# INFLUENCE OF GENDER IN TOILET ACCESS, USE AND MAINTENANCE ON PERFORMANCE OF SHARED SANITATION FACILITIES IN NANYUKI SLUMS, KENYA

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## DECLARATION

This thesis is my original work and has not been presented for a degree in any other Institution.

EG/407/201143/20

Signed ……. Date …….

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## DECLARATION BY SUPERVISORS

This thesis has been presented with our approval as University Supervisors.

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## DEDICATION

With heartfelt love, I dedicate this work to my dear wife, Jayne rose Murugi Ndwiga and to my children, Melisa Mukuhi, Elsie mukuhi, Ethans Maina, Amy mukuhi and Elsa Pendo.

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## OPERATIONAL DEFINITION OF TERMS

| | |
|---|---|
| Access | Capability and chance to gain advantage from a service, resource, facility, or opportunity. This includes the presence, affordability, closeness in location, and social obstacles that could affect an individual or a community's ability to make use of a specific service or resources |
| Gender | The roles and identities linked to being male, female, or another gender, but not related to biological traits. It can include varied identities to just being a male and female, including transgender or non-binary. |
| Improved Sanitation: | Access to facilities and practices that safely separate human waste from human contact, thereby reducing the risk of contamination and the spread of diseases. This includes the availability of proper toilet facilities, waste management systems, menstrual management and hygiene promotion. |
| Influence: | Having the power to affect or change someone or something, often leading to changes in their behavior or decisions |
| Maintenance | The ongoing activities and efforts required to preserve, repair, sustain, or keep a system in a functional and optimal condition. It dictates regular inspections, repairs, cleaning, and upkeep to ensure the longevity and effective functioning of a system, infrastructure, or facility |
| Performance | The measurable outcomes, efficiency, effectiveness, or results of a process, action, system, or individual. It measures how well something or someone functions in achieving its set objectives or goals |
| Safe Sanitation | Denotes the provision of sanitation facilities and practices that ensure the hygienic disposal of human waste while minimizing environmental and |

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|---|---|
| | public health risks. It emphasizes proper waste treatment, hygiene education, and the prevention of pollution and diseases associated with inadequate sanitation |
| Sanitation Systems | Encompass the interconnected infrastructure, technologies, and processes designed to manage human waste, promote hygiene, and safeguard public health. These systems can include sewage treatment plants, onsite sanitation solutions, waste disposal mechanisms, and associated governance and policies |
| Shared Sanitation Facilities: | Sanitation amenities that are used by multiple households or individuals. These facilities could be communal toilets or latrines accessed and maintained by several households, often in densely populated areas where individual household facilities may not be feasible. |
| Slums: | Informal settlements mostly in urban areas characterized by substandard housing, inadequate essential infrastructure, overcrowding, and a lack of essential services such as clean water, sanitation, healthcare and often face socio-economic challenges and limited access to resources. |
| Toilet /sanitation facility | A facility where people go for long call or short call, also referred to as a latrine or a sanitation facility. |
| Toilet Use | Refers to the act of visiting a toilet facility for the purpose of urination or defecation |

## LIST OF ABBREVIATIONS

| | |
|---|---|
| CHPs | Community Health Promoters |
| FGD | Focus Group Discussion |
| HBM | Health Brief Theory |
| MAXQDA | MAX Qualitative Data Analysis |
| NACOSTI | National Commission for Science, Technology and Innovation |
| OD | Open Defecation |
| OR | Odds Ratio |
| PHOs | Public Health Officials |
| SCT | Social cognitive theory |
| SD | Standard Deviation |
| SDG | Sustainable Development Goal |
| SE | Standard Error |
| SIT | Social identity theory |
| UN | United Nations |
| UNICEF | United Nations Children's Fund |
| WHO | World Health Organization |

## ABSTACT

The Sustainable Development Goals agenda 6 emphasizes on sanitation access alongside gender equality as a transformative strategy to improved sanitation. However, with the serious health consequences of poor sanitation, it is essential to understand the gender-related factors associated with ability to access, utilize and maintain shared sanitation facilities in slums. This study aimed at examining the influence of gender in toilet access, use and maintenance on performance of shared sanitation facilities in Nanyuki slums. A convergent research design was used and a sample of 98 participants calculated using Yamane's formula. Quantitative data was collected using structured questionnaires from household heads who were selected using cluster and simple random sampling techniques. The number of household heads per cluster was determined using proportionate-to-size formula. The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 26 in descriptive and inferential statistics to unveil relationship between variables. Qualitative data was collected using focus group discussion guides from a purposively selected group. The data was analyzed using the MAXQDA software in themes and presented in a narrative way. Findings revealed that females were the most users of toilets compared to men (adjusted OR=1.14, 95% CI: 0.05-1.92, P=0.009<0.05) because they were left at their households due to commitments of carrying out household chores when men could use toilets in their places of work. Toilets were 0.76 times less acceptable and 0.75 less preferable for females than for males. Toilet location far from households, use of toilets at night for females, access to toilets with gapped super structures, unsafe and contaminated toilets significantly reduced the odds of toilet use (P<0.05). Adequacy of toilets (adjusted OR 4.95, 95% CI: 0.98-4.40, p= 0.032<0.05), and ability to meet user needs (adjusted OR 5.73, 95% CI: 0.70-4.15, p= <0.001) increased the chances of use of shared toilets. The odds for preference of toilets significantly increased by 4.95 and 2.09 when toilets adequately addressed user needs and when they were separated by gender respectively (p<0.05). The odds of preference to toilets whose pit content depth was less than 1 meter was 15% lower than when pit contents were lower. In toilets where women took cleaning roles, the chances of hygiene increased by 1.83 compared to when men took the roles. Unavailability of toilet cleaning materials seemed to have a negative impact on the hygiene of shared toilets (adjusted OR 0.53, 95% CI: 0.10-2.96, p= 0.003<0.05). The study concluded that sanitation was among the critical issues that affected slum dwellers and its impact was disproportional to gender. The study recommended the need for provision of gender segregated data in sanitation service delivery, strengthening the role of women, need for advocacy, community cohesion and gender mainstreaming in sanitation policies to promote gender-responsive sanitation facilities in slums.

# CHAPTER ONE: INTRODUCTUION

## 1.1 Background Information

Access to safe sanitation is a fundamental human right and is critical for the prevention of diseases such as diarrhea, cholera, and typhoid, which are among the major causes of morbidities and mortalities in developing countries (Demissie *et al*., 2021). The Sustainable Development Goals agenda 6 emphasize on access to sanitation, alongside gender equality as a transformative strategy to improved sanitation (United Nations, 2015). When both men and women access sanitation facilities that adequately address their needs, sanitation conditions could improve. However, although the need for safe sanitation is a well-recognized agenda, a report by WHO/UNICEF (2021) showed that sanitation in urban slums has become a global challenge where residents have limited access and choices to safe sanitation facilities. Despite numerous attempts over the past to reduce the number of people lacking access to safe sanitation around the world, almost 3.6 billion people are still living without access to even basic sanitation facilities such as toilets or latrines (WHO/UNICEF, 2012). Given the serious health consequences of poor sanitation, understanding gender-related factors that influence ability to use safe sanitation facilities could be a critical concern for policy-makers and researchers around the world.

Shared sanitation facilities, which refer to toilets used by more than one household, have been thought as promising solutions to safe sanitation for residents in slums (Simiyu *et al*., 2017). However, influence of gender in toilets access, use and maintenance of the shared sanitations could be a complex yet a critical issue that intersects with broader concerns related to urbanization, sanitation and gender equality (Burt, Nelson, & Ray, 2016). Slum residents continue to access toilets which rarely address needs of all household members, are

unsafe for use and poorly maintained. The gender-related barriers faced in accessing safe and hygienic sanitation facilities could have profound implications for the health, dignity and safety of the affected. Addressing these disparities call for concerted efforts at the community, policy and individual levels to create gender-sensitive and inclusive sanitation solutions which prioritize the needs of all residents, regardless of gender to promote access to safe sanitation (ba *et al*., 2021). These efforts must not only advocate for gender parity but also promotion of gender transformative sanitation approaches along with inclusion to attain better sanitation services for communities.

Gender sensitive and inclusive sanitation facilities are solutions which are accessible, situated in non-isolated areas, promote privacy for users and address the needs of all toilet users (Assefa *et al*., 2021). When sanitation facilities are inclusive, residents could be encouraged to comfortably make use of them. However, in India, a study by Belur *et al*. (2019) that surveyed 142 to examined gender-based encounters in slum toilets established that although women's worry of sanitation-related violence was higher than their ideal experience, their perception of insecurity while visiting toilets was higher for toilets located far from their households.

