characterizing water, sanitation and hygiene in Sub-Saharan Africa., 2014). Another prominent cultural belief influencing sanitation practices is the concept of community responsibility. In many traditional African societies like the Maasai tribe in Kenya and Tanzania, communal spaces such as water sources and latrines are considered shared resources that must be collectively maintained (Kasiva, 2023). This communal ethos fosters a sense of accountability towards keeping these areas clean and sanitary for everyone's benefit.

Some cultures associate certain diseases with supernatural causes rather than biological factors. For example, in parts of Ghana, illnesses like cholera or dysentery may be attributed to curses or witchcraft instead of poor hygiene practices (Akpabio & Takara, Understanding and confronting cultural complexities characterizing water, sanitation and hygiene in Sub-Saharan Africa., 2014). This belief can lead to misconceptions about the root causes of diseases and hinder efforts to promote proper sanitation measures based on scientific evidence (Jeil & Abass, 2021). Additionally, gender roles play a crucial role in shaping attitudes towards sanitation in many communities. In patriarchal societies like Swaziland or Zimbabwe, women are often responsible for household chores, including managing water sources and disposal of waste (Akpabio & Takara, Understanding and confronting cultural complexities characterizing water, sanitation and hygiene in Sub-Saharan Africa., 2014).

These gendered expectations can impact women's access to resources for maintaining proper hygiene standards and ultimately affect overall community sanitation levels (Zakiya, 2014). The significance attached to traditional rites and ceremonies influences how sanitation practices are carried out in many cultures. For

instance, during initiation rites among certain ethnic groups in South Africa or Zambia, participants may undergo purification rituals that involve specific cleansing procedures tied to cultural beliefs (Allegranzi & Pittet, 2009). These rituals reflect deeply ingrained perceptions about purity and cleanliness within these communities.

### **2.2.2.3. Infrastructure**

The development and maintenance of infrastructure such as water supply systems, sewage networks, waste management facilities, and toilet facilities are essential for promoting proper sanitation practices and improving public health outcomes (Kabir, Roy, Begum, Kabir, & Miah, 2021). In the context of sanitation, Kramm and Deffner (2018) defines infrastructure as the physical structures and systems that support hygiene practices and facilitate the safe disposal of waste. This includes but is not limited to water treatment plants, sewerage systems, public toilets, handwashing stations, solid waste management facilities, and drainage systems (Kramm & Deffner, 2018). Adequate infrastructure is crucial for ensuring access to clean water, proper sanitation facilities, and effective waste management services. Well-developed infrastructure can significantly improve hygiene standards by providing communities with access to clean water sources and safe sanitation facilities (Huuhtanen & Laukkanen, 2009). For example, the implementation of piped water systems can reduce reliance on contaminated water sources such as rivers or ponds for drinking purposes (Abellán, 2017).

In urban areas like Accra, Ghana's capital city, the lack of adequate sewage systems has led to open defecation practices in low-income neighbourhoods where access to toilets is limited (Jeil & Abass, 2021). This not only poses health risks but also contributes to environmental pollution. Challenges faced by communities in developing adequate infrastructure for sanitation purposes include limited financial resources, inadequate technical expertise, rapid urbanization leading to overcrowding in cities without corresponding infrastructural development plans; geographical constraints such as arid environments or flood-prone regions that make traditional infrastructural solutions challenging; political instability affecting long-term planning efforts; cultural beliefs influencing perceptions around modern sanitation technologies

(Akpabio, Water meanings, sanitation practices and hygiene behaviours in the cultural mirror: a perspective from Nigeria, 2012; Akter & Ali, 2014; Banerjee & Morella, 2011).

Government policies play a crucial role in addressing the nexus between infrastructure development and sanitation improvement. By prioritizing investments in critical infrastructural projects aimed at enhancing sanitation facilities across urban and rural areas alike governments can effectively tackle issues related to poor hygiene practices within their populations (Ferreira, Grazielle, Marques, & Gonçalves, 2021). Furthermore, promoting behavioral change among citizens through awareness campaigns education programs is essential ensure sustainable maintenance newly implemented facilities (Hofstetter, Bolding, & van Koppen, 2020). Community involvement also plays a vital role in ensuring the success of infrastructure projects aimed at improving sanitation practices (Jeil & Abass, 2021). Community members should be engaged from planning stages all way through implementation maintenance promote sense ownership responsibility towards communal assets (Omambia, 2010). Behavioral change is a necessary component of achieving long-term sustainability ensuring that individuals adopt hygienic behaviors within their daily lives.

### **2.2.3 Contemporary policies for proper sanitation**

In today's interconnected world, the issue of proper sanitation has garnered significant attention from policymakers, public health experts, and communities alike. The importance of adequate sanitation cannot be overstated, as it plays a crucial role in promoting public health and well-being. Key developments such as the establishment of global targets like the Sustainable Development Goal 6: Clean Water and Sanitation, have shaped contemporary approaches to addressing sanitation challenges (Cisneros, 2011; Ghosh & Cairncross, 2014; Akpabio, Water meanings, sanitation practices and hygiene behaviours in the cultural mirror: a perspective from Nigeria, 2012). On an international scale, collaborative initiatives have been established to address global sanitation issues through agreements like the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, which tracks progress towards achieving universal access targets by 2030 (Rakotomanana, Komakech, Walters, & Stoecker, 2020).

Organizations such as UN-Water play a pivotal role in coordinating efforts among various stakeholders including governments, NGOs, private sector entities researchers and local communities toward improving global sanitary conditions (Baumgartner & Pahl-Wostl, 2013). These partnerships underscore the collective responsibility shared by nations worldwide in promoting proper hygiene practices sustainable resource management and equitable access to essential services (Huuhtanen & Laukkanen, 2009). At a national level different countries have implemented diverse policies programs strategies tailored their unique socio-economic contexts promote better sanitary conditions amongst their populations (Ezeudu, 2020). For instance, India's Swachh Bharat Abhiyan (Clean India Mission) launched by Prime Minister Narendra Modi aims eliminate open defecation raise awareness about importance personal hygiene across rural urban areas (Swain & Pathela, 2016). Evaluating effectiveness these initiatives require comprehensive data monitoring evaluation mechanisms measure impact on public health indicators adherence improved sanitary behaviours within target populations, key components successful program implementation sustainability long-term results (Baumgartner & Pahl-Wostl, 2013).

Community engagement participation are crucial aspects fostering lasting behavioural change regarding sanitary practices. By involving residents' decision-making processes planning implementation maintenance projects stakeholders can ensure greater ownership investments infrastructural improvements increased compliance with recommended guidelines waste management protocols (Eshetu, Kifle, & Hirigo, 2020; Kabir, Roy, Begum, Kabir, & Miah, 2021). Empowering individuals take charge their own health safety instils sense pride belonging creates conducive environment reinforcing positive habits improve overall well-being entire communities (Luan, 2013). Technological advancements innovation also plays integral roles transforming landscape accessible affordable efficient sanitization solutions (Inah, Uwadiogwu, Eko, & Inah, 2017). From new toilet designs that require minimal water energy operate smart sensors monitor usage alert maintenance needs technology offers array tools enhance provision basic services marginalized populations hard reach regions, bridging gaps traditional infrastructure logistical barriers hamper progress achieving universal coverage essential amenities households globally (Rotowa, Olujimi, Omole,

& Olajuyigbe, 2015; Luan, 2013; Rakotomanana, Komakech, Walters, & Stoecker, 2020).

Contemporary policies aimed at improving sanitation in African countries encompass a range of initiatives focused on enhancing infrastructure development, promoting hygiene education, and fostering community participation (Angelakis, et al., 2023). These policies often emphasize sustainable solutions that address long-term challenges related to sanitation. One notable example of successful sanitation programs is Rwanda's National Hygiene Program (NHP). The NHP focuses on promoting good hygiene practices at the community level through education campaigns and infrastructure improvements (Stone & Ndagijimana, 2018). As a result of this program, Rwanda has seen significant improvements in public health indicators related to water and sanitation. Regional collaborations such as the African Union's "AfricaSan" initiative have played a pivotal role in promoting proper sanitation practices across the continent (Bongartz, 2008). Through partnerships with international organizations like UNICEF and WHO, AfricaSan has facilitated knowledge-sharing among African nations, supported capacity-building initiatives for policymakers, and advocated for increased investment in sanitation infrastructure at a regional level (Baumgartner & Pahl-Wostl, 2013). These collaborative efforts have helped raise awareness about the importance of proper sanitation while fostering coordinated action towards achieving common goals.

### **2.3. Global perspective of knowledge, attitudes, and practices of sanitation among learners in primary schools**

Sanitation plays a vital role in primary schools as it directly impacts the health and overall well-being of learners. Poor sanitation can lead to various health issues such as diarrheal diseases, parasitic infections, and respiratory illnesses (Akpabio, Water meanings, sanitation practices and hygiene behaviours in the cultural mirror: a perspective from Nigeria, 2012). These health problems not only affect the physical well-being of learners but also hinder their academic performance (Huuhtanen & Laukkanen, 2009). Absenteeism due to illness caused by poor sanitation can result in missed learning opportunities and ultimately impact educational outcomes (Ezeudu,

2020). On a global scale, there are disparities in knowledge regarding sanitation among learners in primary schools. While some regions have comprehensive education programs on hygiene and sanitation practices, others lack access to such information (Heidler, Nesi, Nikiema, & Lüthi, 2023). This discrepancy contributes to varying levels of awareness and understanding among students worldwide when it comes to proper sanitation methods (Kasiva, 2023).

Attitudes towards sanitation among learners are influenced by various factors including cultural norms, socioeconomic status, and educational initiatives (Huuhtanen & Laukkanen, 2009). Learners' perceptions of cleanliness and hygiene are shaped by societal beliefs and behaviors prevalent in their communities (Eshetu, Kifle, & Hirigo, 2020). Educational campaigns promoting good sanitary practices can help shift attitudes towards prioritizing hygiene both at school and home (Inah, Uwadiogwu, Eko, & Inah, 2017). The actual implementation of proper sanitation practices among learners varies across different regions globally. While handwashing with soap after using the toilet is considered a basic practice for maintaining hygiene, challenges such as limited access to clean water sources or adequate toilet facilities pose obstacles for many primary schools (Zakiya, 2014; Setati, 2019). Addressing these infrastructural gaps is crucial for ensuring that students can uphold good sanitary habits effectively.

### **2.3.1. Sanitation knowledge**

In the comprehensive State of the World's Children Report in 2020, UNICEF reported that more than 2 million school-going children lack access to a toilet facility (UNICEF, 2021). This deprivation of safe drinking water and the inadequate sanitation facilities have been significant drivers for undesirable morbidity among school children. UNICEF & WHO (2020) further reported that globally, over 1,000 children under 5 die every day of diarrheal diseases due to lack of appropriate WASH services. As a result, UNICEF drafted the strategic plan for 2022-2025 of which goal area 4 of the plan was to help ensure that every child has access to safe WASH services (UNICEF & WHO, 2020). To achieve this, in 2022 the WASH Thematic Fund supported UNICEF's work worldwide, in seven regions, 69 countries and territories. UNICEF provided WASH

services through direct support, assisted government strengthen nation WASH systems focusing on the most vulnerable children.

The study conducted by Pruss-Ustun, Wolf, Bartman, Clasen, Cumming, Freeman, Gordon, Hunter, Medicott & Johnston (2019), revealed that globally, diarrhea alone kills 850, 000 people every year, 300, 000 of which are children under 5 years. Further, inadequate WASH and poor hygiene practices remain an important determinant of global preventable diseases burden, especially among young children (Ferreira, Grazielle, Marques, & Gonçalves, 2021). For example, inadequate sanitation knowledge might cause children to defecate indiscriminately exposes their fellow school mates and themselves to high disease risk (Akpabio & Takara, Understanding and confronting cultural complexities characterizing water, sanitation and hygiene in Sub-Saharan Africa., 2014). As a result, basic knowledge on disease transmission, access to essential sanitation conditions, and practicing essential hygiene might help maintain health and prevent the spread of diseases (Kong, et al., 2020).

### **2.3.2. Attitude towards sanitation**

About 1.8 million children under the age of 5 die each year from diarrheal diseases and pneumonia, the top two killers of young children around the world (World Health Organization, 2023). As stated, it confirmed that many diseases and conditions are spread by not washing hands with soap and clean running water. Learner's behavior and practice towards sanitation is influenced by the availability of proper sanitation services in schools (Ouma, Okeyo, & Onyango, 2018). According to the World Health Organization Advice for the Public (2022), to ensure good hygiene hands should be washed thoroughly and regularly with soap and clean water as this eliminates germs that may be on the hands, including viruses. The knowledge can be put into practice only if there is access to soap and clean water. Further, the Center for Diseases Control and Prevention (2023), reported that not washing hands harms children globally.

Attitudes, especially efficacy beliefs serve as significant predictors of preventive behaviors, implying that promoting preventive behavior towards Coronavirus-2019 would require promoting both knowledge and efficacy beliefs among the public (Lee,

Kang & You, 2021). This study also displayed that for the public to perform precautionary behaviors after acquiring information, they need to believe that such practices would be effective. For example, learners need to believe that washing hands would keep them from being infected by infectious diseases, beyond merely informed so, to perform and sustain behavior.

### **2.3.3. Sanitation practices**

According to the World Bank Report (2018) on drinking water, sanitation, and hygiene in school, globally 3.5 billion people lacked safely managed sanitation services and almost 8% of the population practiced open defecation. This poor sanitation practice exposed the entire population to communicable infections, including school going children who can easily transmit infections from learner to another. The report further highlighted that over 620 million children worldwide lacked a basic sanitation service at their schools, which hindered proper sanitation practice. The World Bank then developed strategies to assist countries address the sanitation challenges: ending open defecation and closing the loop from access to sanitation facilities. Jones (2022) highlights that in the poorest of rural areas in the world, at least 60% of the homes defecate in open plains. According to Momberg, Ngandu, Voth-Gaeddert, Ribeiro, May, Norris & Said-Mohamed (2021), more than 5.4 million school-going children are predisposed to decadent sources of drinking water such as dirty lakes, dams, and rivers. These practices exposed school-going children to risks of morbidity. Kotze & Coetzee (2019) reviewed schools' hand washing practices and concluded that washing hands with soap helped alleviate exposure to diarrheal and respiratory diseases. The study also found that despite the positive outcomes of washing hands with soap, schools that were studied did not have soap in their sanitation facilities.

Grover, Hossain, Uddin, Venkatesh, Ram & Dreibelbis (2018) study displayed that gastrointestinal and respiratory infections are major causes of absenteeism and morbidity among school-aged children, and that school-aged children tend to be particularly susceptible to such infections due to high levels of social contact, and poor hand and food hygiene. During the study students in some schools were thought to be using locations behind the latrine, behind the school and at some times, out of the

sight of observations altogether, which suggested that promotion of in-latrines toileting events in schools may also impact handwashing behaviors in schools.

#### **2.4. Sub-Saharan perspective of knowledge, attitudes, and practices of sanitation among learners in the primary schools**

Historically, sanitation practices in Sub-Saharan Africa have been influenced by cultural beliefs and traditions. The lack of access to proper sanitation facilities has been a longstanding issue due to factors such as poverty, inadequate infrastructure, and limited awareness about hygiene practices (Khan, Angelakis, & Rose, 2014). Cultural norms around cleanliness and waste disposal have also shaped the way individuals perceive and prioritize sanitation in their daily lives (Omambia, 2010). Currently, there is a growing body of research focusing on sanitation among learners in Sub-Saharan primary schools (Abellán, 2017). Duru, et al. (2017) and Hans (2023) studies have highlighted the disparities in knowledge levels regarding hygiene practices among learners from different socio-economic backgrounds. Recent research has shown that while some learners may have basic understanding of hygiene principles, others lack essential knowledge which can lead to increased vulnerability to waterborne diseases (Akter & Ali, 2014; Kabir, Roy, Begum, Kabir, & Miah, 2021).

Attitudes towards sanitation among learners in primary schools vary based on various factors including socio-economic status, education level, and cultural norms (Ezeudu, 2020). Learners from lower socio-economic backgrounds may face challenges accessing clean water sources or sanitary facilities at school which can impact their attitudes towards maintaining good hygiene practices (Eliud, Kirimi, Mburugu, & Kiogora, 2022). Additionally, cultural beliefs around privacy or gender-specific needs can influence how students perceive certain sanitary practices. The current practices related to sanitation among learners in primary schools often face barriers such as limited resources for maintaining clean facilities or insufficient training on proper hygiene protocols (Huuhtanen & Laukkanen, 2009). Challenges like overcrowded classrooms or lack of running water make it difficult for students to uphold good sanitary habits consistently (Kohlitz & Iyer, 2021). These obstacles contribute to higher

rates of absenteeism due to preventable illnesses caused by poor hygiene conditions at school (Olowoporoku, 2016).