Similarly, in Uganda, a study by Fisher *et al*. (2018) that analysed sanitation-related gender violence risks found out that shared toilets were located in poorly lit and isolated areas which made them unsafe for use especially by women and girls, who feared sexual violence when visiting the toilets at night. Besides location of toilets in unsafe places, a study by O'reilly and Budds (2023) in India established that although shared toilets were provided in slums, failure to repair them facilitated reversion to open defecation due to gaps around the walls which did not maintain privacy of users. The study showed that women mostly

avoided such toilets compared to men because of their dire need for privacy while using toilets. Defecating in the open could contaminate the environment making it unaesthetic and a breeding site for enteric pathogens, capable of transmitting diarrheal infections.

Gender-specific needs must be considered when designing and constructing slum toilets. The toilets thus require special provisions to address the different sanitation needs for both men and women for comfortability and confidence while using such toilets. Although the sanitation urges that cut across men and women are defecation and urination, women have other special sanitation needs such menstruation which require dignified management.

A report by UNICEF (2019) showed that almost 1.8 billion women and girls globally menstruate each month and millions lack the freedom of managing their menstruation in a stately, healthy and private manner. Presence of women and girls in slums highlight the necessity for appropriate facilities for menstrual hygiene management. However, finding secure areas for managing menstrual hygiene, particularly in slums, could be difficult. In Pakistan, India and Kenya, Fayyaz *et al*. (2022), McCarthy and Lahiri-Dutt (2020) and Winter *et al*. (2022) respectively found out that comfortability of women in using toilets during menstruation was a challenge when available toilets were insecure, lacked provisions for menstrual management and were not separated by gender. Failure to provide menstrual hygiene management options for women such as sanitary bins for disposal of used sanitary towels could mean difficult sanitation encounters for women living in slums.

Slums should have enough toilets for use by dwellers. However, as often, slum areas are characterized by limited toilets which force residents to queue for an extended period of time in order to access shared toilets which prompt dwellers to seek for alternative coping solutions. In UK, a study by Greed (2023) that assessed inclusion of women needs in toilets

found out that women's toilets were half the number of toilets for men. The study established that residents bore the embarrassment of opting for defecation in the open to avoid queuing in toilets which could expose them, particularly women, to the risk of sexual assaults. Similarly, in Aligarh, a study by Iqrar and Musavi (2023) that assessed sanitation issues in urban slums established that having to queue for long in toilets was among the factors that hindered toilet utilization. Although expulsion of faeces and urine is a natural process, an extended wait in latrines particularly by women could mean delayed performance of household chores including unattended children.

It is widely recognized that shared facilities are at best a "limited" solution due to the lack of quality maintenance standards (UN Water, 2019). A study by Simiyu *et al*. (2017) examined the quality of shared sanitation facilities in Kenyan slums. The study found out that majority of the toilets which were dirty were shared by an average of 8 households and the toilets maintenance quality decreased with increased number of households sharing the toilets.

The study established that toilets in slums were rarely maintained clean because even though there were schedules for toilet cleaning, the respective parties did not frequently clean the toilets which left them flooded with urine and faeces on their slabs. When members who share toilets are fewer, cooperation towards improving maintenance and hygiene status of toilets could be higher than when toilet users are many. Visiting poorly maintained toilets could be a daunting task as it involves squatting in slabs which are often contaminated with urine and faeces due to poor maintenance. Contaminated slabs have the capability of posing a great health risk to everyone (Pommells *et al*., 2018), but with women whose anatomy is more susceptible to infections from contaminated surfaces could bear a more burden of exposure to sanitation-related diseases such as Urinary Tract Infections. This

underscores the urgent need to address gender-related sanitation issues and ensure both men and women have access to safe and well-maintained toilets.

Existing studies for instance fail to point out in depth the aspects of toilet access, use and maintenance of shared sanitation facilities and the sanitation crisis in relation to gender has not received the attention it deserves (Assefa *et al*., 2021; Burt *et al*., 2016; Greed, 2023; Iqrar & Musavi, 2023; Pommells *et al*., 2018; Simiyu *et al*.,2017). Majority of studies overemphasize on access to water while these disparities in sanitation have not received equal attention. As well, according to Assefa *et al*. (2021), sanitation implementers and policy makers partially include a gender lens in the design and implementation of sanitation facilities. Failure to consider potential sanitation inequalities and gender differences could block achievement of universal sanitation access as envisioned in the Sustainable Development Goals (United Nations, 2015). It was therefore necessary to examine the influence of gender in toilet access, use and maintenance on performance of shared sanitation facilities in slums for improved performance.

### 1.2 Problem Statement

Globally, the growth of slums has been as a result of rapid urbanization which has exacerbated poor sanitation in informal settlements where residents often grapple with inadequate access to basic sanitation services (WHO/UNICEF, 2021). The problem is higher in developing countries, Kenya included due to low living standards and poverty (Simiyu *et al*., 2017). Although shared sanitation facilities have been established in slums as solutions to enhance sanitation conditions, a glaring gender disparity persists in how the shared facilities are accessed, utilized and maintained within the slums. Women have been portrayed as victims who continually bear the burden of unsafe sanitation while using shared

sanitation solutions in slums (Simiyu *et al*., 2017) which could consequently affect their dignity, safety and self-esteem.

Women and girls face substantial barriers including access to toilets located in lonely places which create fear of harassment or sexual assaults (Cassidy, 2021), and long queues (Greed, 2023) in toilets which could be burdensome to women who have multiple caregiving responsibilities (Eliud *et al*., 2022). Privacy, dignity, ability to meet sanitation needs and proper maintenance in sanitation facilities is a priority to toilet users. However, the lack of separate toilets, access to unmaintained toilets and to sanitation facilities which hardly meet sanitation needs of users such as menstrual hygiene management, could discourage people from using shared toilets. The status could also lead to unhygienic alternatives like open defecation (Simiyu *et al*., 2017). Defecation in the open could expose the slum population to sanitation-related diseases which are among the leading causes of children mortalities and morbidities in Sub-Saharan Africa (Demissie *et al*., 2021).

Access, use and maintenance of shared sanitation facilities in slums in relation to gender presents a multifaceted problem with numerous social and health implications (Pommells *et al*., 2018). The fact that shared toilets in Nanyuki slums are often overcrowded, poorly maintained, and sometimes unsafe and that the area has poor drainage and is inadequately served by sewer network (County Government of Laikipia, 2021) warrants attention into exploration of access, utilization and maintenance practices. Although gender disparities in relation to slum sanitation still persist, there exist limited documentation on its influence on performance of shared sanitation facilities in slums as most studies report on disparities in access to water (Simiyu *et al*., 2017). The essence of this study is to address such disparities in the sanitation sector.

## 1.3 Justification of the Study

Gender discrimination continues to persist in various sectors, including sanitation. Women and girls often face unique challenges when it comes to accessing safe and appropriate sanitation facilities, particularly in urban slums and displacement camps. This is due to both gender-related differences, such as cultural and social factors, as well as sex-related differences and physiological factors. Women and men typically have different roles in sanitation, with women often having primary responsibility for household water supply, sanitation, and health. However, inadequate sanitation facilities have a greater impact on women and girls' health and safety, leading to issues like gender-based violence and poor menstrual hygiene management, which can result in reproductive and urinary tract infections.

## 1.4 Objectives

The general and specific objectives are as outlined.

### 1.4.1 General objective

To examine the influence of gender in toilet access, use and maintenance on performance of shared sanitation facilities in Nanyuki slums –Kenya

### 1.4.2 Specific objectives

i. To examine the influence of gender in toilet access on performance of shared sanitation facilities in Nanyuki slums. –Kenya.
ii. To assess the influence of gender in toilet use on performance of shared sanitation facilities in Nanyuki slums- Kenya.
iii. To examine the influence of gender in toilet maintenance on performance of shared sanitation facilities in Nanyuki Slums-Kenya.

## 1.5 Research Questions

i. How does gender in toilet access influence performance of shared sanitation facilities in Nanyuki slums - Kenya

ii. What is the influence of gender in toilet use on performance of shared sanitation in Nanyuki Slums-Kenya

iii. What is the influence of gender in toilet maintenance on performance of shared sanitation facilities in Nanyuki slums – Kenya

**1.6 Significance of the Study**

The significance of the study lies in its potential to address and inform gender gaps in the management of sanitation services, with the aim of empowering women. The study will benefit the government of Kenya by providing it with insights and recommendations on how to address gender inequalities in the management of sanitation services. This will help the government in achieving its gender equity objectives, and promote better health outcomes among citizens. County governments will benefit from the study by using the findings and recommendations to develop gender-sensitive policies and programs for the management of sanitation services.