Poor knowledge, attitudes, and practices of sanitation have profound implications for both education outcomes and public health in Sub-Saharan Africa (Akpabio & Takara, Understanding and confronting cultural complexities characterizing water, sanitation and hygiene in Sub-Saharan Africa., 2014). Learners who are frequently ill due to unsanitary conditions are more likely to miss school days which hinders their academic performance and overall educational attainment (Kong, et al., 2020). Moreover, inadequate access to proper sanitation increases the risk of infectious diseases spreading within school environments which can negatively impact the health of not only students but also teachers and staff members (Nyambe, Agestika, & Yamauchi, 2020; Stone & Ndagijimana, 2018).

#### **2.4.1. Knowledge of learners regarding sanitation**

The sub-Saharan study conducted by Amegah (2020) found that the level of knowledge of learners on waterborne diseases was high (78.45%), but their knowledge on transmission routes was inadequate. The study indicated that many of the respondents had no knowledge when it came to waterborne diseases prevention (80.11%), suggesting the need for continued awareness campaigns on waterborne diseases. Rombo, Lutomia & Malinga (2017) found that there was inadequate sanitation knowledge among learners, including in areas related to the use of hand washing and the essence of refuse collection bins by learners. The study conducted by Joseph & Josephine (2020) in Ghana revealed that 72% of school children were found to have knowledge of hand hygiene. The remaining 28% of learners without the correct knowledge is a gap of concern which needs to be closed, as learners might ingest germs from contaminated hands.

#### **2.4.2. Attitude of learners regarding sanitation**

A study by Shilunga et al (2018) found that two thirds of the learners (66.7%) of the learners had a poor attitude towards hygiene and sanitation and the majority were in grade 5 and 6. Moreover, learners who did not have adequate knowledge were young age groups 10-12 years and 13-15 years. This showed that the younger the learner,

the poorer their attitude towards sanitation. In the study, 51% of the school children reported washing hands before eating, and the majority (68%) were of knowledge that washing hands after defecation is important, however only 17.5 % reported follow this practice, which implies that the learners had negative attitude towards sanitation practices. In the study conducted by Dajaan, Addo, Ojo, Amegah, Fiagbe, Bechala & Benjamin (2018), all the children (100%) accepted the fact that it is significant to wash hands with water and soap when in school, however, the study identified a gap between knowledge and practice where 43% of the learners cited lack of water as the main reason why they will not wash hands when in school. This confirmed that learner's sanitation attitude and practice is influenced by the availability and accessibility of sanitation facilities in schools. Therefore, sanitation gaps need to be addressed in schools to enable learners to translate knowledge into practice.

#### **2.4.3. Sanitation practices in school**

Obadia, Mwanaidi, Edwin, Jonathan, Maryyusta, Yolanda & Robert (2023) found among other factors, knowledge of hand hygiene, forgetfulness, odor, influence of teachers and parents to be the influential factors for hand washing practices among school students in sub-Saharan Africa. Another Sub-Saharan study conducted by McMichael (2019) on sanitation in schools in Zambia observed that there was adequate knowledge, positive attitude, and good practices among learners, and this played a vital role in disease prevention both at personal and community level. On the other hand, Elington (2018) found that there was an increase in knowledge of hygiene and sanitation practices of school learners, which they shared with their families. However, observations pointed to continued poor practices in hand washing and water storage and handling due to not knowing its importance. These results show that learners' increased knowledge does not necessarily lead to improved hygiene practices.

Assessing hand hygiene knowledge, attitudes, and behaviors among Guatemalan primary school students, student's knowledge, attitudes, and self-reported practices regarding hand hygiene were positive (Pieters, Fahsen & Quezada, 2023). This reflected a promising health-conscious behavior foundation. Elias, Japhet & Thomas (2022) concluded that hygiene practices cannot be separated from the availability of

water and sanitation facilities including proper use of latrine and hand washing practices with clean water and soap. The study further revealed that most of the learners had a positive perception towards hygiene. In the study, about 81% of learners responded to wash their hands with water and soap, however, it was observed that no school had soap put on the tap for hand washing. This proved that the results were biased as evidenced by the observed sanitation practices, which is a gap that needs to be addressed in schools.

## **2.5. Southern African perspective of knowledge, attitudes, and practices of sanitation among learners in the primary schools**

In Southern Africa, many primary schools struggle with inadequate sanitation facilities, including a lack of clean toilets or handwashing stations. According to UNICEF (2018) data on Water Sanitation and Hygiene (WASH) in Schools in Eastern and Southern Africa, only 57% of schools had basic water services within 200 meters or less from where students learn. Additionally, only 47% had basic sanitation services available at school or within a 5-minute walk. These statistics highlight the challenges faced by many primary schools in providing adequate sanitation facilities for their learners. Poor infrastructure not only jeopardizes learners' health but also affects their overall learning environment. The level of knowledge regarding sanitation practices among learners varies across different regions in Southern Africa (Akter & Ali, 2014). While some learners may have received education on the importance of handwashing or toilet hygiene at home or through school programs, others may lack this essential information (Mapatse, Sabeta, Fafetine, & Abernethy, 2022). Educational initiatives such as hygiene promotion campaigns or incorporating WASH programs into the curriculum play a crucial role in improving awareness about proper sanitation practices among learners (Akter & Ali, 2014).

Attitudes towards sanitation among learners are influenced by various factors such as societal norms, and access to resources. For instance, some communities may prioritize traditional methods over modern hygiene practices due to cultural preferences or lack of awareness about the benefits of improved sanitary conditions (Duru, et al., 2017). Understanding these attitudes is essential for designing effective interventions that resonate with local values and beliefs. Common sanitation practices

observed among learners include using unclean toilets or skipping handwashing after using the restroom (Inah, Uwadiogwu, Eko, & Inah, 2017). These behaviors pose significant risks to students' health by increasing their susceptibility to infections like diarrhea or respiratory illnesses (Kohlitz & Iyer, 2021). Evaluating the effectiveness of existing practices is crucial for identifying gaps and implementing targeted interventions that promote good hygiene habits among learners (Xilumani, 2023).

### **2.5.1. Knowledge and attitude of learners regarding sanitation**

McFarlane et al (2018) conducted a study in the Gauteng Province of South Africa and found that the attitudes of schools and consequently of the learners towards sanitation were not progressive. Therefore, this was viewed as not comprehensive, which was a significant factor in hampering progress towards better sanitary health in schools. Most of the schools surveyed had insufficient hand washing knowledge and learners did not have a routine usage of sanitation facilities. Alemu (2017) found that the lack of adequate, separate, private, and well-built toilets and facilities for washing may discourage positive attitudes about sanitation. The report also highlighted problems such as inadequate sanitation and hygiene education and a lack of justification for the sanitary facilities by the school management (McFarlane et al, 2018).

### **2.5.2. Sanitation Facilities at school**

The study by Kelly (2022) showed that although there were adequate sinks for learners to wash hands, the taps were wrecked or stolen and there was also no running water from the taps due to negative attitudes of sanitation by learners. This therefore exposes one to the ecological model which argues that apart from the knowledge on sanitation, people's attitudes and practices are also influenced by other factors. Tseole, Mindu, Kalinda & Chimbari (2022) indicated that irrespective of the fact that a healthy and a dignified life experience requires adequate water, sanitation, and hygiene coverage, in many communities of Southern Africa, inadequate WASH resources remain a significant public health challenge.

The report (Equal education) by McFarlane et al (2018) on school sanitation and hygiene advocacy showed that learners were more inclined to wash hands after defecating but were reluctant to wash hands after urinating (Majodina, 2022). They

also did not wash their hands before drinking water from a tap or hand pump. Learners could not wash hands at school because the sanitation structures around them were poor, as some did not function adequately for reasons stemming from poor design and the entire construction, some equipment's were stolen or damaged and more seriously, there was no access to running water (Pillay, 2022).

### **2.5.3. Behavior changes among learners**

Lack of proper WASH facilities in schools is worrisome. In most cases learners are taught about sanitation, however they find it difficult to translate the knowledge taught at school and home into practice due to the exposure of poor sanitation conditions such as scarcity of water, damaged latrines and more, both in school and at home. While the level of sanitation knowledge is high among learners, it does not correlate with the hygiene practices because of insufficient sanitation facilities and their compromising settings that do not meet learners needs. Learners do not always reflect the knowledge they have, since they are underprivileged to practice proper sanitation-related performances they are taught (Shilunga et al, 2018).

The study conducted in Zimbabwe revealed that the learners could not wash their hands after defecation due to having no facilities for washing hands and other learners believed handwashing to be of little importance (Lamard-Scotford, Pfavayi, Kasambala, Choto, Vengesai, Lim et al, 2022). The situation could lead to diarrheal disease. The report (Equal Education) concluded that hand washing is practiced in schools, but the limitation is the availability of facilities to ensure that such practices are carried out as desired or designed (McFarlane et al, 2018). WHO (2018) concluded that learners had good knowledge on hand washing practices, although schools had inadequate hand washing facilities, including soap items to improve their practice. The school environment does not seem to create an enabling environment for learners to change behavior regarding sanitation practices.

## **2.6. Conclusion**

This chapter reviewed existing, recent literature Globally, Sub-Saharan Africa, and in African regions on sanitation knowledge, attitudes, and practices. Factors hampering the progress towards better sanitation knowledge, attitudes, and practices among learners in primary schools were explored. Similar studies conducted in different

countries were also reviewed. It was interesting to note that some studies found adequate knowledge, positive attitudes, and practices on sanitation among learners, while other studies found the same factors inadequate.

## **CHAPTER 3: RESEARCH METHODOLOGY**

### **3.1 Introduction**

The research methodology explains the plan and the structure followed to answer the research question, the instrument used to measure constructs and the methods of data collection (Creswell & Creswell, 2017). This chapter presents the research methodology followed in this study to accomplish the objectives. It includes the research approach, research design, research setting, population, sampling and sample size, selection criteria, recruitment strategies, instruments for data collection, the process of collecting data from the respondents and the methods of analysing data for the study. This is followed by a discussion of the techniques that were used to ensure validity and reliability in the study and to minimise bias, and a description of all the ethical considerations that were observed before and after the data collection.

### **3.2 Research approach.**

Walliman (2017) defines a research approach as the systematic process of collecting, analysing, and interpreting information to give a thorough understanding of the phenomenon of interest. The researcher used the quantitative research approach to investigate the study problem and achieve the said objectives. A quantitative research approach utilises a numerical analysis of the data generated using a structured questionnaire to investigate the study problem (Grove, Gray & Burns, 2017). In quantitative research, data can be manipulated and presented in numerical forms (Silvermann, 2017). Moreover, quantitative research is based on the measurement of amount, which is applicable to phenomena that can be expressed in terms of quantity (Sekaran & Bougie, 2019). The study was quantitative since it was concerned with the gathering of numerical data and the respondents were given structured questionnaires to complete.

### **3.3 Study Design**

According to Creswell & Clark (2017), a research design is a framework that is devised to guide the collection and analysis of data. The study followed the descriptive research design to ensure that a conceptual rationale for the phenomena being studied is presented. Descriptive studies involve gathering information in a practical field through the provision of a picture of the phenomena as it occurs naturally, thus describing the variables to answer the research question (Grove et al, 2017). The

selected study design was suitable for the study, as it ensured that the data acquired for the study could be measured using numerical values for the statistical analysis of the population sample, to ensure that the results are valid and reliable. The survey was used to measure the descriptive numbers related to the respondents' demographic characteristics, and their level of sanitation knowledge, attitudes, and practices in schools.

### 3.4 Study Setting

The study setting is a school environment, which is unique in nature and to some extent predisposes this research to raw data (Grove et al, 2017). The study was conducted in primary schools of the Sekhukhune District, Greater Fetakgomo-Tubatse Municipality. Greater Fetakgomo-Tubatse Municipality is a Local Municipality within the Sekhukhune District located north of the N4 highway, Middelburg, Belfast and Mbombela, and East of the N1 highway. It is located near the border of the two provinces of South Africa, Limpopo, and Mpumalanga. The locally spoken language is Sepedi. The study was conducted at Bogwasha Circuit, situated in Burgersfort Township as depicted in Figure 1 below.



Figure 3.1 Sekhukhune District map

### **3.5 Study Population**

Silvermann (2017) argues that a population is the total number of subjects that are of interest to the research study. In this study, the population comprised all learners within primary schools of the Sekhukhune District, Bogwasha Circuit. Bogwasha Circuit has 18 primary public schools with a total of 8607 learners. A total of 942 learners are in grade 6 and 7665 learners are in other grades. Learners in 9 selected primary schools constituted a population. In the Sekhukhune District, the nature of learners in primary schools is influenced by various factors that shape their educational experiences and outcomes. Sanitation is one of the crucial factors that influence learners' academic performance and overall health.

### **3.6 Target population**

The target population refers to the specific group of individuals or elements that researchers aim to investigate and draw conclusions about based on their study findings. It serves as a cornerstone in research design, guiding decisions on sampling, data collection, and analysis methods (Creswell & Clark, 2017). Therefore, the target population of this study is all learners within primary schools of the Sekhukhune District who are in grade 6. Thus, the target population from all schools are 661 grade 6 learners, from public schools. The study targeted Grade 6 learners, because they are older and cognitively developed to be able to read, write, and comprehend coherent meanings. School A had (108 learners), School B (14 learners), School C (114 learners), School D (98 learners), School E (105 learners), School F (121 learners), School G (52 learners), School H (26 learners) and School I had (23 learners). The above-indicated target population assisted the researcher in establishing the number of learners eligible to participate in the study. The circuit provided a database for the total number of learners in grade 6 which made it easy to get the exact number of grade 6 learners.

### **3.7 Sampling**

The probability sampling was used in the study, and it refers to the predetermined chance of any individual being selected for the study, given the constraints under study (Creswell & Creswell, 2017). Simple random sampling is a probability sampling type where a researcher selects only available samples from the target population (Grove

et al, 2017). A simple random sampling was used to select participating schools. In total Bogwasha Circuit has 18 primary schools within Greater Fetakgomo-Tubatse Municipality.

### 3.7.1 Sampling of schools

The simple random sampling method using fishbowl technique was used to select the schools for the study. The list of the primary schools was obtained from the Sekhukhune District Municipality's Department of Education. The list had a total of eighteen primary schools within the study setting. Following the fishbowl technique, the researcher prepared eighteen small papers with school names and put them in the bowl. Nine schools out of eighteen provided more than 10 percent of the sample size. The nine schools picked from the bowl by the researcher were automatically sampled and each school was then coded as school A, B, C, D, E, F, G, H, and school I.

### 3.7.2 Sample size.

There are various ways to obtain a sample size from a target population of the study, and this could be electronic or non-electronic. In this study, non-electronic approach with a sample calculating method of Slovin's formula was used to calculate an appropriate sample size from the population. The Slovin's formula has a confident level of 95% and a margin error of 0, 05 (Adhikari, 2021).

N= total population                      e= error margin                      n= sample size

N= 661    e= 0.05

$$n = N \div (1 + Ne^2)$$

$$n = \frac{N}{1 + Ne^2}$$

$$= \frac{661}{1 + 661(0.05)^2}$$

$$= \frac{661}{1 + 1,6525}$$

$$= \frac{661}{2,6525}$$

n=249

Considering the above figures, a minimum sample of 249 participants was calculated. The researcher collected data from 249 grade 6 learners within 9 sampled primary schools. The sample number of 249 was divided proportionally amongst the 9 schools.

The proportion of grade 6 learners from each school was calculated by: (School sample ÷ population size) × sample size. Therefore, the proportions of schools were calculated on the table below:

Table 3.1 calculated proportions of participating schools

School	Calculation	Total	School	Calculation	Total	School	Calculation	Sub- Total	Total
A	$(108 \div 661) \times 249$	40,6 =41	D	$(98 \div 661) \times 249$	36,9 =37	G	$(52 \div 661) \times 249$	19,5 =19	97
B	$(14 \div 661) \times 249$	5,7 =6	E	$(105 \div 661) \times 249$	39,5 =39	H	$(26 \div 661) \times 249$	9,7 =10	55
C	$(114 \div 661) \times 249$	42,9 =43	F	$(121 \div 661) \times 249$	45,5 =45	I	$(23 \div 661) \times 249$	=9	97
<b>TOTAL NUMBER OF SCHOOLS =</b>									<b>249</b>

### 3.7.3 Sampling of respondents

The simple random sampling method using the fishbowl technique was used to select learners from the sampled schools. The papers in the bowl were written alphabet A, B and C. The total number of papers with alphabet A were equivalent to the sample size needed from each school. Learners who picked alphabet A automatically were selected to participate in the study.

- **Inclusion criteria**

Grade 6 learners from the sampled schools, who were sampled to participate in the study and have signed Assent forms.

- **Exclusion criteria**

Grade 6 learners from the sampled schools, who were not sampled to participate in the study and do not have signed given assent forms.