This will help in improving sanitation conditions in slum communities and promote better health outcomes. The study will benefit slum communities by promoting gender equality in the management of sanitation services. This will help in reducing the burden of poor sanitation conditions, and promote better health outcomes among slum dwellers. Women will benefit from the study by promoting their participation and empowerment in the management of sanitation services. This will help in promoting their social and economic wellbeing, and also help in reducing the burden of unpaid care work. The study will also be of benefit to policy makers in providing them with evidence-based recommendations on

how to address gender inequalities in the management of sanitation services. This can help in promoting gender equity in policy formulation and implementation. The study will be of essence to future researchers as it provided them with a baseline for further research on gender inequalities in the management of sanitation services. This will help in promoting a culture of evidence-based research and policy formulation in the field of gender and development.

### 1.7 Limitations and Delimitations of the Study

The researcher had difficulties accessing the information due to the confidentiality tag pertaining to the operations of projects in the study area. To overcome this challenge, participants were informed on the purpose of the study that was being undertaken and any information given was to be used for the purposes of the study. The respondents were also assured of anonymity when giving information since the questionnaires do not require a person's identity. Decoding the categorical data for the response variable to make it binary could somehow affect the degree of reliability of the findings. However, future studies conducted in this study's line could ascertain the variables' impacts in a better manner.

### 1.8 Delimitation of the Study

The scope of this study was to explore the influence of gender in toilets access, choice to use, and maintenance on performance of shared sanitation facilities in slums, with a focus on the case of Nanyuki-Kenya. The study aimed to investigate the specific gender-related factors that influence the access to toilets in slums, including the physical proximity of toilets to residential areas, the number of toilets available in the community, and the cultural norms and practices related to toilet use.

The study analyzed the impact of gender on the choice to use toilets, including the availability of gender-segregated toilets, the level of cleanliness and hygiene, and the overall perception of shared sanitation facilities. Lastly, the study assessed the role of gender in the maintenance of toilets, including the responsibility for cleaning and upkeep, the availability of cleaning materials, and the overall condition of the facilities.

The study was delimited to the slums of Laikipia to provide a specific and focused investigation of the issues related to gender in toilet access, choice to use, and maintenance in this particular setting. By limiting the scope of the study, the research was able to provide a more in-depth analysis of the factors that influence the acceptability of shared sanitation facilities in this context.

The findings of this study will contribute to the understanding of the importance of gender in promoting the use and maintenance of shared sanitation facilities in slums, and provide recommendations for policy and practice to improve access and utilization of these facilities in this setting.

# CHAPTER TWO: LITERATURE REVIEW

## 2.0 Introduction

This chapter reviews existing scholarly studies related to the key variables of the study. It provides a foundation for the research by highlighting relevant theories, identifying knowledge gaps, and showing how past findings relate to the study objectives. The chapter focusses on gender aspects in sanitation, performance of shared sanitation facilities, gender in toilet access, use and maintenance of sanitation facilities.

## 2.1 Gender, Sanitation and Performance of Shared Sanitation Facilities in Slums

Access to safe and adequate sanitation facilities is a fundamental human right and a key component of public health and dignity (WHO/UNICEF, 2021). In slums, where living conditions are often characterized by overcrowding, poverty, and inadequate infrastructure, ensuring proper sanitation could be challenging. Shared sanitation facilities are common in slums, and understanding their performance and impact on gender dynamics could be crucial for addressing the sanitation needs of vulnerable populations. This literature review explores the complex interplay between gender, sanitation, and the performance of shared sanitation facilities in slum environments.

Shared sanitation facilities are used by multiple households in slums due to spatial constraints and limited resources (Kobia *et al*., 2022). In Kenya, a study by Kobia *et al*. (2022) that examined strategies for operation and maintenance of community toilets established that while sanitation facilities were essential for meeting the sanitation needs of residents, they often faced challenges related to cleanliness, maintenance, and privacy. The performance of shared sanitation facilities could however vary widely, which could have significant implications for gender equality and public health. Improved performance of

shared sanitation facilities could therefore improve with increased involvement of both women and men in sanitation programming in slums (Kobia *et al*., 2022).

Gender plays a crucial role in shaping sanitation practices and outcomes (Eliud *et al*., 2022). A study by Eliud *et al*. (2022) that examined the influence of cultural factors on adoption of sanitation practices established that women and girls were disproportionately affected by inadequate sanitation facilities as they faced higher risks of sexual harassment, violence, and health issues due to the lack of private and secure toilets.

The study established that the burden of managing sanitation often fell on women, which constrained their time and opportunities for other duties and attracted the practice of open defecation. Increased open defecation could facilitate the spread of sanitation-related infections such as diarrhea, typhoid and cholera. Gender-responsive sanitation interventions are therefore essential to address the sanitation disparities. Gender-responsive sanitation interventions are designed to consider the specific needs and concerns of both women and men (UN, 2015) with interventions which aim to enhance access to sanitation facilities, improve their quality, and ensure that they are safe and dignified for all users. In slums, gender-responsive sanitation approaches could involve the design and location of sanitation facilities, increased security measures, maintenance and targeted awareness campaigns.

Effective interventions should focus on improving facility design, security, privacy, and engaging women and communities in decision-making and management (Das & Baker, 2017). Furthermore, public policies and international development initiatives must prioritize gender-sensitive sanitation solutions to address the specific challenges faced by women and girls in slums (Adhikari & Panda, 2017). Ultimately, achieving gender equality in sanitation

access and outcomes is not only a matter of human rights but also essential for the overall well-being and development of slum communities.

### 2.2 Gender in Toilets Access

Access to toilets is a basic human right and an essential requirement for maintaining good hygiene, health and dignity. However, access to toilets is often not equitable, and gender in toilets access are a global problem. According to the United Nations, approximately 2.3 billion people lack access to basic sanitation facilities such as toilets, and women and girls are disproportionately affected (WHO & UNICEF, 2019). This literature review aims to provide an overview of gender in toilets access.

Gender in toilets access is shaped by cultural, social, and economic factors. In many societies, women face significant challenges in accessing toilets due to social norms and cultural practices. For instance, in some communities, women are expected to avoid using public toilets or shared facilities as a way of protecting their privacy, which can result in inadequate access to toilets (Adhikari & Panda, 2017). Additionally, in some cultures, menstruating women are considered impure and are not allowed to use certain toilets or toilet facilities, further limiting access to sanitation for women (Das & Baker, 2017).

Economic factors are critical in understanding gender disparities in access to toilets. Insufficient resources and inadequate infrastructure often lead to unsanitary toilet facilities, which have a disproportionate impact on women and girls. This issue is particularly prevalent in developing countries, where the absence of safe and private toilets in schools can hinder girls' education by causing them to miss school during their menstrual periods (Adhikari & Panda, 2017). However, despite the progress made in addressing these issues, significant gaps still exist. For example, a study by Headey, Hoddinott, and Ali (2018) found

that while access to improved sanitation facilities has improved in many developing countries, women and girls still face significant barriers in accessing toilets. These barriers are particularly pronounced in rural areas, where households are more likely to lack access to safe and private toilets.

Moreover, economic factors, such as poverty and income inequality, play a significant role in perpetuating these disparities. A study by Sinha *et al*. (2021) found that poor households are less likely to have access to safe and private toilets, which exacerbates gender disparities in sanitation. Additionally, gender-based wage discrimination and limited employment opportunities for women can further restrict their access to resources necessary for constructing and maintaining safe toilets. In conclusion, economic factors play a crucial role in perpetuating gender disparities in access to toilets. Despite some progress in addressing these issues, significant gaps still exist, particularly in rural areas and among poor households. To ensure equitable access to safe and private toilets, policymakers and stakeholders must prioritize addressing the underlying economic factors that perpetuate these disparities.

Several studies have investigated the association between access to toilets and gender-based violence. A study by Das and Baker (2017) found that women and girls who lack access to safe and private toilets are more vulnerable to sexual assault and harassment, which can have significant impacts on their health, safety, and dignity. This study highlights the importance of ensuring that all women and girls have access to safe and private toilets to reduce their risk of experiencing gender-based violence. Similarly, a report by WaterAid (2021) revealed that inadequate access to toilets is a major driver of gender inequality and can contribute to gender-based violence. The report found that women and girls in many

countries face significant barriers in accessing safe and private toilets, which puts them at risk of sexual harassment and assault. Additionally, the report found that women and girls who lack access to toilets are more likely to experience anxiety and fear when using shared toilets, which can impact their daily lives and overall well-being.