### 3.8 Data collection

The researcher collected data in March 2023.

#### 3.8.1 Recruitment Strategy

After obtaining clearance from the Turfloop Research Ethics Committee (TREC) to conduct research (see Annexure 1: approval from university), permission was also received from the Provincial Office of the Basic Department of Education (DoBE) (see Annexure 3: letter of approval), and Sekhukhune Department of Education District

Circuit Office (see Annexure 5: letter of approval). Thereafter, the researcher made a phone call appointment with the school principals from each sampled schools to meet and discuss the purpose of the study and requested to be assisted in identifying grade 6 classes.

After the grade 6 classes were identified, the researcher requested a meeting with the learners the same day to explain the focus of the study and the content of the questionnaires prior the actual data collection. The purpose of the study was explained thoroughly, and the study information sheets were made available to the learners who preferred to read about the study (see Annexure 10: participant information sheet). Sampling of participants was done, and the learner's Assent forms provided and signed by the learners (see Annexure 9: Child Assent Form). The parents were accessed via the learners to sign the consent forms. The day the researcher had a meeting with the learners, the consent forms and the information sheets for the parents were given to the sampled learners to take home (see Annexure 8: parent consent form, and Annexure 11: parent information sheet). The parents signed the consent forms at home. On the day of the actual data collection, learners handed over the signed consent forms of their parents to the researcher. All the parents of the sampled learners signed the consent forms.

### **3.8.2 Data collection instrument**

To address the objectives of this study, data was collected using a questionnaire. This study used pre-designed and structured questionnaires to collect data as it was consistent with the research questions (Brace, 2018). The tool for data collection of the survey was a questionnaire with closed-ended questions and was pre-tested. The questionnaire was developed in English and translated to Sepedi, a locally spoken language by the researcher with assistance from the supervisor (see Annexure 6: English version questionnaire, and Annexure 7: Sepedi version questionnaire). The researcher used five points Likert Scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree). Section A of the questionnaire inquired about biographical information such as gender, age, and grade, Section B had questions on sanitation knowledge, Section C had questions on sanitation attitudes, and Section D focused on sanitation practices among primary school learners.

### **3.8.3 Pre-test of Instrument**

Pre-testing of the questionnaire was conducted prior the study in one school, which was out of the sample among the grade 6 learners, to check the relevance of the questionnaires, how long it will take to administer and to correct and align questions that were not clear before the actual data collection. Pre-test of questionnaire was conducted on a smaller group of 10 grade 6 learners. Three of the learners opted to answer the English version questionnaire and the remaining 7 learners opted for the Sepedi version questionnaire. Each learner completed the questionnaire in about an hour. The participants were asked to give the feedback. All the learners reported that the questions were specific and easy to answer. The researcher expected the learners to seek clarity on some questions. No learner experienced difficulties in responding to the questionnaire. The results of pre-testing of the questionnaire revealed that the questionnaire was relevant and appropriate, and questions were clear as the participants did not raise any question nor experience problems during data collection. Therefore, no changes were made on the questionnaire prior to conducting the data collection for the main study. The results of this small-scale study were not included in the large main study as its aim was to test the feasibility of the study by determining quantity and efficiency of the questionnaire and recruitment process. The findings proved validity and reliability of the data collection tool and helped to ensure the smooth flow of the actual fieldwork.

### **3.8.4 Data Collection Procedure**

Time for availability of participants was checked with the school principal to avoid interrupting classroom lessons. Before data collection, the researcher provided sufficient information and background on the research topic of sanitation to the participants. The purpose of the study was explained thoroughly to the participants. Study information sheets were made available to the participants who preferred to read about the study. The researcher collected data using a researcher-administered questionnaire. Data were collected in a classroom environment. A separate classroom was arranged for data collection where learners assumed the test/examination sitting arrangement to avoid sharing information. Data was collected after learners had lunch. It took the participants an hour to complete the questionnaire. The researcher collected all questionnaires back and kept them safely in a sealed envelope. The researcher thanked the learners and teachers for participating in the study.

### **3.9 Data Analysis**

Quantitative data analysis deals with data in the form of numbers and uses mathematical operations to investigate their properties. Some of the primary purposes of quantitative analysis are to measure, make comparisons, examine relationships, make forecasts, test hypotheses, construct concepts and theories, explore, control, and explain (Walliman, 2017).

Data were analysed using Statistical Package for the Social Sciences (SPSS) version 29. Descriptive statistics was performed, and Pearson Chi-square statistical test was used. Data were presented in frequencies and percentages using tables. Average scores of sanitation knowledge, attitudes and practices among the participants were computed in 5 categories, namely: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). Data captured was then sent to a statistician to aid with the analysis.

### **3.10 Validity**

According to Surucu & Maslakci (2020), validity refers to whether the measuring instrument measures the behavior or quality it is intended to measure and is a measure of how well the measuring instrument performs its functions. Validity was ensured by using a standard questionnaire, which captured all the important variables of the study. Pre-test of the questionnaire was run to check if the questionnaire is comprehensive to achieve the research objectives, and to ensure validity.

### **3.11 Reliability**

According to Surucu & Maslakci (2020), reliability refers to the stability of the measuring instrument used and its consistency over time. In other words, reliability is the ability to measure instruments to give similar results when applied at different times. To ensure reliability, the questionnaire was translated into the local language (Sepedi). The translation was done by the researcher with assistance from the supervisor to ensure that the participants fully understood the questions. Pre-test of the data collection tool was done to check if the tool is reliable in a way that it measured what it intended to measure, and if the questions were easier for participants to understand and answer. Reliability was further ensured by avoiding participant error by collecting the data at the same time.

### **3.12 Ethical considerations**

Ethical considerations entail the ethical standards, and principles applied in the research study to protect the data collected and respondents (Grove, Gray & Burns, 2017). In Chapter 2, Section 10 of the Children's Act (2005:38), it is stated that children have the right to participate and to have a voice. In Chapter 2, Section 3 and 4 of the Children's Act (2005:38), it is stated that parents must act in the best interest of the child and avoid delays in any decision to be taken concerning the child. Ethical standards adhered to during the study are listed below.

#### **3.12.1 Ethical Clearance**

Prior to data collection, the research proposal was submitted to the relevant committees to obtain ethical clearance. The proposal was approved by the Sekhukhune Department of Education District Office, then Circuit Office. Thereafter, permission was obtained from the school principals of the individual sampled schools.

#### **3.12.2 Voluntary Informed consent**

The study was conducted on the principles of informed consent. Therefore, no learner participated in the study without consenting. Participation was voluntary. The parents were provided with the parental information sheet for the study and the consent forms, which they signed. The learners were provided with the learner information sheets for the study and the assent forms which they signed. Participants were reassured about the right to withdraw at any time without any penalty.

#### **3.12.3 Privacy**

Privacy is conserved by keeping data in a safe place and limiting access to information (Botma, Greeff, Mulaudzi & Wright, 2017). Therefore, data collected was stored in a sealed file and kept in a locked fireproof cabinet. Captured data was saved in the computer. The folder was created and protected with a password.

#### **3.12.4 Confidentiality**

To protect the identity of the respondents, pseudonyms were used as an identity on the questionnaire (Grove et al, 2017). Data collected were stored confidentially under locked office with the key being accessible to only the supervisor or the researcher. No data were used for commercial or self-satisfaction purposes. The information from the study was not shared with people who were not part of the study.

### **3.12.5 Anonymity**

Anonymity refers to how the researcher keeps the data unidentifiable (Botma, Greeff, Mulaudzi & Wright, 2017). The identification of the participants was not required on the questionnaires. Findings from this study did not identify the respondents and the researcher did not link individual responses with the participants' identities. The names of the schools were not mentioned. No personal information about the participants' identities was disclosed, and the data gathered were handled as strictly confidential between the data collector and the participants.

### **3.12.6 Beneficence**

The principle of beneficence emphasises that the researcher must consider the rights of the participant to be protected; therefore, the study was free of harm (Botma, Greeff, Mulaudzi & Wright, 2017). No remuneration was offered for engaging in the study.

### **3.12.7 Harm**

The study was free from harm, there was no procedure that can inflict pain on participants and the researcher ensured a harm-free environment by collecting data in the comfort of a familiar allocated classroom in which learners felt safe.

### **3.13 Bias**

Bias is any influence that produces a distortion in the results of the study or that strongly favours the results of a research study findings (Brink, Van der Walt & Van Rensburg, 2018). Although bias is unavoidable in most studies, bias was minimized as far as possible in this research study. Selection and information bias may have been a threat to the study. The fishbowl technique could have created selection bias as it did not consider the four quadrants (South, North, East and West) of the circuit. Selection of schools included all the schools and participants who met the inclusion criteria and who consented to participate in the study. The researcher used a questionnaire because it could collect objective data and allow multiple types of answers. Information bias was reduced by using the same questionnaire with all participants. All the data collected were interpreted to avoid data manipulation and analyzed to avoid bias. No collected data was left behind and no results were left unreported.

### **3.14 Conclusion**

In this chapter, the study setting, population, reliability, and validity were discussed in detail. Chapter 3 expanded on the appropriateness of using a quantitative approach following a descriptive study design to describe sanitation practices amongst the learners. Approval and permission to conduct the study were obtained from relevant authorities. Ethical principles were observed for the duration of the study.

## **CHAPTER 4: RESULTS OF THE STUDY**

### **4.1 Introduction**

The key results from the data collected during the study are presented in this chapter, to respond to the objectives of the study. A quantitative research approach and a descriptive design were used to investigate the knowledge, attitudes, and practices on sanitation among primary school learners. The study was conducted in nine primary schools of the Sekhukhune District. As depicted in Figure 1, Bogwasha Circuit has 18 primary public schools with a total of 8607 learners. A total of 942 learners were in grade 6 and 7665 learners were in other grades during the data collection process. The study focused on the sampled grade 6 learners of nine (9) primary schools from Bogwasha Circuit, which were randomly selected.

Section A of the data collection tool focused on questions regarding the biographical information (gender, age, and grade), Section B had questions on the level of sanitation knowledge, Section C focused on information related to the level of sanitation attitudes and Section D had information on the level of sanitation practices. The results were presented in tables for both the biographical information and the overall sanitation knowledge, attitudes, and practices of the participants. Overall, level of knowledge, attitude and practice for learners who answered correctly on the sanitation knowledge variables items with the score >60% were categorised as adequate knowledge, sanitation attitudinal variables items with the score >60% categorised as positive attitude and sanitation practice with the score >60% were categorised as good practice. The key findings of the study are presented and discussed below.

### **4.2 Demographic profile of participants**

The questionnaire first sought the demographic information of the participants involved in the study. The total sample included 249 of grade 6 male and female learners from the nine sampled primary schools combined (see Table 3.1 for calculated proportions per participating schools).

**Table 4.1: Demographic profile of participants**

<b>Number of samples</b>									
School code	A	B	C	D	E	F	G	H	I
Response rate N=249 (100%)	41 (100%)	6 (100%)	43 (100%)	37 (100%)	39 (100%)	45 (100%)	19 (100%)	10 (100%)	9 (100%)
<b>Demographic profile of the participants by age and gender</b>									
Characteristics: n=249									P Value =0.087  Mean =1.5
Gender	Age				Total				
	11 years	12 years	13 years	14 years					
Male	61(54, 5%)	38(33.9%)	10(8.9%)	3(2.7%)	112(45%)				
Female	87(63.5%)	44(32.1%)	6(4.4%)	0(0.0%)	137(55%)				
Total	148(59.4%)	82(32.9%)	16(6.4%)	3(1.2%)	249(100%)				

Table 4.1 above illustrates the distribution of the participants by age and gender. Of 249 participants, more participants were females n=137(55%) compared to males n=112(45%). The results show that 63% (n=87) of participants were female within the age group of 11 years, followed by 54% (n=61) of the male participants within the age group of 11 years, mean=1.5, Sd =0.673. The results show that 59% (n=149) of the participants were 11 years of age, followed by 33% (n=82) participants 12 years of age. Further, 6% (n=4) of the participants were 13 years of age and the lowest percentage 1% (n=3) of the participants were 14 years of age, with the mean=1.5 and the Sd =0,498. Participation of learners by gender in each four age groups was normally distributed with females being marginally higher. The results show no statistical significance between age and gender distribution of the participants (P value=0,087).

### 4.3 Key Results of the level of sanitation knowledge, sanitation attitude and sanitation practice.

#### 4.3.1 Sanitation knowledge

**Table 4.2: Participants responses to sanitation knowledge questions**

<b>Responses n=249</b>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
4. Surfaces contain germs	17(6.8%)	2(0.8%)	34(13.7%)	131(52.6%)	65 (26.1%)
5. Shaking hands can spread germs	16(6.4%)	19(7.6%)	15(6%)	129(51.8%)	70 (28.1%)
6. Human faeces contain germs	15(6%)	13(5.2%)	22(8.8%)	106(42.6%)	93 (37.3%)
7. If hands look clean there is no need to wash them before eating or after	78(31.3%)	69(27.7%)	9(3.6%)	47(18.8%)	46 (18.4%)
8. Washing hands with water only after toilet use is enough to protect illness.	99(39.7%)	99(39.7%)	13(5.2%)	23(9.2%)	15(6%)
9. Playing near rubbish or wastewater is not dangerous.	96(38.5%)	72(28.9%)	7(2.8%)	39(15.7%)	35 (14.1%)
10. Defecating in an open bush/space can lead to spread of illness.	29(11.6%)	24(9.6%)	14(5.6%)	88(35.3%)	94 (37.8%)
11. Poor hygiene/sanitation can lead to diarrhoea and lung illness.	4(1.6%)	9(3.6%)	23(9.2%)	95(38.2%)	118 (47.4%)

Table 4.2 above present the results adopted from Section B of the questionnaire on sanitation knowledge. The results show that 52.6% of the participants agree that surfaces contain germs, 26.1% of the participants strongly agree with the same statement. Furthermore, 6.8% of the participants strongly disagree that surfaces contain germs and 13.7% of the learner's response was neutral. This means that most of the participants has adequate knowledge that surfaces contain germs. On the statement that shaking hands can spread germs, about 51.8% of the participants and 28.1% of the participants strongly agree with the same statement. Furthermore, 6.4% of the participants strongly disagree that shaking hands can spread germs, 7.6% disagree with the statement and 6% of the learner's response was neutral. Meaning that few learners have inadequate knowledge that shaking hands can spread germs.

Regarding the statement that human faeces contain germs, 42.6% of the participants agree and 37.3% of the participants strongly agree with the statement, and 8.8% of were neutral. This means that more learners know that human faeces contain germs.

Regarding the statement that if hands look clean there is no need to wash them before eating or after, 31.3% of the participants strongly disagree, and 27.7% disagree. Furthermore, 18.9% of the learners strongly agree that if hands look clean there is no need to wash them before eating or after, 18.5% of the learners agree with the statement and 3.6% of learners has no information since their response was neutral. This implies that many of the learners has knowledge that if hands look clean there is a need to wash them before eating or after.

The similarity of 39.8% is noted on the learners who strongly disagree and disagree that washing hands with water only after toilet use is enough to protect illness. Further, 9.2% of the learners agree that washing hands with water only after toilet use is enough to protect illness, 6% strongly agree with the statement and 5.2% neither agree nor disagree since their response was neutral. This shows that more learners know that washing hands with water only after toilet use is not enough to protect illness.

Regarding the knowledge that it is not dangerous playing near rubbish or wastewater, 38.6% strongly disagree and 28.9% agree with the statement. Furthermore, 15.7 % of the learners agree it is not dangerous to play near rubbish or wastewater, 14.1% of the participants strongly agree with the statement and 2.8% were neutral. This means that many of the learners have adequate knowledge that playing near rubbish or wastewater is dangerous.

Regarding the knowledge whether defecating in an open bush/space can lead to spread of illnesses, 37.8% of the learners strongly agree and 35.3% of the learners agree with the statement. Further, 11.6% strongly disagree that defecating in an open bush/space can lead to spread of illnesses, 9.6% of the learners disagree with the statement and 5.6% of the learners were neutral. This implies that most of the learners has good knowledge that defecating in an open bush/space can lead to spread of illnesses. About 47.4% of the participants strongly agreed that poor hygiene/sanitation can lead to diarrhoea and 38.2% of learners agree with the statement either. Meanwhile, 3.6% of learners disagree, 1.2% of the learners strongly disagree with the statement, whereas 9.2% were neutral. This means many of the learners has knowledge that poor hygiene/sanitation can lead to diarrhoea and lung illness. The results suggest that the overall score on sanitation knowledge questionnaire is higher.

### 4.3.2 Sanitation Attitude

**Table 4.3: Participants responses to sanitation attitude questions**

Responses n=249	12. Hands should be cleaned before eating at school/home.	13. Hands should be cleaned after blowing nose with plain hands.	14. It is my duty to keep the school environment clean.	15. It is my duty to pick up litter even if I am not the one who littered.
Strongly disagree 1	16(6.4%)	11(4.4%)	10(4%)	10(4%)
Disagree 2	7(2.8%)	9(3.6%)	7(2.8%)	5(2%)
Neutral 3	4(1.6%)	9(3.6%)	10(4%)	7(2.8%)
Agree 4	98(39.4%)	104(41.8%)	112(44.9%)	95(38.2%)
Strongly agree 5	124(49.8%)	116(46.5%)	110(44.1%)	132(53%)

Table 4.3 above illustrates the results adopted from Section C of the questionnaire on attitude towards sanitation. The results show that the highest percentage (53%) of the participants strongly agree that it is their duty to pick up litter even if they did not litter, and 38% of the participants agree with the statement. Further, 6% of the participants do not agree that it is their duty to pick up litter even if they did not litter, and the remainder neither agree nor disagree with the statement. This means that most learners were correct about the statement. About 50% of the participants strongly agree that hands should be cleaned before eating at school/home and 39% of the participants agree with the statement. This implies that more than half (89%) of the learners are correct that hands should be cleaned before eating at school/home.

The results further show that 46% of the participants strongly agree that hands should be cleaned after blowing nose with plain hands while 42% of the participants agree with the statement. It means that about (88%) of the learners answered correctly that hands should be cleaned after blowing nose with plain hands. Furthermore, 45% of the participants agree that it is their duty to keep the school environment clean and 44% of the participants strongly agree with the statement. This shows that the highest percentage (89%) of the learners are correct that it is their duty to keep the school environment clean. The results show that the overall score on sanitation attitudinal questionnaire is higher.

### 4.3.3 Sanitation Practices

**Table 4.4: Participants responses to sanitation practice questions**

<b>Responses n=249</b>	16. Hands must be washed only after using the toilet	17. Hands should only be washed when it is time to eat.	18. Defecating should only be done in the toilet	19. Soap and water must always be used when washing hands
Strongly disagree 1	90(36.1%)	108(43.4%)	44(17.7%)	10(4%)
Disagree 2	73(29.3%)	110(44.2%)	35(14.1%)	4(1.6%)
Neutral 3	20(8%)	10(4%)	12(4.8%)	4(1.6%)
Agree 4	35(14.1%)	14(5.6%)	55(22.1%)	75(30.1%)
Strongly agree 5	31(12.4%)	7(2.8%)	103(41.4%)	156(62.6%)

Table 4.4 above present the results adopted from Section D of the questionnaire on sanitation practice. The results show that 63% of the participants strongly agree that soap and water must always be used when washing hands and 30% of the participants agree with the same statement. This means many of the participants know that soap and water must always be used when washing hands. Further, 44% of the participants disagree that hands should only be washed when it is time to eat and 43% of the participants strongly disagree with the statement either. This means about 88% of the learners reject the idea that hands should only be washed when it is time to eat.

Furthermore, 41% of the participants strongly agree that defecating should only be done in the toilet and 22% of the participants disagree with the very statement. This means that about 37% of the remaining learners have no knowledge that defecating should only be done in the toilet. Moreover, 36% of the participants strongly disagree that hands must be washed only after using the toilet and 29% of the participants disagree with said statement. This means that about 60% of the participants reject the idea that hands must be washed only after using toilet. The results illustrate that the overall score on sanitation practice questionnaire is higher.

## 4.4 Association between participants sanitation knowledge, Sanitation Attitude, Sanitation Practice, and demographic characteristics

### 4.4.1 Association between participants sanitation knowledge and demographic

Table 4.5: Association between sanitation knowledge, age, and gender

Statement		Responses n=249				p-value	Gender		P-value
		11 years	12 years	13 years	14 years		Male	Female	
Surfaces contain germs	SD	10(6.8)	5(6.1)	1(6.3)	1(33.3)	0.653	10(9)	7(5.1)	0.461
	D	1(0.7)	1(1.2)	0(0)	0(0)		0(0)	2(1.5)	
	N	21(14.2)	10(12.2)	3(18.8)	0(0)		13(12)	21(15.3)	
	A	82(55.4)	44(53.7)	4(25)	1(33.3)		59(52.6)	72(52.6)	
	SA	34(23)	22(26.8)	8(50)	1(33.3)		30(27)	35(25.5)	
Shaking hands can spread germs	SD	10(6.8)	6(7.3)	0(0)	0(0)	0.122	8(7.1)	8(5.8)	0.781
	D	14(9.5)	4(4.9)	1(6.3)	0(0)		11(9.8)	8(5.8)	
	N	5(3.4)	8(9.8)	1(6.3)	1(33.3)		6(5.4)	9(6.6)	
	A	78(52.7)	45(54.9)	6(37.5)	0(0)		57(50.9)	72(52.6)	
	SA	41(27.7)	19(23.2)	8(50)	2(66.7)		30(26.8)	40(29.2)	
Human faeces contain germs	SD	9(6.1)	5(6.1)	1(6.3)	0(0)	0.027	8(7.1)	7(5.1)	0.859
	D	7(4.7)	6(7.3)	0(0)	0(0)		7(6.3)	6(4.4)	
	N	13(8.8)	3(3.7)	4(25)	2(66.7)		9(8)	13(9.5)	
	A	67(45.3)	34(41.5)	5(31.3)	0(0)		45(40.2)	61(44.5)	
	SA	52(35.1)	34(41.5)	6(37.5)	1(33.3)		43(38.4)	50(36.5)	
If hands look clean, there is no need to wash them before or after eating	SD	45(30.4)	26(31.7)	5(31.3)	2(66.7)	0.73	40(35.7)	38(27.7)	0.161
	D	40(27)	25(30.5)	4(25.0)	0(0)		27(24.1)	42(30.7)	
	N	7(4.7)	2(2.4)	0(0)	0(0)		2(1.8)	7(5.1)	
	A	32(21.6)	15(18.3)	0(0)	0(0)		18(16.1)	29(21.2)	
	SA	24(16.2)	14(17.1)	7(43.8)	1(33.3)		25(22.3)	21(15.3)	
Washing hands with water only after toilet use is enough to protect illness	SD	64(43.2)	30(36.6)	3(18.8)	2(66.7)	0.213	48(42.9)	51(37.2)	0.580
	D	54(36.5)	37(45.1)	8(50)	0(0)		39(34.8)	60(43.8)	
	N	9(6.1)	2(2.4)	1(6.3)	1(33.3)		5(4.5%)	8(5.8)	
	A	11(7.4)	10(12.2)	2(12.5)	0(0)		12(10.7)	11(8)	
	SA	10(6.8)	3(3.7)	2(12.5)	0(0)		8(7.1)	7(5.1)	
Playing near rubbish or wastewater is not dangerous	SD	58(39.2)	30(36.6)	6(37.5)	2(66.7)	0.695	42(37.5)	54(39.4)	0.082
	D	38(25.7)	27(32.9)	7(43.8)	0(0)		25(22.3)	47(34.3)	
	N	3(2)	4(4.9)	0(0)	0(0)		3(2.7)	4(2.9)	
	A	25(16.9)	12(14.6)	1(6.3)	1(33.3)		20(17.9)	19(13.9)	
	SA	24(16.2)	9(11)	2(12.5)	0(0)		22(19.6)	13(9.5)	
Defecating in an open bush/space can lead to spread of illness	SD	16(10.8)	11(13.4)	2(12.5)	0(0)	0.940	12(10.7)	17(12.4)	0.243
	D	14(9.5)	8(9.8)	1(6.3)	1(33.3)		6(5.4)	18(13.1)	
	N	9(6.1)	3(3.7)	2(12.5)	0(0)		8(7.1)	6(4.4)	
	A	53(35.8)	30(36.6)	4(25)	1(33.3)		40(35.7)	48(35)	
	SA	56(37.8)	30(36.6)	7(43.8)	1(33.3)		46(41.1)	48(35)	
Poor hygiene/sanitation can lead to diarrhoea and lung illness	SD	1(0.7%)	1(1.2)	1(6.3)	1(33.3)	<0.001	1(0.9)	4(1.6)	0.404
	D	3(2)	3(3.7)	3(18.8)	0(0)		6(5.4)	9(3.6)	
	N	16(10.8)	6(7.3)	1(6.3)	0(0)		9(8)	23(9.2)	
	A	54(36.5)	35(42.7)	6(37.5)	0(0)		47(42)	95(38.2)	
	SA	74(50)	37(45.1)	5(31.3)	2(66.7)		49(43.8)	118(47.4)	

SD (strongly disagree), D (disagree), N (neutral), A (agree), SA (strongly agree)

Statistical Pearson chi-square was performed to examine the association between sanitation knowledge, age, and gender. The results show no statistical association

between sanitation knowledge and gender as indicated by the p-value of greater than the significant level 0.05 (ranging between 0.082 and 0.859) in all the questions regarding sanitation knowledge.

#### 4.4.2 Association between participants sanitation Attitude and demographics

Table 4.6: Association between sanitation attitude, age, and gender

Statement		Responses n=249				P-value	Gender		P-value
		11 years	12 years	13 years	14 years		Male	Female	
Hands should be cleaned before eating at school/home	SD	10(6.8)	5(6.1)	1(6.3)	0(0)	0.693	8(7.1)	8(5.8)	0.423
	D	4(2.7)	2(2.4)	1(6.3)	0(0)		5(4.5)	2(1.5)	
	N	4(2.7)	0(0.0)	0(0.0)	0(0)		3(2.7)	1(0.7)	
	A	63(42.6)	4(37.8)	4(25.0)	0(0)		42(37.5)	56(40.9)	
	SA	44(45.3)	10(53.7)	10(62.5)	3(100)		54(48.2)	70(51.1)	
Hands should be cleaned after blowing nose with plain hands	SD	7(4.7)	4(4.9)	0(0)	0(0)	0.718	6(5.4)	5(3.6)	0.118
	D	7(4.7)	2(2.4)	0(0)	0(0)		6(5.4)	3(2.2)	
	N	4(2.7)	5(6.1)	0(0)	0(0)		1(0.9)	8(5.8)	
	A	65(43.9)	32(39.0)	7(43.8)	0(0)		43(38.4)	61(44.5)	
	SA	65(43.9)	39(47.6)	9(56.3)	3(100)		56(50)	60(43.8)	
It is my duty to keep the school environment clean	SD	6(4.1)	4(4.9)	0(0)	0(0)	0.192	5(4.5)	5(3.6)	0.724
	D	2(1.4)	4(4.9)	0(0)	1(33.3)		2(1.8)	5(3.6)	
	N	6(4.1)	3(3.7)	1(6.3)	0(0)		6(5.4)	4(2.9)	
	A	67(45.3)	37(45.1)	8(50.0)	0(0)		48(42.9)	64(46.7)	
	SA	67(45.3)	34(41.5)	7(43.8)	2(66.7)		51(45.5)	59(43.1)	
It is my duty to pick up litter even if I am not the one who littered	SD	7(4.7)	3(3.7)	0(0)	0(0)	0.328	4(3.6)	6(4.4)	0.729
	D	4(2.7)	0(0)	1(6.3)	0(0)		3(2.7)	2(1.5)	
	N	1(0.7)	5(6.1)	1(6.3)	0(0)		2(1.8)	5(3.6)	
	A	57(38.5)	31(37.8)	7(43.8)	0(0)		40(35.7)	55(40.1)	
	SA	59(53.4)	43(52.4)	7(43.8)	3(100)		63(56.3)	69(50.4)	

SD (strongly disagree), D (disagree), N (neutral A (agree), SA (strongly agree)

Pearson chi-square statistical test was performed to examine the association between sanitation attitude, age, and gender. The results show no association between sanitation attitude scores and demographics (age, and gender) as indicated by the p-value of greater than the significant level 0.05 (ranging between 0.118 and 0.729) in all sanitation attitudinal questions.

#### 4.4.3 Association between participants sanitation practice and demographics

Table 4. 7: Association between sanitation practices, age, and gender

Statement		Responses n=249				P- value	Gender		P- value
		11 years	12 years	13 years	14 years		Male	Female	
Hands must be washed only after using the toilet	SD	62(41.9)	25(30.5)	3(18.8)	0(0)	0.003	42(37.5)	48(35)	0.222
	D	45(30.4)	22(26.8)	6(37.5)	0(0)		25(22.3)	48(35)	
	N	10(6.8)	8(9.8)	2(12.5)	0(0)		11(9.8)	9(6.6)	
	A	18(12.2)	14(17.1)	3(18.8)	0(0)		17(15.2)	18(13.1)	
	SA	13(8.8)	13(15.9)	2(12.5)	3(100)		17(15.2)	14(10.2)	
Hands should only be washed when it is time to eat	SD	71(48)	29(35.4)	7(43.8)	1(33.3)	0.342	52(46.4)	56(40.9)	0.191
	D	61(41.2)	42(51.2)	6(37.5)	1(33.3)		43(38.4)	67(48.9)	
	N	5(3.4)	4(4.9)	0(0)	1(33.3)		7(6.3)	3(2.2)	
	A	7(4.7)	5(6.1)	2(12.5)	0(0)		8(7.1)	6(4.4)	
	SA	4(2.7)	2(2.4)	1(6.3)	0(0)		2(1.8)	5(3.6)	
Defecating should only be done in the toilet.	SD	28(18.9)	12(14.6)	3(18.8)	1(33.3)	0.003	22(19.6)	22(16.1)	0.162
	D	18(12.2)	15(18.3)	2(12.5)	0(0)		16(14.3)	19(13.9)	
	N	7(4.7)	3(3.7)	0(0)	2(66.7)		9(8)	3(2.2)	
	A	31(20.9)	20(24.4)	4(25)	0(0)		20(17.9)	35(25.5)	
	SA	64(43.2)	32(39)	7(43.8)	0(0)		45(40.2)	58(42.3)	
Soap and water must always be used when washing hands	SD	6(4.1)	4(4.9)	0(0)	0(0)	0.015	5(4.5)	5(3.6)	0.779
	D	2(1.4)	1(1.2)	0(0)	1(33.3)		3(2.7)	1(0.7)	
	N	4(2.7)	0(0)	0(0)	0(0)		2(1.8)	2(1.5)	
	A	43(29.1)	25(30.5)	7(43.8)	0(0)		32(28.6)	43(31.4)	
	SA	93(62.8)	52(63.4)	9(56.3)	2(66.7)		70(62.5)	83(62.8)	

*SD (strongly disagree), D (disagree), N (neutral), A (agree), SA (strongly agree)*

Pearson chi-square statistical test was performed to examine the association between sanitation attitude, age, and gender. There is a statistically significant association between age and the questions related to sanitation practices towards hands must be washed only after using the toilet (p-value 0.003). All (100%) of the participants aged 14 years strongly agree that hands must be washed only after using the toilet. The statistical significance is also noted on the statement that defecating should only be done in the toilet (p-value 0.003). There is a statistically significant association between age and the questions related to sanitation practices towards soap and water must always be used when washing hands (p-value 0.015). Many of the participants aged 11 years (63%), 12 years (63%) and 13 years (56%) strongly agree that soap and water must always be used when washing hands, and 51% of the participants aged 12 years disagree with the statement. There is no statistical association between age and the question on sanitation knowledge towards hands should only be washed when it is time to eat as indicated by p-value= 0.342. There is no statistical association between sanitation practices and gender as evidenced by the significant level greater than 0.05 (p-value ranging between 0.191 and 0.779).

#### **4.5 Conclusion**

This chapter has presented and discussed key results of knowledge, attitude, and practice of sanitation among primary school learners. Pearson chi-square statistical test was used to assess the association between sanitation knowledge, sanitation attitude, sanitation practices, and the demographics. Data were presented using the frequencies, percentages, means, and P-value was set at  $<0, 05$ . The data was analysed using SPSS version 29. The results were presented in tables. The last chapter will present the discussion, recommendations, and conclusion of the study.

## CHAPTER 5: DISCUSSION, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

### 5.1 Introduction

This chapter discusses the results of the study highlighted in chapter 4 and the findings are described in line with the objectives of the study and the existing literature on the topic. This chapter also discusses the limitations of the study, and recommendations are made based on learner's knowledge, attitudes, and practices of sanitation, followed by the conclusion. The purpose of this study was to investigate the knowledge, attitudes, and practices of sanitation among learners in primary schools of the Sekhukhune District, Limpopo Province. The objectives of the study were:

- *To assess the knowledge, attitudes, and practices of sanitation among learners in the primary schools of the Sekhukhune District, Limpopo Province.*
- *To describe the knowledge, attitudes, and practices of sanitation among learners in the primary schools of the Sekhukhune District, Limpopo Province.*

### 5.2 Demographic profile of learners

The survey on sanitation knowledge, attitude and practices was conducted at nine primary schools located in Sekhukhune District. Of the 249 learners, the study had 100% response rate. The demographic findings of this study are in line with the studies conducted previously in other primary schools. Ages ranged from 11 to 14 years. Most of the participants belonged to the 11 years age group, followed by learners who belonged to the 12 years age group. This was expected because the majority of grade 6 learners in the schools sampled were between 11 and 12 years of age.