Despite these findings, significant gaps still exist in addressing the issue of access to safe and private toilets. A study by Bhattarai and Baral (2020) revealed that women in rural areas of Nepal face significant barriers in accessing safe and private toilets, which can impact their health, safety, and overall well-being. The study found that lack of sanitation infrastructure and cultural norms surrounding menstruation can further exacerbate the gender disparities in access to toilets. Access to toilets is a critical issue in addressing gender disparities and gender-based violence. Studies have consistently shown that women and girls who lack access to safe and private toilets are at a greater risk of sexual assault and harassment. While progress has been made in addressing this issue, significant gaps still exist, particularly in rural areas and developing countries. Therefore, it is important to prioritize the development of safe and private sanitation infrastructure and address cultural norms surrounding menstruation to ensure equitable access to toilets for all.

Gender in toilets access is a significant problem that impacts the health, safety, and dignity of women and girls. Cultural, social, and economic factors play a significant role in shaping gender in toilets access. Interventions such as the provision of gender-specific toilets and menstrual hygiene management facilities can help to address gender to toilets access and ensure that women and girls have access to safe and private sanitation facilities. Further research is needed to identify effective interventions to promote equitable access to toilets and to ensure that this basic human right is available to all. In addition to the factors

discussed above, access to toilets can also be influenced by geographic location and infrastructure development. A study by Mukherjee and Sain (2019) found that access to toilets was significantly lower in rural areas compared to urban areas in India, due to the lack of sanitation infrastructure and funding for toilet construction. This highlights the importance of considering the local context and infrastructure development in addressing gender disparities in access to toilets.

Moreover, the issue of access to toilets is not limited to developing countries. A study by Hawkins *et al*. (2019) found that women in the United Kingdom also face barriers in accessing safe and private toilets, particularly those who are homeless or living in poverty. These women often have to rely on shared toilets or facilities provided by charities, which may not be safe or clean. This highlights the need to address the issue of access to toilets in developed countries as well.

In terms of policy interventions, several studies have emphasized the importance of involving women and girls in the decision-making process for sanitation projects. A study by Fisher *et al*. (2021) found that involving women in the planning and design of toilet facilities led to more effective and sustainable solutions. This approach ensures that the facilities meet the specific needs of women and girls, and can help to break down cultural barriers that may prevent them from accessing toilets.

Furthermore, education and awareness-raising programs can also play a crucial role in promoting equitable access to toilets. A study by Amin *et al*. (2020) found that providing education on menstrual hygiene management and addressing cultural norms surrounding menstruation can help to increase the use of toilets by women and girls. This approach can also help to reduce the stigma associated with menstruation, which can be a significant

barrier to accessing toilets. In conclusion, gender in toilets access is a complex and multifaceted issue that requires a holistic approach. Cultural, social, economic, and infrastructure factors all play a role in shaping access to toilets, and effective interventions must address each of these factors. Involving women and girls in the decision-making process, promoting education and awareness, and ensuring the availability of safe and private sanitation facilities are all critical steps towards promoting equitable access to toilets for all.

Implications of influence of Gender access to toilets can have significant implications for access to these facilities. Transgender and non-binary individuals may be at risk of harassment or violence when using shared toilets that are designated for a specific gender, which can limit their access to these facilities (Spearritt & Smith, 2019). Additionally, women who avoid using shared toilets due to concerns about cleanliness and safety may have limited access to these facilities, which can impact their ability to participate in public life (Kiefer & Sanchez, 2017).

In addition to the factors discussed in the previous sections, technology and infrastructure also play a role in shaping gender in toilets access. For example, the use of mobile technologies and sensors can help to monitor the cleanliness and availability of toilets in real-time, allowing for more efficient maintenance and management of sanitation facilities (Gao *et al*., 2017). Furthermore, the development of eco-toilets and other sustainable sanitation technologies can help to address issues of water scarcity and environmental degradation while also improving access to safe and private toilets (Sarkar *et al*., 2021).

Another important consideration is the intersectionality of gender in toilets access with other forms of social inequality, such as race, ethnicity, and disability. For example, a study by

Chen *et al*. (2021) found that physically challenged women face significant barriers in accessing toilets due to a lack of accessible infrastructure and negative attitudes towards disability. Similarly, indigenous women and girls may face additional challenges in accessing safe and private toilets due to historical and ongoing systemic discrimination and marginalization (Amnesty International, 2019).

Finally, it is important to recognize the role of advocacy and activism in promoting equitable access to toilets. Grassroots movements and community-based initiatives have been successful in raising awareness about gender in toilets access and advocating for the development of safe and private sanitation facilities (Shrestha & Dahal, 2021). Policy advocacy and lobbying efforts can help to ensure that gender considerations are integrated into national and international development agendas.

Overall, the issue of gender in toilets access is complex and multifaceted, with a range of social, cultural, economic, technological, and political factors shaping these disparities. To promote equitable access to safe and private sanitation facilities, it is essential to prioritize the development of infrastructure and policies that address the underlying economic and social determinants of gender-based disparities in access to toilets. It is important to recognize the intersectionality of gender in toilets access with other forms of social inequality and to engage in advocacy and activism efforts to promote gender equity and social justice.

**2.3 Gender in Toilets Use**

The use of shared toilets is indeed an essential aspect of daily life that affects everyone (O'reilly & Budds, 2023). However, gender influences use toilets, which can result in unequal access to facilities. Several studies have investigated the factors that contribute to

gender influence in use shared toilets, and their implications on access to toilets. For instance, a study by Gaspari and colleagues (2020) found that gender differences in the use of shared toilets were related to cultural and societal norms that dictate how men and women should behave in public spaces. This study revealed that women are more likely to feel uncomfortable using toilets due to safety concerns, privacy concerns, and social norms, which can lead to unequal access to shared toilets.

In contrast, a study by Allard and colleagues (2017) found that men and women have similar preferences for the design and features of toilets, such as cleanliness and privacy. However, the study also found that women are more likely to experience discomfort when using shared toilets due to concerns about cleanliness and safety. Another study by Bradford and colleagues (2016) found that transgender individuals face significant barriers in accessing safe and inclusive public toilets, which can impact their health, safety, and overall well-being. The study revealed that gender-neutral toilets were preferred by transgender individuals as they felt more comfortable and safer in these facilities.

Influence of gender to use toilets can lead to unequal access to facilities. Factors such as cultural and societal norms, safety concerns, and preferences for cleanliness and privacy contribute to these diversities. Therefore, it is essential to develop safe, clean, and inclusive shared toilets that cater to the needs of all individuals, regardless of their gender identity. The findings from these studies emphasize the importance of addressing the diverse needs of individuals in shared toilet design and policy.

A study by Spearritt and Smith (2019) that assessed sanitation facilities for gender inclusivity established that in many cultures, it is expected that men use urinals, while women use stalls with doors. These social expectations can make it challenging for people

who do not conform to traditional gender roles to access shared toilets. For instance, transgender and non-binary individuals may feel uncomfortable using toilets that are designated for a specific gender, leading to feelings of anxiety and exclusion. Similarly, a study by Gaspari *et al*. (2020) found that gender differences in the use of shared toilets were related to cultural and societal norms that dictate how men and women should behave in public spaces.

In contrast, a study by Allard *et al*. (2017) found that men and women have similar preferences for the design and features of toilets, such as cleanliness and privacy. However, the study also found that women are more likely to experience discomfort when using shared toilets due to concerns about cleanliness and safety. Furthermore, a study by Adeyeye and Adepoju (2018) found that social norms and cultural beliefs also play a significant role in access to sanitation facilities in rural communities. In this study, it was revealed that in some communities, women are not allowed to use shared toilets during the day, as it is considered inappropriate for them to be seen in public spaces.

Social norms and expectations are significant factors that influence gender in the use shared toilets. These expectations can make it challenging for individuals who do not conform to traditional gender roles to access shared toilets. Therefore, it is crucial to develop safe, inclusive, and gender-neutral shared toilets that cater to the diverse needs of all individuals, regardless of their gender identity.

Women's concerns about cleanliness and safety when using shared toilets have been extensively documented in several studies. Kiefer and Sanchez (2017) found that women are more likely than men to experience discomfort when using toilets due to concerns about cleanliness, privacy, and safety. This discomfort can lead women to limit their use of shared

toilets, which can impact their access to facilities. Moreover, a study by Allard *et al*. (2017) found that women have higher standards for the cleanliness of shared toilets than men. Women are more likely to avoid shared toilets that are poorly maintained, lack adequate privacy, and have unpleasant odors, which can limit their access to these facilities. Similarly, a study by Giroldi *et al*. (2020) found that women are more likely to experience anxiety and stress when using shared toilets due to concerns about cleanliness and hygiene. Men have however been found to be less concerned about the cleanliness and privacy of shared toilets. A study by Gaspari *et al*. (2020) found that men are more likely to use urinals in shared toilets, which may indicate that they are less concerned about privacy when using these facilities.