Participants by age were not much different from the study conducted in rural area of Northeast China by Jiabei, Yi, Ming & Taro (2021), the study was among 333 primary school students, most of them (64%) were 10 years of age, followed by (62%) participants who were 11 years. In this study, of the 249 learners, gender between the participants was almost equally spread, with 55% (n=137) being female and 45% (n=112) being male. This indicated that most of the participants were females which was due to the highest ratio of female to male learners in the primary schools sampled. Kouame, Galli, Peter, Loss, Wassa, Bonfo, Utzinger & Winkler (2021) conducted a study on access to water and sanitation infrastructures for primary school children,

involving 394 primary school children and the participants slightly comprised more females (56%) than males (53%) participants. Therefore, a study like this one should be conducted in other primary schools, with learners from different grades and age categories as participants.

### **5.3 Level of Sanitation Knowledge, Sanitation Attitudes and Sanitation Practices**

The study used a questionnaire survey to determine primary school learners' level of sanitation knowledge, attitude, and practices. SDG 6 aims to ensure availability and sustainable management of water and sanitation. According to a UNICEF (2022) and WHO (2022) joint monitoring program, achieving universal access to basic sanitation services in schools by 2030 requires an increase in the current rates of progress on basic sanitation and basic hygiene services. Amegah (2020) argues that learners are more likely to have improved attendance and school performance if they have positive attitudes about hygienic learning environments. According to Berhe, Aregay, Abreha, Aregay, Gebretsadik, Negash, Gebreegziabher, Demoz, Fenta, & Mamo (2020). Therefore, it is important to make provision for cleaners to routinely maintain sanitation facilities and to incorporate long-term health promotions schemes targeted at addressing the identified KAP gaps in schools, besides providing adequate school Water, Sanitation and Hygiene (WASH) facilities. According to UNICEF & WHO (2020), a million of school children all over the globe experience lack of access to toilet facilities and this deprivation of the adequate sanitation facilities have been significant drivers for undesirable morbidity among school children.

#### **5.3.1 Level of Sanitation Knowledge**

The overall results of the study on the level of sanitation knowledge score illustrated an adequate sanitation knowledge among the participants. Eight statements measured sanitation knowledge of the participants and the results revealed a good score of more than 60% on sanitation knowledge items. More than 50% of the participants strongly agreed that the surface contain germs, however it is still a concern to have 6.8% of the learners who are unaware and strongly disagree that surfaces contain germs while 13.7% of the learner's response was neutral. This lack of knowledge can influence the learners not to consider hand washing serious for disease prevention and will not understand why they might repeatedly get sick and miss classes, limiting their chances of high educational achievements.

About 11.6% of the participants showed no idea that defecating in an open bush/space can lead to spread of illnesses while 9.6% of the learners disagreed that defecating in an open bush/space spread diseases and 5.6% of the learners were neutral about this concern. Meaning that they can still defecate in an open bush/space believing that nothing is wrong, yet the action can contribute to the spread of diseases to other individuals. About 47.4% strongly agreed and 38.2% of learners agreed that poor hygiene/sanitation can lead to diarrhea and lung illness. The rest of the participants (3.6%) disagree, 1.6% of the learners strongly disagree. About 9.2% who were neutral show that they have no idea of the consequences of poor hygiene on the health of individuals.

More than half of the learners agreed, and some strongly agreed that hands should be cleaned before eating and after blowing their nose with plain hands at school/home. The study shows that within the participating school, there are learners who seem not to know the importance of hand washing as they disagree (2.8%), some strongly disagree (4%) that hands should be washed before eating and after blowing the nose while some were neutral (4%) about the matter. These are learners who might be silently picking up minor ailments and seeking health care services at nearby facilities. All participants (100%) aged 14 years strongly agree that hands must be washed only after using the toilet, meaning that they might not worry about washing hands before eating or handling fruits, which is a health hazard. Therefore, sanitation knowledge should be imparted to learners incredibly early in life.

The results of this study are in line with the previous study conducted on knowledge, attitudes and practices of sanitation and hygiene where more than half of the students knew that diarrhoea is a waterborne disease, and many students had a correct cognition of hygiene behaviours (Jiabei et al, 2021) and the study conducted by Pieters, et al (2023) where 78% of learners answered correctly that water and soap should be used to clean hands that are visibly dirty and 95.4% of the participants had knowledge that handwashing is important to prevent diseases. The study conducted by Almoslem, Alshehri, Althumairi, Aliassim, Hassan & Berekaa (2021) in Saudi-Arabia revealed that many of the students had a high level of knowledge on hand hygiene, were 97% of the participants agreed that using soap and water is the best method to wash their hands. According to Kouame et al (2021), research report, the main reasons why students practiced open defecation or used the area behind the

latrine was related to the bad smell and uncleanliness of the toilets. The results of the study conducted by Wada, Olawade, Oladeji, Amusa & Oloruntoba (2022) revealed that 100% public schools practiced open defecation, which were like the findings of the study conducted by Shilunga et al (2018) where sanitation was scored with an overall knowledge score of 30(100%) amongst the participants.

### **5.3.2 Level of Sanitation Attitudes**

The overall results of the study on the level of sanitation attitude illustrated that the participants had positive attitude towards sanitation. Attitude towards sanitation was measured by four statements, which highlighted a good score of over 80% on sanitation attitudinal statement higher compared to the study conducted by Eshetu et al (2020) where 61.3% of the learners had positive attitudes towards sanitation, and lower compared to the study conducted by Pieters et al (2023) where 95.4% of the students demonstrated positive attitude across all questions.

Despite a good score of over 80% on sanitation attitude statements, there were less than 10% of learners who did not answer correctly on each sanitation attitude question, and less than 5% of learners who neither agreed nor disagreed with each statement. For example, (6%) of learners responded incorrectly that it is not their duty to pick up litter even if they did not litter, and about 3% of learner's response was neutral about the statement. In addition, (9%) of learners believed that hands should not be cleaned before eating at school/home and about 2% were not sure about the matter. Further, (8%) of learners were of the idea that hands should not be cleaned after blowing nose with plain hands and 4% were not certain about the idea. Moreover, (7%) of learners answered wrongly that it is not their duty to keep the school environment clean and 4% neither agreed nor disagreed with the statement. This is a noted gap of concern which might compromise learner's health. Learner's negative attitude towards sanitation might lead to poor sanitation practices, resulting in poor school environmental hygiene, ingestion of germs, and spread of infections from unhygienic hands. The gap identified may mean that the literature on sanitation, and the sustainable health educational programs vital to equip learners with healthy attitude towards sanitation are still lacking in schools. Therefore, the literature on sanitation needs to be emphasised.

According to the South African School Act (1996:84), learners have the right to a clean and safe environment, and clean toilets facilities. The Department of Basic Education launched the Bill of Responsibilities that correspond with the Children Bill of Rights (2003) in chapter 2 of the Constitution, stating that learners have the responsibility to prevent pollution, to not litter and to keep the learning environment clean and tidy. The study conducted in Nigeria on school water, sanitation, and hygiene inequalities by Wada et al (2022) revealed a significant portion of knowledge gaps associated with understanding the importance of hand washing and the extent to which open defecation practices is dangerous (55.8% of the respondents possessed good knowledge and the remainder possessed poor knowledge), the attitude score for the students was 35.2% positive attitude, 49.7% fair attitude and 15.1% negative attitude. The results of the current study are in line with the findings of the study conducted by Pieters et al, (2020) found that the level of knowledge of learners on hand hygiene was relatively high (73%), 66.8% of the learners correctly stated that people should wash their hands before eating, but different from the study conducted by Shilunga et al (2018) where 66.7% of the learners had a poor attitude towards sanitation.

### **5.3.3 Level of sanitation practices**

The overall results of the study on the level of sanitation practice showed that learners exhibited good score on sanitation practice questionnaire. In terms of sanitation practice, four statements that measured sanitation practices of the participants revealed good score of over 60% in all the statements. Like, on the statement that soap and water must always be used when washing hands, (93%) of learners had the correct answer, and about 63% of learners responded correctly that defecating should only be done in the toilet. Similarly, the study conducted by Pieters et al (2023) revealed that 91.8% of learners reported using an appropriate hand hygiene method. In the study conducted by Daajan et al (2018), sanitation practice was higher because all learners (100%) answered correctly that it is important to wash hands with soap and water, compared to the study conducted by Berhanu, Mengistu, Temesgen, Mulat, Dirirsa, Alemu et al (2022), where more than half (61.6%) of students had good knowledge about hand washing practices and 66.6% had a positive attitude.

Even though learner's sanitation practice score is good, there was a worrying percentage of learners who did not answer correctly in all the statements. This

includes less than 9% of learners who were neutral in all the statements and less than 40% of learners who were of no knowledge of sanitation practice. About 63% of learners agreed that defecation should only be done in the toilet, however, the remaining 37% of the learners who did not agree with the statement indicates an important gap on sanitation practices to note. Therefore, learners should be educated that defecation should only be done in the toilet to prevent the spread of germs from human feces. Hands are known to be the significant vehicles that can easily transport infectious illnesses among children. About 26% of the learners who were of the knowledge that hands must be washed only after using the toilet and the remaining 9% of learners who were of the idea that hands should only be washed when it is time to eat, may suggest that learners have no idea of when to wash hands. Low use of soap for washing hands may mean that there is no soap at school. This is a health challenge that requires more sanitation related educational training, frequent hand-wash technique practices and the availability of soap for hand wash to facilitate, promote and improve hygiene practices in schools.

These findings are in line with the study conducted recently on effectiveness of water, sanitation and hygiene-based program on toilet etiquette and sanitation among primary school children, where about 90.9% of respondents in baseline said hand washing can prevent sicknesses, 82% agreed that hand washing with water alone is not enough, and 53% agreed that defecating in open causes the spread of germs (Taware & Thakur, 2021). Kotze & Coetzee (2019) conducted a study which reviewed schools' hand washing practices and noted that washing hands with soap helped alleviate exposure to diarrheal and respiratory diseases. The study further found that despite the positive outcomes of washing hands with soap, schools that were studied did not have soap in their sanitation facilities. The results of the KAP handwashing survey of conducted by Almoslem et al (2021) remarkably revealed that more than 85% of the students washed their hands before eating and after using the toilet which showed evidence of positive hand hygiene practices,

#### **5.4 Association between sanitation knowledge, sanitation attitudes, sanitation practices, and demographics**

Statistical analysis was done using a Statistical Package for Social Sciences (SPSS) version 29. Pearson chi-square statistical test was performed to examine the

association between sanitation KAP level, and the demographics. The findings were presented in tables. Data were presented using the frequencies, percentages and P-value was set at  $<0.05$ . P-value  $<0.05$  was considered statistically significant.

A chi-square indicated no statistical association between gender and all the questions related to sanitation knowledge, sanitation attitude, sanitation practice as indicated by the p-value of greater than the set significance level (P-value $>0.05$ ). This implies that the ratio of gender does not reflect the overall level of sanitation KAP among learners in the primary schools. The study revealed no association between learner's age and sanitation attitude. An association was found between the learners' age and statements related to sanitation knowledge, and sanitation practice (P-value $<0.05$ ).

The results showed that participants who did not have adequate knowledge were older learners 14 years of age, while younger learners had adequate knowledge of sanitation. This may be due to learner's views and perceptions on sanitation. The association between age and sanitation KAP, were likely to be significantly different due to age distribution of participants. Of 249(100%) learners, 3(1.2%) were 14 years of age. It is recommended that a study like this one should be done in other primary schools, with learners from different grades and different age groups as participants. According to McMichael (2019), school authorities need to incorporate WASH-related knowledge into their curricula as this has been reported to improve WASH-related knowledge, attitudes, practices, and reduce diseases associated with water and sanitation among learners.

## **5.5 Limitations**

The following are the limitations of the study:

- The study was limited to the sampled grade 6 learners who represented other learners in different primary schools in the whole District. Therefore, the findings from the sampled learners cannot reflect the true representation of KAP on sanitation for all the learners in the primary schools of the Sekhukhune District.
- The survey of the learners relied on questionnaires, it was respondent-driven, and therefore was prone to response bias.
- A hand washing skill test and waste disposal skill test were excluded. A demonstration might have been helpful in assessing the response bias.

- The high level of KAP score on sanitation revealed by the study does not correlate with the observed sanitation practices in schools.
- Observed sanitation practices in schools showed that SDG 6 is not yet well addressed, and to achieve SDG 6, these gaps need to be addressed.

## **5.6 Recommendations**

The following are recommendations of the study:

- The school curriculum on Health promotion should be strengthened by educators and implementers of the ISHP for learners to take control and combat the spread of diseases to other individuals at school and in communities where they live by improving their sanitation practices.
- Awareness should be created in schools by relevant stakeholders about the consequences of poor sanitation on the health of individuals.
- Statistics should be reviewed at nearby health facilities/ clinics to measure how lack of good sanitation and hygiene is affecting learners at schools and local community members.
- Local Community members should be empowered by relevant stakeholders such as Nurses, Health Promotion Practitioners and CHW, on how to prevent poor hygiene and sanitation. Almost all learners in participating schools came from the local communities around the school, meaning that the knowledge, attitudes, and practices displayed by learners reflect the picture of the communities where they come from.

## **5.7 Conclusion**

To assess the knowledge, attitudes, and practices of sanitation among learners, a structured questionnaire was used. In terms of the questionnaire's results, learners' level of knowledge on sanitation can be described as adequate, whereas learners' level of attitude towards sanitation can be described as positive and learners' level of sanitation practice can be described as good. The results of the study revealed that the overall score for the level of KAP on sanitation is higher among grade 6 learners. Therefore, it can be concluded that the percentage of KAP on sanitation among learners in the study area was found to be satisfactory.

The study also foregrounded the association among sanitation knowledge, attitude, practices, and the demographics characteristics. A statistically association was found between the learners' age and statements related to sanitation knowledge, and sanitation practice (P-value<0.05). Therefore, further studies like this one comprising samples from different grades and different age groups are suggested.

Though the overall results of sanitation KAP were good, the level of KAP on sanitation in some features was poor. It is recommended that the school curriculum on Health promotion be strengthened. This will ensure that learners have mutual understanding on sanitation. This study offers an insight into the level of KAP towards sanitation and that if addressed, may positively impact sanitation practices in schools.