Overall, these studies highlight the gender differences in concerns about cleanliness, hygiene, and safety when using shared toilets. Women tend to have higher standards and are more likely to experience discomfort and anxiety when using shared toilets that do not meet their expectations. To ensure equitable access to shared toilets, it is crucial to address these gender differences in toilet design and policy.

The design of toilets can also contribute to gender influence in the toilets use. For example, many shared toilets lack adequate facilities for breastfeeding or changing diapers, which can make it challenging for women with children to access these facilities (Baldwin *et al*., 2019). Additionally, the location and accessibility of shared toilets can also impact their use. For example, women may be more likely to use toilets that are well-lit and located in areas with high foot traffic (Kiefer & Sanchez, 2017).

The influence of Gender in toilets use is determined by a range of social, cultural, and environmental factors. These factors can impact access to shared toilets, particularly for

transgender and non-binary individuals and women. To address these issues, it is important to design shared toilets that are accessible, safe, and inclusive for all individuals, regardless of gender identity. Additionally, efforts should be made to challenge traditional gender roles and expectations surrounding the use of shared toilets.

Research has also shown that gender-neutral or single-stall restrooms positively impact the restroom experiences of gender non-conforming and transgender individuals (Williams Institute, 2013). According to the study, transgender individuals are more likely to experience negative restroom-related experiences, such as verbal harassment or physical assault, compared to their cisgender counterparts. Access to gender-neutral or single-stall restrooms was found to decrease the likelihood of negative experiences for transgender individuals.

Moreover, some studies have shown that the design of shared restrooms can perpetuate gender norms and reinforce gender binaries (Hernandez *et al*., 2019). For instance, traditional binary restrooms often feature signs that depict a person wearing a dress for female restrooms and a person wearing pants for male restrooms. This can be problematic for individuals who do not conform to these gender norms and can result in discomfort or harassment when using shared restrooms. Gender-neutral restrooms, on the other hand, often feature signage that is more inclusive and welcoming to individuals of all genders.

Overall, the issue of restroom access and use is complex and influenced by a variety of factors, including gender identity, cultural norms, and societal expectations. Understanding the needs and experiences of diverse individuals is critical in creating safe, accessible, and inclusive restroom facilities for all (Breyer *et al*., 2015; Raisborough & Adams, 2008; Grant *et al*., 2011; James *et al*., 2016).

## 2.4 Gender in Toilets Maintenance

The maintenance and cleaning of shared toilets are crucial for ensuring that they remain safe and hygienic for users. However, influence of gender in toilets maintenance can affect cleaning roles and impact the cleanliness and safety of toilets, especially in developing countries where there is a lack of infrastructure and resources (Adhikari & Panda, 2017).

One issue that arises in shared toilets is the stagnation of urine and feces on the floor. This can lead to unpleasant odors, as well as the risk of catching infections. A study by Kinnear *et al*. (2020) found that women in Ghana are often responsible for cleaning shared toilets, but are not provided with the necessary resources and training to do so effectively. This can lead to inadequate cleaning practices and the buildup of urine and feces on the floor, which can pose health risks to users.

In addition to cleaning, repairing and maintenance of shared toilets are also important for ensuring their functionality and safety. However, gender influence in maintenance roles can lead to delays in repairs and inadequate maintenance practices. A study by Sen and Mandal (2017) found that in India, men are often responsible for maintaining shared toilets, but may lack the necessary skills and resources to do so effectively. This can lead to delays in repairs and inadequate maintenance practices, which can impact the safety and usability of shared toilets.

Access to resources such as brooms, water, and brushes can also impact the cleanliness and safety of toilets. A study by Adhikari and Panda (2017) found that in many developing countries, there is a lack of resources for cleaning and maintaining shared toilets, which can lead to inadequate cleaning practices and the buildup of waste on the floor.

Despite these findings, there is limited research on influence of gender in toilets maintenance and cleaning roles in shared toilets, especially in developing countries. More research is needed to understand the factors that contribute to influence of gender in cleaning and maintenance roles, and their implications for the cleanliness and safety of shared toilets. Additionally, interventions and policies should be developed to address these gender influences and ensure equitable access to safe and hygienic shared toilets for all (Kinnear *et al*., 2020; Sen & Mandal, 2017).

According to a study by Dubale and Gudina (2019), women in Ethiopia are responsible for cleaning public toilets, but they are often excluded from decision-making processes regarding the design and maintenance of these facilities. This can lead to inadequate facilities that do not meet the needs of women users. The study recommends involving women in decision-making processes regarding public toilets to ensure that their needs are adequately addressed.

Moreover, research suggests that the gender wage gap in cleaning and maintenance jobs can further exacerbate gender inequalities in public toilets. Women are often paid less than men for the same work, which can lead to a lack of motivation and dedication towards their job (Kinnear *et al*., 2020). Therefore, it is crucial to address the gender wage gap in cleaning and maintenance jobs to ensure that all workers are adequately compensated and motivated to perform their duties effectively.

Furthermore, the lack of access to safe and hygienic public toilets can have far-reaching consequences on health, education, and economic outcomes. According to a report by the World Health Organization and UNICEF (2019), inadequate sanitation can lead to the spread of diseases, including diarrhea, cholera, and hepatitis A. This can have significant

economic consequences, such as increased healthcare costs and loss of productivity due to illness.

In conclusion, addressing influence of gender in toilets maintenance and cleaning roles in shared toilets is crucial for ensuring equitable access to safe and hygienic facilities for all users. This involves recognizing the social and cultural implications of gender roles in maintenance and cleaning, addressing the gender wage gap, and involving women in decision-making processes regarding shared toilets. By doing so, we can work towards creating inclusive and accessible shared toilets that promote health, education, and economic outcomes for all.

## 2.5 Theoretical Review

The study is informed by the Social Identity Theory (SIT); Health Belief Model (HBM) and Social Cognitive Theory (SCT)

### 2.5.1 Social Identity Theory (SIT)

Social Identity Theory (SIT) proposes that an individual's sense of self and social identity are shaped by their membership in different social groups (Tajfel & Turner, 1979). In the context of shared sanitation facilities in slums, the influence of gender in toilets access, use and maintenance can create a sense of "us vs. them" among different gender groups, which can lead to poor performance of shared sanitation facilities.

Studies have found that women in slums are more likely to face challenges in accessing and using shared toilets than men. Women often have restricted access to toilets due to the fear of harassment or sexual assault (Kwiringira *et al*., 2014). Moreover, women's sanitation practices differ from those of men, as they have to use toilets for menstruation and childbirth, which require additional privacy and cleanliness (Sahoo *et al*., 2015). Therefore, lack of

gender-sensitive sanitation facilities can create a sense of exclusion and discrimination among women, leading to their reluctance to use shared toilets.

On the other hand, men may feel that shared toilets are not their responsibility to maintain, leading to a lack of cleanliness and hygiene in these facilities (Kwiringira *et al*., 2014). This may further contribute to the sense of "us vs. them" among gender groups and lead to a lack of acceptability of shared sanitation facilities.

To address these challenges, it is essential to design gender-sensitive sanitation facilities that take into account the unique sanitation practices and needs of men and women in slums. Additionally, engaging communities in the maintenance and management of these facilities can help in promoting a sense of ownership and responsibility among both men and women (Sahoo *et al*., 2015).

Overall, the SIT provides insights into the social dynamics that influence the performance of shared sanitation facilities in slums, highlighting the need to address gender inequalities and promote community involvement in designing and maintaining these facilities.

### 2.5.2 Health belief model

The Health Belief Model (HBM) is a theoretical framework that explains how an individual's beliefs and perceptions can influence their health-related behaviors. According to the HBM, an individual's perception of the susceptibility to a health issue and the perceived severity of that issue can influence their behavior (Becker, 1974). In the context of sanitation in slums, gender-based barriers such as safety concerns, menstrual hygiene management, and privacy can affect women's perception of the susceptibility to health risks, leading to a lack of acceptability of shared sanitation facilities.

Women in slums often face safety concerns while using shared sanitation facilities, as these facilities are usually located in isolated areas and lack adequate lighting and security (Kwiringira *et al*., 2014). These safety concerns can lead to a perception of increased susceptibility to health risks, such as sexual assault or harassment, which can discourage women from using shared toilets.

In addition, menstrual hygiene management is a significant challenge for women in slums, as they often lack access to adequate sanitation facilities and menstrual hygiene products (Sahoo *et al*., 2015). The lack of privacy and cleanliness in shared toilets can exacerbate these challenges and increase the perceived severity of health risks associated with poor menstrual hygiene management.

Moreover, women's perception of the susceptibility to health risks can be affected by the cultural norms and taboos surrounding menstruation, which can further stigmatize women and discourage them from using shared toilets (Sahoo *et al*., 2015).

To promote the performance of shared sanitation facilities, it is essential to address these gender-based barriers and promote gender-sensitive sanitation facilities. Providing adequate lighting, security, and privacy can help to address women's safety concerns and increase their perception of the susceptibility to health risks. Additionally, providing menstrual hygiene products and promoting awareness about menstrual hygiene management can help to address the challenges faced by women in slums (Kwiringira *et al*., 2014).

In conclusion, the Health Belief Model provides insights into the factors that influence the performance of shared sanitation facilities in slums, highlighting the need to address gender-based barriers and promote gender-sensitive sanitation facilities to improve the perception of the susceptibility to health risks.

### 2.5.3 Social Cognitive Theory (SCT)

Social Cognitive Theory (SCT) proposes that individuals learn through their observation and interaction with the social environment, which includes peers, family members, and community members (Bandura, 1977). In the context of shared sanitation facilities in slums, gender-based power relations, norms, and expectations may play a significant role in shaping the acceptability of shared sanitation facilities. The behaviors and expectations of individuals in their social environment can influence their behavior and decision-making regarding the use and maintenance of shared sanitation facilities.

Gender-based power relations in slums can create unequal access to resources, including sanitation facilities. Women may have less access to and control over shared sanitation facilities due to traditional gender roles and expectations (Gupta, 2010). These power relations can shape women's attitudes and behaviors towards shared sanitation facilities and limit their ability to maintain and improve the facilities. Moreover, social norms and expectations regarding gender roles and responsibilities can also affect the use and maintenance of shared sanitation facilities in slums.

SCT suggests that individuals' behavior is influenced by their observations of others in their social environment. In the context of shared sanitation facilities in slums, the behavior of other community members can influence individual behavior. For example, if men in the community do not prioritize the maintenance of shared sanitation facilities, women may feel discouraged from using the facilities or maintaining them (Kwiringira *et al*., 2014). Conversely, if community members, including men, demonstrate positive behaviors towards shared sanitation facilities, it can encourage individuals to adopt similar behaviors.

To promote the acceptability of shared sanitation facilities in slums, it is important to address gender-based power relations, social norms, and expectations. Gender-sensitive approaches that involve both men and women can help to promote more equitable access and control over sanitation facilities (Gupta, 2010). Additionally, community-wide education and awareness-raising campaigns that involve all members of the community can help to promote positive behaviors towards shared sanitation facilities and improve their maintenance.

In conclusion, the Social Cognitive Theory provides insights into the factors that influence the performance of shared sanitation facilities in slums, highlighting the need to address gender-based power relations, social norms, and expectations to promote positive behaviors and improve the maintenance of shared sanitation facilities.

### 2.6 Conceptual Framework

The conceptual framework presented in this context provides a structured way of understanding the factors that influence the performance of shared sanitation facilities in slums. The dependent variable, performance, is influenced by several independent variables, including gender in toilets access, gender in toilet use, and gender in toilets maintenance. Performance was measured by increased toilet utilization, acceptability based on toilet condition and reduced open defecation.

Influence of Gender in toilets maintenance include factors such as cleaning roles, fear of catching infections due to urine and faeces stagnation on the floor, repairing, and resources such as brooms, water, and brushes. These factors can affect the willingness of individuals to use shared sanitation facilities, as the cleanliness and hygiene of the facilities are crucial in determining their performance.

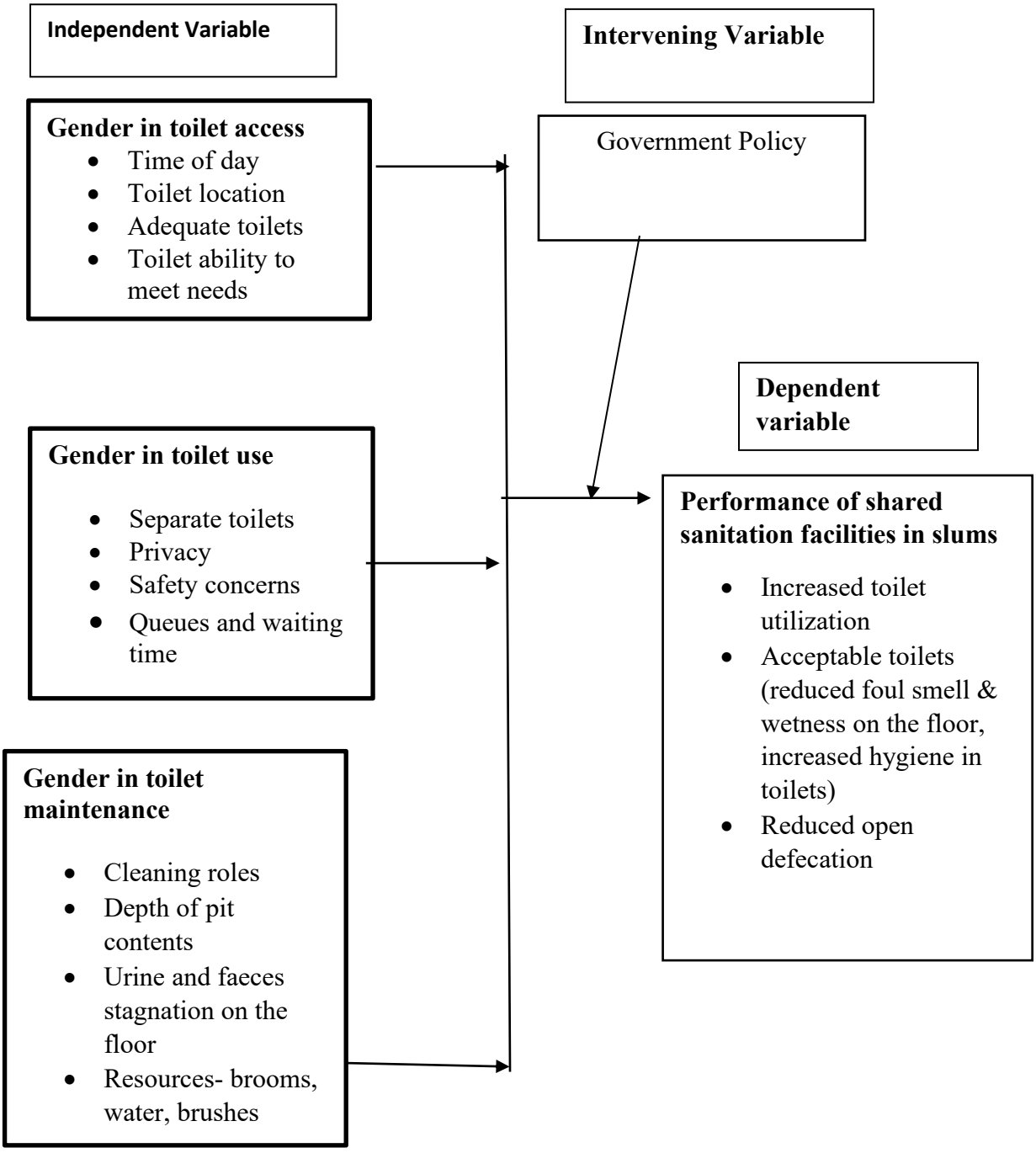
The influence of Gender in toilets use involve factors such as location, privacy, distance, and roofing in toilets. These factors can influence individuals' decisions to use or avoid shared sanitation facilities. For example, if the facilities are located far from people's homes or lack privacy, individuals may be less likely to use them. Influence of Gender in toilets access involve factors such as time of day, latrine availability, irregular or narrow paths towards latrines, and the terrain to the latrines. These factors can affect the ease and convenience of accessing shared sanitation facilities, which can, in turn, affect their performance.

Government policy is an intervening variable that can influence the relationship between the independent and dependent variables. For example, government policies that promote the construction of well-maintained, gender-sensitive, and accessible sanitation facilities can increase their acceptability among slum dwellers.

Overall, the conceptual framework provides a useful way of understanding the complex factors that influence the performance of shared sanitation facilities in slums. By identifying the key independent variables and intervening variables, policymakers and practitioners can develop targeted interventions to improve sanitation conditions in these settings.

**Figure 2. 1**

*Conceptual Framework*




*Source: Researcher, (2023)*

## 2.7 Summary of Literature Review and Research Gap

This literature review discusses influence of gender in access to toilets, with a focus on the challenges faced by women and girls due to cultural, social, and economic factors. The review emphasizes the need for safe and private sanitation infrastructure to prevent gender-based violence. Further research is needed to identify effective interventions for equitable access to toilets.