## REFERENCES

- Abellán, J. 2017. Water supply and sanitation services in modern Europe: developments in 19th-20th centuries. In *International Congress of The Spanish Association of Economic History* (pp. 6-9). University of Salamanca.
- Adhikari, G. 2021. Calculating the sample size in quantitative studies. *Scholars' Journal*, pp.14-29.
- Akpabio, E. M. 2012. Water meanings, sanitation practices and hygiene behaviours in the cultural mirror: a perspective from Nigeria. *Journal of Water, Sanitation and Hygiene for Development*, 2(3), 168-181.
- Akpabio, E. M., & Takara, K. 2014. Understanding and confronting cultural complexities characterizing water, sanitation, and hygiene in Sub-Saharan Africa. *Water International*, 39(7), 921-932.
- Akter, T., & Ali, A. M. 2014. Factors influencing knowledge and practice of hygiene in Water, Sanitation and Hygiene (WASH) programme areas of Bangladesh Rural Advancement Committee. *Rural and remote health*, 14(3), 31-40.
- Alemu, AM. 2017. To what extent does access to improved sanitation explain the observed differences in infant mortality in Africa? *African Journal of Primary Health Care and Family Medicine*, 9(1), pp. 1-9.
- Allegranzi, B., & Pittet, D. 2009. Role of hand hygiene in healthcare-associated infection prevention. *Journal of hospital infection*, 73(4), 305-315.
- Almoslem, MM, Alshehri, TA, Althumairi, AA, Aljassim, MT, Hassan, ME & Berekaa, MM. 2021. Handwashing Knowledge, Attitudes, and Practices among Students in Eastern Province Schools, Saudi Arabia. *Journal of environmental and public health*.
- Amadi COA, Yakubu MB, Iro OK et.al. 2020. Assessment of sanitation practices of primary school pupils in Abuja, Nigeria. *International Journal of Research and Review*, 7(4): 413-417.
- Amegah, AK. 2020. Improving handwashing habits and household air quality in Africa after COVID-19. *The Lancet Global Health*, 8(9), pp. 1110-1111.
- Angelakis, A. N., & Rose, J. B. (2014). *Evolution of sanitation and wastewater technologies through the centuries*. London: IWA Publishing.
- Angelakis, A., Capodaglio, A., Passchier, C., Valipour, M., Krasilnikoff, J., Tzanakakis, V., . . . Roubelakis, M. (2023). Sustainability of Water, Sanitation,

- and Hygiene: From Prehistoric Times to the Present Times and the Future. *Water*, 15(8).
- Anthonj, C, Githinji, S, Hoser, C, Stein, A, Blanford, J and Grossi, V. 2021. Kenyan schoolbook knowledge for water, sanitation, hygiene, and health education interventions: Disconnect, integration or opportunities? *International Journal of Hygiene and Environmental Health*, 235, pp.113756.
- Azqueta, D., & Montoya, Á. 2017. The social benefits of water and sanitation projects in Northern Colombia: Cost-benefit analysis, the water poverty index and beyond. *Development Policy Review*, 35, 118-139.
- Banerjee, S. G., & Morella, E. 2011. *Africa's water and sanitation infrastructure: access, affordability, and alternatives*. Washington DC: World Bank Publications.
- Bankole, A., James, A., Odjegba, E., Bankole, A., Emmanuel, B., Fiore, F., . . . Moruzzi, R. 2023. Factors affecting sanitation coverage in three income levels and potential toward achieving SDG 6.2. *Water Policy*, 25(2), 146-176.
- Baumgartner, T., & Pahl-Wostl, C. 2013. UN–Water and its role in global water governance. *Ecology and Society*, 18(3).
- Berhanu, A, Mengistu, DA, Temesgen, LM, Mulat, S, Dirirsa, G, Alemu, FK et al. 2022. Hand washing practice among public primary school children and associated factors in Harar town, eastern Ethiopia: *an institution-based cross-sectional study*. *Front Public Health*.
- Berhe, AA, Aregay, AD, Abreha, AA, Aregay, AB, Gebretsadik, AW, Negash, DZ, Gebreegziabher, EG, Demoz, KG, Fenta, KA & Mamo, NB. 2020. Knowledge, attitude, and practices on water, sanitation, and hygiene among rural residents in Tigray Region, Northern Ethiopia. *Journal of Environmental and Public Health*, 9(1), pp.1–9.
- Bongartz, P. 2008. CLTS Sharing and Learning Workshop at AfricaSan. *Durban, South Africa*, 17.
- Botma, Y, Greeff, M, Mulaudzi, FM & Wright, SCD. 2017. *Research in health science*. Pearson Holdings Southern Africa. Cape Town.
- Brace, I. 2018. *Questionnaire design: how to plan, structure and write survey material for effective market research. 4<sup>th</sup> edition*. London, United Kingdom: Koganpage.

- Brink, H, Van der Walt, C & Van Rensburg, G. 2018. *Fundamentals of research methodology for health care professionals*. South Africa: Juta.
- Brown, J., Cavill, S., Cumming, O., & Jeandron, A. 2012. Water, sanitation, and hygiene in emergencies: summary review and recommendations for further research. *Waterlines*, 11-29.
- Burton, M., Cobb, E., Donachie, P., Judah, G., Curtis, V., & Schmidt, W. P. 2011. The effect of handwashing with water or soap on bacterial contamination of hands. *International journal of environmental research and public health*, 8(1), 97-104.
- Cisneros, B. J. 2011. Safe sanitation in low economic development areas. *Treatise on water science*, 147.
- Creswell, J & Creswell, W. 2017. *Research design: qualitative, quantitative, and mixed methods approach*. London: SAGE.
- Creswell, JW & Plano Clark, VL. 2017. *Designing and Conducting Mixed Methods research*. Thousand Oaks: SAGE.
- Curtis, V., & Cairncross, S. 2003. Effect of washing hands with soap on diarrhoea risk in the community: a systematic review. *Lancet Infect Dis*, 3(5), 275-281.
- Dajaan, DS, Addo, HO, Ojo, L, Amegah, KE, Fiagbe, L, Bechala, BD & Benjamin, BB. 2018. Hand washing knowledge and practices among public primary schools in the Kintampo Municipality of Ghana. *International Journal of Community Medicine and Public Health*, 5(6), pp. 2205-2216.
- Daniel, D., Djohan, D., & Nastiti, A. 2021) Interaction of factors influencing the sustainability of water, sanitation, and hygiene (WASH) services in rural Indonesia: evidence from small surveys of wash-related stakeholders in Indonesia. *Water*, 13(3), 314.
- Daramola, O., & Olowoporoku, O. 2016. Environmental sanitation practices in Osogbo, Nigeria: An assessment of residents' sprucing-up of their living environment. *Economic and Environmental Studies*, 4 (40), 699-716.
- Deroo, L., Walter, E., & Graham, J. 2015. Monitoring and evaluation of WASH in school's programs: lessons from implementing organizations. *Journal of Water, Sanitation and Hygiene for Development*, 5(3), 512-520.
- Dugard, J, Langford, M & Anderson, E. 2017. Determining progress on access to water and sanitation. *Journal of Environmental Health Research*, 24(1), pp. 31-43.

- Duru, C., Iwu, A., Diwe, K., Uwakwe, K., Merenu, I., Madubueze, U., . . . Nwaigbo, E. 2017. Environmental sanitation practices: A case study of solid waste management in semi-urban communities in Orlu, Imo State Nigeria. *Occupational Diseases and Environmental Medicine*, 5(4), 88-105.
- Ekong, I. E. 2015. An assessment of environmental sanitation in an urban community in Southern Nigeria. *African Journal of Environmental Science and Technology*, 9(7), 592-599.
- Elias, M, Japhet, S & Thomas, R. 2022. Assessment of Hygienic Practices among Primary School Pupils in Mwanza City. *Advances in Applied Sciences*, 7(4), pp. 135-143.
- Eliud, G. K., Kirimi, L. M., Mburugu, K. N., & Kiogora, D. 2022. In the cultural mirror: Influence of cultural factors on adoption of sanitation practices in rural areas: -A case of Nzau Sub-County, Makueni County, Kenya. *African Journal of Science, Technology and Social Sciences*, 1(2), 174-183.
- Elrington, J. 2018. State of sanitation in Africa: a CSE–Down to Earth media briefing in Africa. *Centre for Science and Environment*. From: <https://policycommons.net/artifacts/2228489/state-of-sanitation-in-africa-a-case/2985921/> (Accessed 8 Oct. 2022).
- Eshetu, D, Kifle, T & Hirigo, AT. 2020. Knowledge, Attitudes, and Practices of Hand Washing among Aderash Primary School children in Yirgalem Town, Southern Ethiopia. *Journal of Multidisciplinary Health*, (13), pp. 759-768.
- Eshetu, D., Kifle, T., & Hirigo, A. T. 2020. Knowledge, attitudes, and practices of hand washing among aderash primary schoolchildren in Yirgalem Town, Southern Ethiopia. *Journal of Multidisciplinary Healthcare*, 759-768.
- Ezeudu, O. B. 2020. Urban sanitation in Nigeria: the past, current and future status of access, policies, and institutions. *Reviews on environmental health*, 35(2), 123-137.
- Ferreira, D. C., Grazielle, I., Marques, R. C., & Gonçalves, J. 2021. Investment in drinking water and sanitation infrastructure and its impact on waterborne diseases dissemination: The Brazilian case. *Science of the Total Environment*, 779.
- Ghosh, A., & Cairncross, S. 2014. The uneven progress of sanitation in India. *Journal of Water, Sanitation and Hygiene for Developmen*, 4(1), 15-22.

- Grove, SK, Gray, JR & Burns, N. 2017. Understanding nursing research: *building an evidence-based practice*. 6<sup>th</sup> edition. St Luis: ELSEVIER.
- Grover, E, Hossain, MK, Uddin, S, Venkatesh, M, Ram, PK & Dreibelbis, R. 2018. Comparing the behavioral impact of a nudge-based handwashing intervention to high-intensity hygiene education: a cluster-randomized trial in rural Bangladesh. *Tropical medicine & international health*, 23(1), pp.10-25.
- Guppy, L., Mehta, P., & Qadir, M. 2019. Sustainable development goal 6: Two gaps in the race for indicators. *Sustainability Science*, 14(2), 501-513.
- Hans, V. 2023. Sanitation—An Economic Perspective.
- Harris, B., & Helgertz, J. 2019. Urban sanitation and the decline of mortality. *The History of the Family*, 24(2), 207-226.
- Heidler, A., Nesi, M., Nikiema, J., & Lüthi, C. 2023. Multilateral development banks investment behaviour in water and sanitation: findings and lessons from 60 years of investment projects in Africa and Asia. *Journal of Water, Sanitation and Hygiene for Development*, 13(5), 362-374.
- Hofstetter, M., Bolding, A., & van Koppen, B. 2020. Addressing failed water infrastructure delivery through increased accountability and end-user agency: The case of the Sekhukhune District, South Africa. *Water Alternatives*, 13(3), 843-863.
- Hueso, A., & Bell, B. 2013. An untold story of policy failure: the Total Sanitation Campaign in India. *Water Policy*, 15(6), 1001-1017.
- Hutton, G & Chase, C. 2017. Water supply, sanitation, and hygiene. In Disease Control Priorities: Injury Prevention and Environmental Health, Washington DC. *The international Bank for Reconstruction and Development/ The World Bank*, 3(9), pp. 171-198.
- Huuhtanen, S., & Laukkanen, A. 2009. A guide to sanitation and hygiene in developing countries. *Updated version*, 2.
- Hyde-Smith, L., Zhan, Z., Roelich, K., Mdee, A., & Evans, B. 2022. Climate change impacts on urban sanitation: a systematic review and failure mode analysis. *Environmental science & technology*, 56(9), 5306-5321.
- Inah, S., Uwadiogwu, Z., Eko, J., & Inah, J. 2017. Environmental sanitation practices on malaria control and prevention in Abi local government area, Cross River State, Nigeria. *Asian journal of medicine and Health*, 6(2), 1-12.

- Irehovbude, J & Okoye, CA. 2020. Hand hygiene compliance: bridging the awareness-practice gap in sub-Saharan Africa. *GMS hygiene and infection control*, 15.
- Jasper, C., Le, T. T., & Bartram, J. 2012. Water and sanitation in schools: a systematic review of the health and educational outcomes. *International journal of environmental research and public health*, 9(8), 2772-2787.
- Jeil, E. B., & Abass, K. 2021. A contextual analysis of public health implications of water choices and hygiene practices in Northern Ghana. *Local Environment*, 26(5), 542-556.
- Jiabei, HE, Yi Ming, H & Taro, Y. 2021. Knowledge, attitudes and practices of sanitation and hygiene among primary school students in rural areas of Northeast China. *Research Institute for Humanity and Nature, Japan*. Graduate (School of Health Sciences) dissertation. Hokkaido university, Japan.
- Jones, C. 2022. The lack of proper sanitation and access to water in South African schools: How an ethics of responsibility can help. *Tydskrif vir Geesteswetenskappe*, 62(3), pp. 476-497.
- Joseph, RF & Josephine, AG. 2020. Evaluation of hand hygiene behaviour in basic schools in Ghana: a case study of the Ablekuma Central Municipality in the greater region of Ghana, *Health Education Research*. 35(5), pp. 362–375.
- Kabir, A., Roy, S., Begum, K., Kabir, A. H., & Miah, M. S. 2021. Factors influencing sanitation and hygiene practices among students in a public university in Bangladesh. *PLoS One*, 16(9).
- Kasiva, E. G. 2023. Influence of Social Cultural Factors and Latrine Status on Adoption of Sanitation Practices in Rural Areas a Case of Nzau Sub-County, Makueni County, Kenya. Doctoral dissertation: Meru University of Science and Technology.
- Kelly, K. 2022. *Innovative, cost-effective solution for the school sanitation crisis*. IMIESA, 47(6), pp. 12-15.
- Khan, S., Angelakis, A., & Rose, J. 2014. Sanitation and wastewater technologies in Harappa/Indus valley civilization (ca. 2600-1900 BC). *Evolution of sanitation and wastewater technologies through the centuries*, 25, 1-16.
- Kohlitz, J., & Iyer, R. 2021. Rural sanitation and climate change: Putting ideas into practice. *Frontiers of Sanitation: Innovations and Insights*.

- Kong, Y. L., Anis-Syakira, J., Fun, W. H., Balqis-Ali, N. Z., Shakirah, M. S., & Sararaks, S. 2020. Socio-economic factors related to drinking water source and sanitation in Malaysia. *International Journal of Environmental Research and Public Health*, 17(21).
- Kotze, P & Coetzee, L. 2019. Opportunities for the internet of things in the water, sanitation, and hygiene domain. *Internet of Things*, 194.
- Kouame, PK, Galli, A, Peter, M, Loss, G, Diarassouba, W, Bassirou B, Utzinger, J & Winkler, MS. 2021. Access to water and sanitation infrastructures for primary schoolchildren in the south-central part of Cote d'Ivoire. *International Journal of Environmental Research and Public Health* 18(16), pp. 8863–8863.
- Kramm, J., & Deffner, J. 2018. Social aspects of new sanitation infrastructure. In L. S, K. J, J. A, & M. K (Eds.), *Integrated Water Resources Management in Water-scarce Regions. Water Harvesting, Groundwater Desalination and Water Reuse in Namibia* (pp. 52-59). London: IWA Publishing.
- Lampard-Scotford AR, Pfavayi L, Kasambala M, Choto E, Vengesai A, Lim R et al. 2022. Knowledge, attitudes, practices, and behaviors (KAPB) around water, sanitation, and hygiene (WASH) in villagers exposed to schistosomiasis in Zimbabwe. *PLOS Water*, 1(10).
- Lee, M, Kang, BA & You, M. 2021. Knowledge, attitudes, and practices (KAP) toward COVID-19: a cross-sectional study in South Korea. *BMC Public Health*. 21 (295).
- Louis, G. E., & Magpili, L. 2007. A life-cycle capacity-based approach to allocating investments in municipal sanitation infrastructure. *Structure and Infrastructure Engineering*, 3(2), 121-131.
- Luan, I. O. 2013. Singapore water management policies and practices. *Asian Perspectives on Water Policy*, 101-116.
- Majodina, Z. 2022. School sanitation needs more than rhetoric. *Water & Sanitation: Africa*, 17(1), pp. 34-36.
- Mamafha, N. C. 2022. Analysis of hygiene practices among learners in selected Makhado Municipality Secondary Schools in Limpopo Province. Doctoral dissertation: University of Venda.
- Mapatse, M., Sabeta, C., Fafetine, J., & Abernethy, D. 2022. Knowledge, attitudes, practices (KAP) and control of rabies among community households and health

- practitioners at the human-wildlife interface in Limpopo National Park, Massingir District, Mozambique. *PLoS neglected tropical diseases*, 16(3).
- Masoud, A. M., Alfarra, A., & Sorlini, S. 2022. Constructed wetlands as a solution for sustainable sanitation: A comprehensive review on integrating climate change resilience and circular economy. *Water*, 14(20), 3232.
- McFarlane, R, Ford, A & Bukenya, A. 2018. Breaking the cycle: *uncovering persistent sanitation challenges in Gauteng schools*. Equal Education: Gauteng. From: <https://equaleducation.org.za> 2018/12/05 (accessed 14 October 2021)
- McMichael, C. 2019. Water, Sanitation, and Hygiene (WASH) in schools in low-income countries: a review of evidence of impact. *International Journal of Environmental Research and Public Health*, 16(3), p. 359.
- Mehta, M. 2018. Public finance at scale for rural sanitation—a case of Swachh Bharat Mission, India. *Journal of Water, Sanitation and Hygiene for Development*, 8(3), 359-373.
- Moagi, P. K. 2021. *Challenges in the delivery of water services in Sekhukhune District Municipality: a case of Makhuduthamaga Local Municipality*. Doctoral dissertation: University of Limpopo.
- Momberg, DJ, Ngandu, BC, Voth-Gaeddert, LE, Ribeiro, KC, May, J, Norris, SA & Said-Mohamed, R. 2017. Governance of water, sanitation, and hygiene (WASH) in Sub-Saharan Africa and association with nutritional status in children under five years of age. *A Systematic Review: Journal of Developmental Origins of Health and Disease*, (71), pp. 19-22.
- Momberg, DJ, Ngandu, BC, Voth-Gaeddert, LE, Ribeiro, KC, May, J, Norris, SA & Said-Mohamed, R. 2021. Water, sanitation, and hygiene (WASH) in Sub-Saharan Africa and associations with under nutrition, and governance in children under five years of age. *A Systematic Review: Journal of Developmental Origins of Health and Disease*, 12(1), pp. 6-33.
- Morgan, C., Bowling, M., Bartram, J., & Kayser, G. L. 2017. Water, sanitation, and hygiene in schools: Status and implications of low coverage in Ethiopia, Kenya, Mozambique, Rwanda, Uganda, and Zambia. *International journal of hygiene and environmental health*, 220(6), 950-959.
- Muhele, M. 2016. Factors influencing sanitation practices in Kibera urban informal settlements in Nairobi-Kenya. Doctoral dissertation: University of Nairobi.