The document also discusses influence of gender in the use shared toilets, factors contributing to these gaps, and the importance of safe, clean, and inclusive toilets. Additionally, the document examines influence gender in maintenance and cleaning roles of toilets and emphasizes the need to address gender inequalities and involve women in decision-making processes. Finally, the document describes a conceptual framework for understanding the factors that influence the acceptability of shared sanitation facilities in slums, including influence of gender in access, use, and maintenance of toilets, and the impact of government policies as an intervening variable.

# CHAPTER THREE: RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter describes the type of research methods that was used in this study. The chapter includes the study design, study area, target population, sampling techniques and sample size determination, data collection and analysis and ethical considerations.

## 3.2 Research Design

The research employed a convergent mixed methods design, a comprehensive approach that combines both quantitative and qualitative data collection and analysis methods. This methodology enhanced the comprehensiveness of the study, providing a deeper and more nuanced understanding of the research problem. Quantitative data was collected through structured surveys and questionnaires administered to a large sample of participants. This allow for the collection of numerical data, enabling statistical analysis to identify patterns, trends, and correlations.

The quantitative phase provided a broad overview of the research topic, offering generalizable insights. Simultaneously, qualitative data was gathered through focus group discussions with a subset of participants. These qualitative methods offered rich, context-specific insights, allowing for a deeper exploration of individual perspectives, experiences, and motivations. Qualitative data was analyzed thematically to extract meaning and provide a qualitative depth to the research. The integration of quantitative and qualitative data occurred during the interpretation phase, allowing for the comparison and triangulation of findings. This convergence provided a comprehensive understanding of the research problem by complementing each other's strengths, enhancing the validity and reliability of the study. The final analysis involved synthesizing the quantitative and qualitative findings

to draw comprehensive conclusions and insights, contributing to a more robust understanding of the research question.

### 3.3 Study Area

The study was conducted in the slums of Nanyuki town in Laikipia County, Kenya. The slums included Majengo, likii A, Likii B and Kanyoni. Laikipia County borders Samburu County to the north, to the south, Nyeri County, to the east, Isiolo County, and to the west, Nakuru County. The slums are characterized by overcrowded living conditions, limited access to basic amenities, and a diverse population facing significant socio-economic challenges (County Government of Laikipia, 2021) which informed their choice for the study. These slums exemplify the dire challenges residents face regarding sanitation facilities.

The slums often lack proper sewage systems, facilities and clean water sources, leading to open defecation and the spread of waterborne diseases. This study location presents an opportunity to investigate the critical issue of inadequate sanitation infrastructure in urban informal settlements, examining its impact on public health and the community's coping strategies. Findings from this location can inform targeted interventions and policies to enhance sanitation access and improve the overall well-being of slum residents.

### 3.4 Study Population

The study targeted households within Nanyuki slums which have an approximate population of 26,148 people and 6,537 households (KNBS, 2019). The study engaged household heads from the four slums in Nanyuki. Household heads are likely to deliver precisely, the household sanitation information as desired by the researcher. Further, the study involved

men, women, landlords, Community Healthy Volunteers, Sanitation representative and a Public Health Officer. The population distribution is as shown in Table 3.1.

**Table 3. 1**:

*Population distribution in Nanyuki slums*

| Slum | Households | Population |
|---|---|---|
| Likii A | 1436 | 5744 |
| Likii B | 859 | 3436 |
| Majengo | 2110 | 8440 |
| Kanyoni | 2132 | 8528 |
| Total | 6537 | 26148 |

*KNBS (2019)*

### 3.5 Inclusion and Exclusion Criteria

The study included participants aged above 18 years, thus children did not participate in the study. Residents of households within the slums were considered for participation while non-slum residents were excluded. The study only engaged participants who were willing to take part in the study particularly those who signed informed consent. People who were unwilling to take part in the study and who did not sign the consent form were excluded from participation.

### 3.6 Sample Size Determination and Sampling Techniques

The section presents techniques used to select participants for the study and the number of participants to be engaged in the study, obtained from statistical computation.

### 3.6.1 Sample size determination

Samples are smaller subsets of a population that are studied to gain insights into the characteristics of the whole population (Walter & Andersen, 2013). The total number of households in the study area is 6537. Since the study targets household heads, the number of households, as opposed to the total population was considered in computing the sample size. The proportion of the population to participate in the study was calculated using Yamane's (1967) formula, with a margin of error of 0.1. Although the formula considers a margin of error of 0.05, Adam (2021) confirmed that a margin of error of 1% to 10% is effective in calculating sample sizes for quantitative data. The formula has successfully been used in calculation of sample sizes by other scholars like Ali *et al*. (2021) and Mohammad (2018). This study is a mixed methods research and issues of bias were minimal due to triangulation. The calculation for the sample size is as shown below:

$$n = N / (1 + N(e^2)) \quad (1)$$

Where: n = sample size; N = population size ((households were targeted in this case); e = level of precision (the margin of error, taken as 0.1 for this study)

$n = 6537 / (1 + 6537 (0.1^2)) = 98$ households

### 3.6.2 Sampling techniques

It is imperative that a certain protocol be observed in selection of participants to avoid biases. This study involved household heads who were selected from the households within the slums. The four slums in Nanyuki were considered as clusters. Proportionate-to-size simple random sampling technique was employed to select household heads from the households in each cluster. The method ensured that all participants, even though originating from unevenly distributed clusters, stood equal chances of being selected for participation. The

number of participants (household heads) from every cluster were calculated by multiplying the ratio of the total households per cluster to the total households in all clusters by the intended sample size (households in a cluster/total household in the area × Intended sample size). The distribution of samples in the slums is as shown in Table 3.2.

**Table 3. 2:**

*Sample size distribution in Nanyuki slums*

| **Cluster** | **Households** | **Sample per cluster** |
|---|---|---|
| Likii A | 1436 | 22 |
| Likii B | 859 | 13 |
| Majengo | 2110 | 31 |
| Kanyoni | 2132 | 32 |
| **Total** | **6537** | **98** |

*Source: KNBS (2019)*

Purposive sampling technique was also used in the selection of focus group discussion participants, three focus group discussions were held, one involving 2 women, 2 men, 2 landlords, 2 CHPs, 1 Public Health Officer and 1 sanitation representative. Another group was on 6 women as they were believed to be vulnerable to poor sanitation in slums (Kobia, Kirimi & Mbugua, 2022) and the third group engaged 6 men.

Women and men were engaged in a focus group discussion to express their encounters in relation to access, use and maintenance of sanitation facilities in slums. Landlords were involved in the study as they were the owners of the toilets and oversaw their establishment. On the other hand, Public health officers (PHOs) and Community Health Promoters (CHPs) as well as a sanitation representative was involved in the study given their knowledge and

experience with sanitation issues in the community. The basis for using separate groups for men and for women was to facilitate open discussions on sensitive sanitation matters which either gender could feel uncomfortable sharing in the presence of the other gender. The groups are likely to possess the necessary information about sanitation access for the slums.

### 3.7 Data Collection

The study involved collection of both qualitative and quantitative data. For quantitative data collection, structured questionnaires were employed, featuring a range of closed-ended questions on demographic information of participants, performance of shared sanitation facilities, access, use and maintenance of shared sanitation facilities in slums. These questions were designed to gather numerical responses from participants, enabling statistical analysis. The data was collected from household heads within the slums.

Conversely, qualitative data was gathered through open-ended focus group discussion guides from selected women, men, landlords, CHPs, Public Health Officer and a sanitation representative. The research assistants were carefully designed to explore specific research themes and encourage participants to express their viewpoints authentically. Field notes and audio recordings were used to capture non-verbal cues and contextual information during the qualitative data collection process.

#### 3.7.1 Piloting

It was essential that the instruments for data collection are tested before the actual study. The piloting was done in Majengo slums in Meru County, tis site was selected because it has similar to the study area sample characteristics such as rapid growth, poor water and sanitation services and unplanned settlements as the slums in the study area.

### 3.7.2 Validity and reliability testing

Ensuring the validity and reliability of research instruments is essential for the credibility and trustworthiness of a study. To test the validity of research instruments, three sanitation experts reviewed the research instruments to ensure that the questions are relevant and comprehensive. Their feedback was used to refine and improve the data collection instruments. The test-retest reliability test was done through administering the instrument to the same participants at two different points in time and comparing the results for consistency. A Cronbach's alpha coefficient of 0.88 was achieved as shown in Table 3.3 which was more than 0.7. The high reliability coefficient denoted that the instruments were reliable (Tavakol & Dennick, 2011).