- Nhamo, G & Muchuru, S. 2019. *Climate adaptation in the public health sector in Africa*. Evidence from United Nations Framework convention on climate change national communications. *Jâmbá: Journal of Disaster Risk Studies*, 11(1), pp. 1-10.
- Nyambe, S., Agestika, L., & Yamauchi, T. 2020. The improved and the unimproved: factors influencing sanitation and diarrhoea in a peri-urban settlement of Lusaka, Zambia. *PloS one*, 15(5).
- Obadia, KB, Mwanaidi, O, Edwin, L, Jonathan, MM, Maryyusta, N, Yolanda, JM, Robert, MN & Mwanaidi, K. 2023. Hand hygiene practices among primary and secondary school students in sub-Saharan Africa: a systematic review. *Journal of Water, Sanitation and Hygiene for Development*. 13 (12), pp.1018–1035.
- Olowoporoku, O. A. 2016. Assessing environmental sanitation practices in slaughterhouses in Osogbo, Nigeria: Taking the good with the bad. *MAYFEB Journal of Environmental Science*.
- Omambia, A. N. 2010. Sanitation in urban slums: Perception, attitude, and behavior: The case of Kibera, Nairobi-Kenya. *Journal of Environmental Science and Engineering*, 4(3), 70.
- Ouma, V. M., Okeyo, D. O., & Onyango, R. 2018. Demographic and socio-cultural factors influencing the willingness and ability to invest in sanitation facilities by households in Busia County, Kenya. *Africa Health Agenda International Journal*, 1(5).
- Pieters, MM, Fahsen, N, Quezada, R et al, 2023. Assessing hand hygiene knowledge, attitudes, and behaviors among Guatemalan primary school students in the context of the COVID-19 pandemic. *BMC Public Health*. 23(1), pp. 2252.
- Pillay, S. 2022. *SPIH summary of sanitation findings to date for South African government public schools*. Mar-May 2017 interviews. *Gates Open Research*, 6(55), p.55.
- Poortvliet, P. M., Sanders, L., Weijma, J., & De Vries, J. R. 2018. Acceptance of new sanitation: The role of end-users' pro-environmental personal norms and risk and benefit perceptions. *Water Research*, 131, 90-99.
- Pruss-Ustun, A, Wolf, J, Bartram, J, Clasen, T, Cumming, O, Freeman, MC, Gordon, B, Hunter, PR, Medlicott, K & Johnston, R. 2019. Burden of disease from inadequate water, sanitation, and hygiene for selected adverse health

- outcomes: An updated analysis with a focus on low- and middle-income countries. *International Journal of Hygiene and Environmental Health*, 222, pp. 765–777.
- Rakotomanana, H., Komakech, J. J., Walters, C. N., & Stoecker, B. J. 2020. The WHO and UNICEF Joint Monitoring Programme (JMP) indicators for water supply, sanitation and hygiene and their association with linear growth in children 6 to 23 months in East Africa. *International journal of environmental research and public health*, 17(17).
- Ritchie, H & Roser, M. 2019. Sanitation. *Our World in Data*. From: <https://ourworldindata.org/sanitation>. (Accessed 10 January 2024).
- Roccaro, P., Santamaria, A. E., & Vagliasindi, F. G. 2014. Historical Development of Sanitation from the 19th Century to Nowadays: Centralized vs Decentralized Wastewater Management Systems (Evolution of Sanitation and Wastewater Technologies through the Centuries). *Evolution of Sanitation and Wastewater Technologies through the Centuries*, 437-456.
- Rombo, DO, Lutomia, AN & Malinga, T. 2017. Water and sanitation in East Africa. Perspectives from Africana Feminism: *Journal of Pan African Studies*, 10(5), pp. 190-204.
- Rose, J., Angelakis, A. N., & Rose, J. B. 2014. *An overview and synthesis of the evolution of sanitation, and wastewater technologies through the centuries: past, present, and future*. London: IWA Publishing.
- Rosenqvist, T., Mitchell, C., & Willetts, J. 2016. A short history of how we think and talk about sanitation services and why it matters. *Journal of Water, Sanitation and Hygiene for Development*, 6(2), 298-312.
- Rotowa, O. O., Olujimi, J. A., Omole, F. K., & Olajuyigbe, A. E. 2015. Socio-economic Factors Affecting Households Sanitation Preferences in Akure, Nigeria. *European International Journal of Science and Technology*, 4(5), 183-194.
- Safo-Adu, G. 2019. Sanitation Attitudes of Urban Dwellers and Their Influence on Sanitation Practices in Central Region of Ghana. *International Journal of Toxicology*, 4(2), 70-78.
- Seetharam, K. 2015. Challenges and opportunities for sanitation in developing countries. *Journal of Science Policy & Governance*, 7(1), 1-12.

- Sekaran, U & Bougie, R. 2019. *Research methods for business: a skill building approach*. 8<sup>th</sup> edition. John Wiley & Sons. United Kingdom.
- Setati, M. E. 2019. Hand Hygiene knowledge, attitude, and practices among health care workers of Pietersburg Tertiary Hospital, Polokwane, Limpopo Province. Doctoral dissertation.
- Shilunga, APK, Amukugo, HJ & Mitonga, KH 2018. Knowledge, attitudes, and practices of primary schools' learners on sanitation and hygiene practices. *University of Namibia: International Journal of Community Medicine and Public Health*, 5(8), pp. 3197-3204.
- Show Me the Science. - Why Wash Your Hands? *Centre for Disease Control and Prevention*. 2023. From: <https://www.cdc.gov/handwashing/why-handwashing.html>. (Accessed 10 May 2023).
- Sibiya, J. E., & Gumbo, J. R. 2013. Knowledge, attitude, and practices (KAP) survey on water, sanitation and hygiene in selected schools in Vhembe District, Limpopo, South Africa. *International journal of environmental research and public health*, 10(6), 2282-2295.
- Silverman, D. 2017. *Doing qualitative research: a practical handbook*. 5<sup>th</sup> edition. London: Sage.
- South Africa. 1996. *School Act, no. 84, (as amended)*. Pretoria: Government Printer.
- South Africa. 2005. *Children Act, no. 38, 2005, (as amended)*. Pretoria: Government Printer.
- Stone, M. A., & Ndagijimana, H. 2018. Educational intervention to reduce disease related to sub-optimal basic hygiene in Rwanda: initial evaluation and feasibility study. *Pilot and Feasibility Studies*, 4, 1-8.
- SuRuCu, L & MASLAKÇI, A. 2020. Validity and reliability in quantitative research. *Business & Management Studies: An International Journal*, 8(3), pp. 2694–2726.
- Svenningsson, J, Höst, G, Hultén, M & Hallström, J. 2021. Students' attitudes toward technology: Exploring the relationship among affective, cognitive, and behavioural components of the attitude construct. *International Journal of Technology and Design Education*, 32(3), pp. 1531–1551.
- Swain, P., & Pathela, S. 2016. Status of sanitation and hygiene practices in the context of “Swachh Bharat Abhiyan” in two districts of India. *Int J Community Med Public Health*, 3(11), 3140-3146.

- Taware, S & Thakur, H. 2021. Effectiveness of water, sanitation and hygiene-based programme on toilet etiquette and sanitation targeted at primary school children of Mumbai. *International Journal of Community Medicine and Public Health*, (8), pp. 1826-35.
- Tseole, NP, Mindu, T, Kalinda, C & Chimbari, MJ. 2022. Barriers and facilitators to Water, Sanitation and Hygiene (WaSH) practices in Southern Africa: *A scoping review*. PLoS One. 17(8).
- UNICEF. 2018. *Scoping Study of WASH in Schools (WinS) Programming in Eastern and Southern Africa: A review of evidence, barriers, and opportunities to meeting Sustainable Development Goal (SDG) targets*. Nairobi: United Nations Children's Fund.
- United Nations Children's Fund (UNICEF) and the World Health Organization (WHO). 2020. *State of the World's Sanitation: An urgent call to transform sanitation for better health, environments, economies, and societies*. New York. <https://www.unicef.org/media/86836/file/State-of-the-world%E2%80%99s-sanitation-2020.pdf>. (Accessed 8 Nov 2020).
- United Nations Children's Fund, The State of the World's Children. 2021. *On My Mind – Promoting, protecting, and caring for children's mental health*, UNICEF, New York. [https://unicef.at/fileadmin/media/Infos\\_und\\_Medien/Info-Material/Lage\\_der\\_Kinder\\_weltweit/UNICEF-State-of-the-worlds-children-2021-full-report-English.pdf](https://unicef.at/fileadmin/media/Infos_und_Medien/Info-Material/Lage_der_Kinder_weltweit/UNICEF-State-of-the-worlds-children-2021-full-report-English.pdf). (Accessed October 2021).
- United Nations International Children's Emergency Fund. 2018. United Nations International Children's Emergency Fund. <http://www.data.unicef.org/topic/child-health/diarrhoeal-disease>. (Accessed 20 May 2018).
- Van der Voorden, C. 2013. Monitoring for sanitation and hygiene: An overview of experiences, issues, and challenges. *International Water and Sanitation Centre's Monitoring Sustainable WASH Service Delivery Symposium*, Addis Ababa, Ethiopia. <https://www.ircwash.org/sites/default/files/voorden-2013-monitoring.pdf>
- Van Minh, H., & Hung, N. V. 2011. Economic aspects of sanitation in developing countries. *Environmental health insights*.
- Wada, OZ, Olawade, DB, Oladeji, EO, Amusa, AO & Oloruntoba, EO. 2022. School water, sanitation, and hygiene inequalities: a bane of sustainable development goal six in Nigeria. *Canadian Journal of Public Health*, 113(4), pp.622-635.

- Walliman, N. 2017. *Research methods: the basics*. 2<sup>nd</sup> edition. London: Routledge.
- Whittington, D., & Hanemann, W. M. 2006. *The economic costs and benefits of investments in municipal water and sanitation infrastructure: a global perspective*. Berkeley: University of California.
- Whittington, D., & Hanemann, W. M. 2006. The economic costs and benefits of investments in municipal water and sanitation infrastructure: a global perspective. *Working or Discussion Paper*, 1-41.
- WHO, & UNICEF. 2023. *Water, sanitation, hygiene, waste, and electricity services in health care facilities: Progress on the fundamentals*. Geneva: World Health Organization and the United Nations Children's Fund (UNICEF).
- World Bank. 2018. *Drinking Water, Sanitation and Hygiene in Schools*. From: <http://documents.worldbank.org/curated/en/630671538158537244/The-World-Bank-Annual-Report-2018>. (Accessed 10 November 2023)
- World Health Organisation & United Nations Children's Fund. 2018. Drinking water, sanitation, and hygiene in schools: *Global baseline report 2018*. Geneva. <https://www.washdata.org/sites/default/files/documents/reports/2018-11/JMP%20WASH%20in%20Schools%20WEB%20final.pdf>. (Accessed 30 January 2024)
- World Health Organisation. 2018. Drinking Water, Drinking Water Ladder. [www.who.int/water-sanitation-health/monitoring/water.pdf](http://www.who.int/water-sanitation-health/monitoring/water.pdf) (Accessed 10 November 2023)
- World Health Organization (WHO) & United Nations Children's Fund (UNICEF). 2022. *Progress on drinking water, sanitation, and hygiene in schools 2000-2021*. WHO and UNICEF, New York.
- World Health Organization (WHO). 2022. *Compendium of WHO and other UN guidance on health and environment*. <https://www.who.int/tools/compendium-on-health-and-environment/wash> (Accessed 15 March 2023)
- World Health Organization. 2023. *Addressing climate change: supplement to the WHO water, sanitation, and hygiene strategy 2018–2025*. Geneva: World Health Organization.
- World Health Organization. 2018. *Water, Sanitation and Hygiene Strategy 2018-2025*. Department of Public Health, Environmental and Social Determinants of Health. WHO, Geneva.

- World Health Organization. 2020. *Progress on drinking water, sanitation, and hygiene in schools: special focus on COVID-19*. UNICEF.
- World Health Organization. 2022. *Advice for the Public*.  
<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>. (Accessed 29 August 2022)
- Xilumani, D. 2023. Knowledge, attitudes, and practices of food handlers regarding food hygiene and safety in school feeding schemes, Mopani District, South Africa. Doctoral dissertation: University of Johannesburg.
- You, J., Staddon, C., Cook, A., Walker, J., Boulton, J., Powell, W., & Ieropoulos, I. 2020. Multidimensional Benefits of Improved Sanitation: Evaluating 'PEE POWER®' in Kisoro, Uganda. *Int J Environ Res Public Health*, 17(7).
- Zakiya, A. S. 2014. Centring African culture in water, sanitation, and hygiene development praxis in Ghana: a case for endogenous development. *Development in Practice*, 24(5-6), 699-713.

# ANNEXURES

## Annexure 1: Approval from University



**University of Limpopo**  
Department of Research Administration and Development  
Private Bag X1106, Sovenga, 0727, South Africa  
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: anastasia.ngobe@ul.ac.za

**TURFLOOP RESEARCH ETHICS COMMITTEE**  
**ETHICS CLEARANCE CERTIFICATE**

**MEETING:** 29 November 2022

**PROJECT NUMBER:** TREC/616/2022: PG

**PROJECT:**

**Title:** Knowledge, attitudes and practices of sanitation among primary schools learners in Sekhukhune district, Limpopo province.  
**Researcher:** JM Choshane  
**Supervisor:** Dr TJ Mashamba  
**Co-Supervisor/s:** Prof L Skaal  
**School:** Health Care Sciences.  
**Degree:** Master of Public Health

**PROF D MAPOSA**  
**CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE**

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: REC-0310111-031

**Note:**

- i) This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.
- ii) Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.
- iii) PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

*Finding solutions for Africa*

**Annexure 2: Letter seeking consent from the Department of Education:  
Limpopo Province**

P.O BOX 600  
MASEMOLA  
1060  
12-01-2023

Department of Education  
Private Bag X9489  
Polokwane  
0700

Dear Head of Department

Re: REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY

I Choshane Julia Motlakaladi, student no (200626285), studying Master of Public Health at the University of Limpopo, hereby request permission to conduct a research study at Greater Fetakgomo Tubatse Sub-district, Sekhukhune District. The title of my study is: KNOWLEDGE, ATTITUDES AND PRACTICES OF SANITATION AMONG PRIMARY SCHOOLS LEARNERS IN SEKHUKHUNE DISTRICT.

The aim of the study is to investigate the knowledge, attitude, and practices of sanitation among learners in the primary schools of Sekhukhune District. The target population is the grade 6 learners. Participation in the study will be voluntary and data collection will not interfere with the school class lessons. The findings of the study will be confidential and used for educational purposes. My research supervisor is Dr TJ Mashamba.

I undertake to abide by the rules and regulations to ensure ethical adherence.

Researcher: Choshane Julia Motlakaladi

Contact details 0714858104: Email address: [choshanejulia@gmail.com](mailto:choshanejulia@gmail.com)

## Annexure 3: Letter of approval: Department of Education: Limpopo Province



**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF  
**EDUCATION**  
CONFIDENTIAL

Ref: 2/2/2      Enq: Makola MC      Tel No: 015 290 9448      E-mail: [MakolaMC@edu.limpopo.gov.za](mailto:MakolaMC@edu.limpopo.gov.za)

**Choshane JM**  
P O Box 600  
Masemola  
1060

### **RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH**

---

1. The above bears reference.
2. The Department wishes to inform you that your request to conduct research has been approved. Topic of the research proposal: "**KNOWLEDGE ,ATTITUDE AND PRACTICES OF SANITATION AMONG PRIMARY SCHOOLS LEARNER IN SEKHUKHUNE DISTRICT LIMPOPO PROVINCE "**
3. The following conditions should be considered:
  - 3.1 The research should not have any financial implications for Limpopo Department of Education.
  - 3.2 Arrangements should be made with the Circuit Office and the School concerned.
  - 3.3 The conduct of research should not in anyhow disrupt the academic programs at the schools.
  - 3.4 The research should not be conducted during the time of Examinations especially the fourth term.
  - 3.5 During the study, applicable research ethics should be adhered to; in particular the principle of voluntary participation (the people involved should be respected).
  - 3.6 Upon completion of research study, the researcher shall share the final product of the research with the Department.

REQUEST FOR PERMISSION TO CONDUCT RESEARCH : CHOSHANE JM Page 1

---

Cnr 113 Biccard & 24 Excelsior Street, POLOKWANE, 0700, Private Bag X 9489, Polokwane, 0700  
Tel: 015 290 7600/ 7702 Fax 086 218 0560

***The heartland of Southern Africa-development is about people***

**Annexure 4: Letter seeking consent from the Department of Education:  
Sekhukhune District**

P.O BOX 600  
MASEMOLA  
1060  
09-02-2023

Limpopo Department of Education  
Bogwasha Circuit  
Private Bag X  
Burgersfort  
1150

Dear circuit manager

Re: REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY

I Choshane Julia Motlakaladi, student no (200626285), studying Master of Public Health at the University of Limpopo, hereby request permission to conduct a research study at Greater Fetakgomo Tubatse Bogwasha circuit, Sekhukhune District. The title of my study is: KNOWLEDGE, ATTITUDES AND PRACTICES OF SANITATION AMONG PRIMARY SCHOOLS LEARNERS IN SEKHUKHUNE DISTRICT.

I have attached the permission letter from the Provincial Department of Education and the Ethical Clearance Certificate from the University of Limpopo. The target population is the grade 6 learners of the 9 sampled primary schools in Bogwasha circuit. The actual data collection is going to take place in the school classrooms. The questionnaires will take less than an hour to answer, one day per school. Suggested time frame for data collection is March 2023 and latest April 2023. The parental consent form and learners assent forms are ready for distribution.

I undertake to abide by the rules and regulations to ensure ethical adherence.

Researcher: Choshane Julia Motlakaladi

Contact details 0714858104: Email address: [choshanejulia@gmail.com](mailto:choshanejulia@gmail.com)

**Annexure 5: Letter of approval: Department of Education: Sekhukhune District**

Confidential information - This is for official consumption



**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF  
**EDUCATION**

**SEKHUKHUNE EAST DISTRICT-DISTRICT ON THE RISE**

REF: 2/2/4 ENQ: MADITSI RD Tel: 013 231 0100 DATE: 07/03/2023

To: The Principal


FROM: **MAKOLA MS- DISTRICT DIRECTOR  
SEKHUKHUNE EAST DISTRICT**

SUBJECT: **PERMISSION TO CONDUCT RESEARCH IN SCHOOLS WITHIN THE  
SEKHUKHUNE EAST DISTRICT**

1. The above matter has refers.  
Kindly be informed that Chosane JM, studying for Master of Public Health at the University of Limpopo is granted permission to conduct research at your school.
2. Condition attached to permission are:
  - Participation is voluntary.
  - Information collected will only be used for study purposes and will remain confidential.
  - No names should be written on questionnaire.
  - Participants are free to withdraw anytime during the process.

**NB: DATA COLLECTED AND ADMINISTRATION OF QUESTIONNAIRE MUST BE  
DONE ONLY DURING BREAKS AND AFTER TEACHING HOURS**

3. The District Director wishes you well as you continue to assist her.

  
\_\_\_\_\_  
**MAKOLA MS**  
DISTRICT DIRECTOR

8/3/2023  
DATE

Subject: Permission to conduct research in Schools within Sekhukhune east District  
83 Aloe Street, 2314 Extension4, Aloe Ridge West, BURGERSFORT, 1150, P/Bag X 9041, BURGERSFORT, 1150

*The heartbeat of Southern Africa-development is about people!*

## Annexure 6: Questionnaire (ENGLISH)

### SECTION A: BIOGRAPHICAL INFORMATION

#### 1. GENDER: What is your gender?

Male	1
Female	2
Other, please specify	3

#### 2. AGE: What is your age?

11	1
12	2
13	3
14	4

#### 3. GRADE: In which grade are you?

6	1
7	2

### SECTION B: SANITATION KNOWLEDGE

Tick✓ the correct answer according to you

	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
4.Surfaces contain germs					
5.Shaking hands can spread germs					
6.Human faeces contain germs					
7.If hands look clean no need to wash them before eating or after					
8.Washing hands with water only after toilet use is enough to protect illness					
9.Playing near rubbish or wastewater is not dangerous					
10.Defecating open/bush can lead to spread of illness					
11.Poor hygiene/sanitation can lead to diarrhoea and lung illness					

### SECTION C: SANITATION ATTITUDES

Tick ✓ the correct answer according to you

	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
12.Hands should be cleaned before eating at school/home					
13.Hands should be cleaned after blowing nose with plain hands					
14.It is my duty to keep the school environment clean					
15.It is my duty to pick up litter even if I am not the one who littered					

### SECTION D: SANITATION PRACTICE

Tick ✓ the correct answer according to you

	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
16.Hands must be washed only after using the toilet					
17.Hands should only be washed when it is time to eat					
18.Defecating should only be done in the toilet					
19.Soap and water must always be used when washing hands					

## Annexure 7: Questionnaire (SEPEDI)

Questionnaire translated from English to Sepedi version by the researcher.

### KAROLO YA A: TSHEDIMOŠO YA BIOGRAF

#### 1. BONG

Bong bja gago ke bofe?

Monna	1
Mosadi	2
Tše dingwe, hle hlalosa	3

#### 2. MENGWAGA

Kgetha legoro la gago la mengwaga?

11	1
12	2
13	3
14	4

#### 3. KEREITI/ MPHATO

O mphato ofe?

6	1
7	2

### KAROLO YA B: TSEBO YA TLHOKOMELO

swaya ✓ Swaya lepokisi le le nepagetšego goya le ka wena

	Gake Dumelane kamo go Tiilego. 1	Gake dumelane le seo 2	Magareng 3	Ke a Dumela 4	Dumelane a ka go Tia. 5
4. Bokagodimo bo na le ditwatši					
5. Go swarana ka diatla go ka phatlalatša ditwatši					
6. Mantle a batho a na le ditwatši					
7. Ge e ba diatla di bonala di hlwekile ga go nyakege gore o di hlatswe pele o eja goba ka morago ga go ja					
8. Go hlapa diatla ka meetse feela ka morago ga go diriša ntlwana ya boithomelo go lekane go šireletša bolwetši					
9. Go bapala kgaufsi le ditlakala goba meetse a ditšhila ga go kotsi					
10. Go ntšha mantle/makaka mo go bulegilego goba go sethokgwa go ka lebiša go phatlalala ga malwetši/ditwatsi					
11. Bohlweki bjo bo fokolago bo ka lebiša go letšhollo le bolwetši bja maswafo/mafahla					

**KAROLO YA C: MAITSHWARO A TLHOKOMELO**

swaya ✓ Swaya lepokisi le le nepagetšego goya le ka wena

	Gake Dumelelane kamogo Tiilego. 1	Ga ke dumelelane le seo 2	Magareng 3	Ke a Dumela 4	Dumelelana ka go Tia. 5
12.Matsogo a swanetše go hlwekišwa pele o eja sekolong/gae					
13.Matsogo a swanetše go hlwekišwa ka morago ga go foka/swara di nko ka diatla					
14.Ke mošomo wa ka go netefatsa gore tikologo ya sekolo e hlwekile					
15.Ke mošomo wa ka go topa matlakala le ge e se nna yo a ilego a tšholla matlakala					

**KAROLO YA D: MOKGWA WA TLHOKOMELO**

Swaya ✓ Swaya lepokisi le le nepagetšego goya le ka wena

	Gake Dumelelane kamogo Tiilego. 1	Gake dumelelane le seo 2	Magareng 3	Ke a Dumela 4	Dumelelana ka go Tia. 5
16.Matsogo a swanetše go hlapiwa fela ka morago ga go šomiša ntlwana ya boithomelo					
17.Matsogo a swanetše go hlapiwa fela ge nako ya go ja e fihlile					
18.Go ntšha mantle/makaka go swanetše go dirwa fela ka ntlwaneng ya boithomelo					
19.Sesepa le meetse di swanetše go šomišwa ka mehla ge o hlapa diatla					

**Annexure 8: Parent/Guardian Consent form**

**Name of Study: KNOWLEDGE, ATTITUDES AND PRACTICES OF SANITATION AMONG PRIMARY SCHOOLS LEARNERS IN SEKHUKHUNE DISTRICT.**

I have read the information and heard the aims and objectives of the proposed study and given adequate time to rethink the issue. The aim and objectives of the study are sufficiently clear to me that my child has not been pressurised to participate in any way.

I am aware that this material may be used in scientific publications that will be electronically available throughout the world. I consent to this, provided that my child's name and surname will not be revealed.

I understand that participation in this study is voluntary and that my child may withdraw from it at any time and without supplying reasons. I know that this study has been approved by the Turfloop Research Ethics Committee (TREC). I am fully aware that the results of this Study / Project will be used for scientific purposes and may be published.

Access to the records that pertain to my child's participation in the study will be restricted to persons directly involved in the research. Any questions that I may have regarding the research or related matters will be answered by the researcher/s.

I indemnify the University of Limpopo and all persons involved with the above project from any liability that may arise from my child's participation in the above project or that may be related to it, for whatever reasons, including negligence on the part of the mentioned persons.

I hereby give consent for my child.....to participate in this study.

Name of the guardian/parent.....Signature.....date.....

Signature of researcher.....

Signed at..... this..... day of.....20

Contact No: .....

## Annexure 9: Child Assent form

I am \_\_\_\_\_, a student/researcher from the University of Limpopo. I am conducting a study to assess the knowledge, attitudes, and practices on sanitation among primary school learners. I am asking you to take part in the research study because your teacher recommended you for this project.

**Purpose of the study:** To investigate the knowledge, attitudes, and practices of sanitation among learners in primary schools in Bogwasha Circuit, Sekhukhune District of Limpopo Province. For this research, I will give you some questionnaires to answer about knowledge, attitudes, and practices on sanitation.

**Confidentiality:** I will keep your answers private and will not show them to your (teacher or parents/guardian). Only people from the University of Limpopo working on this study will see them. Your information will be solely used for the intended purpose of the study.

**Duration to complete the questionnaires:** the questionnaires will take an hour to complete.

**Voluntary participation:** You should know that you should not be in this study if you do not want to. You may stop participating in the study at any time.

**Benefits:** There are no direct personal benefits that you will get by participating in this study. The results of the study may be used by the school to engage with policies and programmes that are relevant to the school.

Feel free at any time to ask questions. You can contact me on 0714858104.

I freely consent to take part in this study. I understand that I am participating freely and without being forced in any way to do so. I also understand that I can stop participating anytime, should I not wish to continue. I also confirm that the purpose of the study has been fully explained to me. I understand that this research project's purpose is not necessarily to benefit me personally. I also understand that my participation will remain confidential.

\_\_\_\_\_  
Your signature

\_\_\_\_\_  
printed name

\_\_\_\_\_  
date

## **Annexure 10: Participant information sheet**

### **TITLE: KNOWLEDGE, ATTITUDES AND PRACTICES OF SANITATION AMONG PRIMARY SCHOOLS LEARNERS IN SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE.**

Dear participant

This is an invitation for you to participate in the research project.

My name is **Choshane Julia Motlakaladi**, and I am a student from the University of Limpopo. I am conducting a research study to assess the knowledge, attitudes, and practices on sanitation among primary school learners. I am inviting you to participate in the study. The purpose of this form is to inform you and provide information about the study. If you decide you want to take part in the research project, you will be asked to sign the assent form.

#### **Purpose of the study:**

For my master's dissertation, I am researching on the knowledge, attitudes, and practices of sanitation among learners in primary schools in Bogwasha Circuit, Sekhukhune District of Limpopo Province. The purpose of the study is to investigate the knowledge, attitudes, and practices of sanitation among learners in primary schools for this research, you will be asked to answer the questionnaires on knowledge, attitudes, and practices on sanitation. The results of this study will be used for scientific purposes and may be published. The results may be used by the Department of Education to engage with policies and programmes that are relevant to the school.

#### **Why am I being invited to take part in a research study?**

I am asking you to take part in the research study because the study's target group is the grade 6 learners only and you are in grade 6. The study is done to assess your knowledge, attitudes, and practices of sanitation.

#### **What will happen if I agree to participate?**

If you agree to participate in the study, the researcher will give you the papers with questions to answer. The researcher will use the same questions with all participants.

This will take place in your classroom. Time for availability will be checked with your school principal to avoid interrupting the classroom lessons. The researcher will visit your classroom for only one day.

**What happens if I say yes, but I change my mind later?**

Your participation in this study is entirely voluntary and you may stop participating in the study at any time. If you choose not to participate or to withdraw from the study, there will be no penalty.

**What are the benefits to me in this study?**

There are no direct personal benefits that you will get by participating in this study. Although there may be no direct benefits to you, the possible benefit for your participation is the knowledge to be gained from this study. You will play an important role in improving sanitation. This research project is not funded.

**What happens to the information collected for the study?**

I will keep your answers confidential. I will not show them to your teacher. Only the researcher and the research team who are conducting the study will access your personal information. Your information will be solely used for the intended purpose of the study. The data collected will be kept in locked cabinets and computer protected with a password. Access to the records that pertain to your participation in the study will be restricted to persons directly involved in the research.

**Is there any risk to me by being in this study?**

It is not anticipated that there are any risks to participation in this study.

**Who should be contacted for questions?**

Feel free at any time to ask questions. If you have questions about the study, please contact me on 0714858104 or send an email to [choshanejulia@gmail.com](mailto:choshanejulia@gmail.com). My supervisor is Dr Mashamba Joyce: 061 250 6398 and email: [takalanijoycem@gmail.com](mailto:takalanijoycem@gmail.com)

Thank you!!!

## **Annexure 11: Parent information sheet**

### **TITLE: KNOWLEDGE, ATTITUDES AND PRACTICES OF SANITATION AMONG PRIMARY SCHOOLS LEARNERS IN SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE.**

Dear parent/caregiver/legal guardian

This is an invitation for the child in your care to participate in the research project.

My name is **Choshane Julia Motlakaladi**, and I am a student/researcher from the University of Limpopo. I am conducting a research study to assess the knowledge, attitudes, and practices on sanitation among primary school learners. The purpose of this form is to inform you and provide information about the study. If you decide that you want your child to take part in the research project, you will be asked to sign the consent form.

#### **Purpose of the study:**

For my master's dissertation, I am researching on the knowledge, attitudes, and practices of sanitation among learners in primary schools in Bogwasha Circuit, Sekhukhune District of Limpopo Province. The purpose of the study is to investigate the knowledge, attitudes, and practices of sanitation among learners in primary schools for this research. Your child will be asked to answer the questionnaires on knowledge, attitudes, and practices on sanitation. The results of this study will be used for scientific purposes and may be published. The results may be used by the Department of Education to engage with policies and programmes that are relevant to the school.

#### **Duration to complete the questionnaires:**

We expect that your child will be in this research study for one day. Your child will be given the questionnaires that will take an hour to complete.

#### **Benefits:**

There are no direct personal benefits that your child will get by participating in this study. Although there may be no direct benefits to your child, the possible benefit of

your child's participation is the knowledge to be gained from this study. Your child will play an important role in improving sanitation. This research project is not funded.

**Possible risks and disadvantages**

It is not anticipated that there are any risks to participation in this study.

**Confidentiality:** The study is approved by the Turfloop Research Ethics Committee (TREC). I will keep your child's answers/response confidential. I will not show them to their teacher. Only the researcher and the research team who are conducting the study will access your child's personal information. Your child's information will be solely used for the intended purpose of the study. The data collected will be kept in locked cabinets and computer protected with a password. Access to the records that pertain to your child's participation in the study will be restricted to persons directly involved in the research.

**Why is my child being invited to take part in a research study?**

We are asking your child to take part in the research study because the study target group is the grade 6 learners only and your child is in grade 6.

**Voluntary participation:**

Participation in any research project is voluntary. Your child's participation in the study is entirely voluntary and your child may stop being in the study at any time. If you decide not to give your consent for your child's participation in the study, your child has the option to sign the children assent form if they want to participate. There will be no penalty if your child decides to stop taking part in the study.

**Who should be contacted for questions?**

Feel free at any time to ask questions. If you have questions about the study, please contact me on 0714858104 or send an email to [choshanejulia@gmail.com](mailto:choshanejulia@gmail.com). My supervisor is Dr Mashamba Joyce: 0612506398 and email:

[takalanijoycem@gmail.com](mailto:takalanijoycem@gmail.com)

Thank you!!!

**Annexure 12: Observed Sanitation Practices in schools.**



## Annexure 13: Editorial letter

### UNIVERSITY OF LIMPOPO

Faculty: Humanities  
School: Languages and Communication Studies  
Department: Languages



Private Bag X1106  
Sovenga  
0727  
Tel: +27 15 268 3564  
Cell: 073 597 4602  
E-Mail: [moffat.sebola@ul.ac.za](mailto:moffat.sebola@ul.ac.za)

14 September 2023

#### TO WHOM IT MAY CONCERN

This letter serves to certify that I have edited a research dissertation entitled: **KNOWLEDGE, ATTITUDES AND PRACTICES OF SANITATION AMONG PRIMARY SCHOOLS LEARNERS IN SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE** by **Choshane Julia Motlakaladi**. A version of the dissertation with the evidence of editorial interventions and comments for consideration by the researcher has been sent to the researcher.

I trust you will find the editing quality in order.

Best regards

*Sebola, M*

---

DR. MOFFAT SEBOLA