**Table 3. 3:**

*Reliability results*

| Crobach's Alpha | N of terms |
|---|---|
| .88 | 3 |

*Source: Research data (2023)*

### 3.8 Data Analysis

Data analysis involves the process of organizing the gathered data into groups and layouts that made it simple and effective to present the findings (Cameron, Sankaran & Scales, 2015).

### 3.8.1 Analysis of quantitative data

Quantitative data gathered from households was analysed in descriptive statistics like percentages, frequencies, means and standard deviations and in inferential statistics using the Statistical Package for Social Sciences (SPSS) version 26 and results presented in tables,

graphs and pie charts. The SPSS software was considered as it is a user-friendly interface with various statistical analysis options which could allow complex operations even to non-programmers (Bala, 2016).

For inferential statistics, logistic regression analysis was performed to show the relationship between dependent and independent variables. Binary logistic regression analysis was considered because the researcher desired to obtain results which would show the probability that predictor variables (toilet access, use and maintenance) would influence occurrence of events for the response variable (performance of shared sanitation facilities). The analysis is effective in relationship testing where response variables are binary. As such since some data for the dependent variable was collected in categorical scale, it was decoded into binary variables with 'low' and 'high' categories of preference where scores from 1-2.5 were categorised under low preference and from 2.5-5 were decoded under high preference. The findings were summarised in logistic regression models. The following models were used to show the association between gender, the independent and dependent variables:

1. **Model showing the relationship between gender and performance of shared sanitation facilities in slums**

$$y_{i/ii/iii/iv} = \beta_{0+}\beta_1 g + \epsilon \quad (2)$$

Where: y was the dependent variable (performance of shared sanitation facilities); i,ii,iii, iv represented the indicators of toilets performance (use, acceptability, preference and hygiene) respectively; $\beta$ was the constant term, $g$ showed gender and e was the error.

**Models showing the relationship between independent variables and performance of shared sanitation facilities in slums**

The relationship between indicators of toilets performance and indicators of toilet access, choice to use toilets and maintenance of toilets were tested using the following models:

**i) Models that showed the link between performances of shared sanitation facilities and indicators of the dependent variable**

$$y_i=\beta_{0+}\beta_i x_i+\beta_{ii}x_{ii}...+\epsilon \quad (3)$$

Where; $y_i$= toilet use as an indicator of performance; $\beta$ = Constant; $x_{i,\ ii\ ...}$ represented indicators of the independent variables and *e* was the error

$$y_{ii}=\beta_{0+}\beta_i x_i+\beta_{ii}x_{ii}...+\epsilon \quad (4)$$

Where; $y_{ii}$= toilet acceptability as an indicator of performance; $\beta$ = Constant; $x_{i,\ ii\ ...}$ represented indicators of the independent variables and *e* was the error

$$y_{ii}=\beta_{0+}\beta_i x_i+\beta_{ii}x_{ii}...+\epsilon \quad (5)$$

Where; $y_{iii}$= toilet preference as an indicator of performance; $\beta$= Constant; $x_{i,\ ii\ ...}$ represented indicators of the independent variables and *e* was the error

**ii) Model for the association between toilet maintenance and performance of shared sanitation facilities**

To understand the relationship between toilet maintenance and performance of sanitation facilities in slums, a test was done on the independent variable against hygiene of toilets, one of the indicators of the dependent variable because it was the only indicator which could give relevant relationship. The other indicators of the dependent variable (toilet use, preference and acceptability were excluded from this relationship testing. The equation was as follows:

$$y_{ii}=\beta_{0+}\beta_{iii}x_{iii}+e \quad (6)$$

$y_{ii}$= hygiene as an indicator of performance of shared sanitation facilities; $\beta$= Constant; $x_{iii}$ = indicators of toilet maintenance which included: availability of toilet cleaning materials, floor condition, pit contents depth and toilet cleaning roles.

### 3.8.2 Analysis of qualitative data

Qualitative data, which was gathered from the focus group discussions was analysed in themes and presented in form of narratives. The MAXQDA software was used for organization, coding and generation of themes from the findings. The software was considered due to its ability to categorise and summarise themes from transcribed data.

## 3.9 Ethical Consideration

In research, respect to human rights must be diligently observed to ensure the protection and well-being of all involved parties. Approval to conduct research was sought from the Meru University after subjecting the study to ethical review process. A permit for data collection was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) (Ref.: NACOSTI/P/23/31342). Informed consent was sought from participants. The participants were fully informed about the research's purpose, procedures, potential risks, and benefits, and requested to provide voluntary and informed consent before participating. The participants were notified of their right to withdraw participation at any point they wish to with no consequences whatsoever. Participant's personal information was safeguarded and data was anonymized to prevent any potential breach of privacy. The study embraced fairness and avoided discrimination, ensuring that participants are selected and treated equally and without bias.

# CHAPTER FOUR: RESULTS AND DISCUSSION

## 4.0 Introduction

This chapter describes the results and discussion of findings obtained from the study conducted in four slums of Nanyuki. It outlines the analysis of results on the response rate, demographic characteristics of respondents, performance of shared sanitation facilities, and influence of gender on access, use and maintenance of shared sanitation facilities in slums.

## 4.1 Response Rate

The number of responses obtained after distribution of research instruments was determined and the findings were as shown in Table 4.1.

**Table 4. 1:**

*Response rate*

| Area | Desired respondents | Questionnaire return |
|---|---|---|
| Likii A | 22 | 22 |
| Likii B | 13 | 13 |
| Majengo | 31 | 31 |
| Kanyoni | 32 | 32 |
| **Total** | **98** | **98** |

*Source: Researcher, (2023)*

The researcher had distributed questionnaires to 98 household heads in the four clusters. All the questionnaires distributed to the participants were fully filled qualifying the return rate to be 100%. The return rate was achieved because of close supervision and monitoring of the process of data collection which enabled all participants to respond to the questions

adequately. A response rate of 100 % implied that the data collected was sufficient for analysis and reporting.

### 4.2 Demographic Characteristics

The characteristics of respondents in terms of gender, age, marital status, education level and economic status was examined. The findings were as follows:

#### 4.2.1 Gender of respondents

Table 4.2 shows the number of males and females who took part in the study.

**Table 4. 2:**

*Gender of respondents*

| Gender | Frequency | Percent |
|---|---|---|
| Male | 47 | 48.0 |
| Female | 51 | 52.0 |
| Total | 98 | 100.0 |

*Source: Researcher, (2023)*

From Table 4.2, female respondents were 52% while males were 48%. The findings implied that more females than male took part in the study. The results could be related to the fact that while men were busy at work to feed their families, women were left at home doing their usual household duties thus being the household heads at the time of the study. These findings concurred with the study by Kobia *et al*. (2022) in Meru slums which reported more females in the households as a result of commitments in carrying out household chores. The fact that more women than men were found at the households suggested that women used household toilets more frequently than men, who had other options of using toilets in their

workplaces. Sanitation facilities at the household level therefore required to be gender-friendly so that the needs of the most frequent users of toilets were addressed.

### 4.2.2 Age of respondents

The study further sought to establish the respondents' age in years and the findings were as shown in Table 4.3.

**Table 4. 3:**

*Respondents' Age*

| Age bracket | Frequency | Percent |
|---|---|---|
| 18-28 | 9 | 9.2 |
| 29-39 | 56 | 57.1 |
| 40-49 | 26 | 26.5 |
| Above 50 | 7 | 7.1 |
| Mean age= 37, SD= 0.741 | | |
| **Total** | **98** | **100.0** |

*Source: Researcher, (2023)*

Findings in Table 4.3 show that (57.1%) participants were aged between 29 and 39 years, followed by 26.5% who laid in the age bracket, 40-49 years. The least number of participants (7.1%) were aged more than 50 years. The mean age was 37 years, Standard Deviation (SD)=0.741 which implied that majority of the respondents found at households during the time of the survey were middle-aged, who had not settled in a stable occupation and were observed to be in their own work near their households, which could have been the reason for their availability for participation. Further, the findings could be explained by the fact that the age is mostly of active child-rearing (Shemu *et al*., 2022) and participants

particularly women had to be at their households to look after young children. The findings suggested the need to ensure that slum toilets were friendly to children so that women did not postpone attendance to household duties trying to escort the children to defecation sites given that availability of children in households require close monitoring to ensure that their sanitation needs are adequately attended to.

### 4.2.3 Marital status of respondents

Participants were requested to indicate their marital status and results were as indicated in Table 4.4.

**Table 4. 4:**

*Marital status of respondents*

| | **Frequency** | **Percent** |
|---|---|---|
| Single | 25 | 25.5 |
| Married | 62 | 63.3 |
| Divorced | 6 | 6.1 |
| Widowed | 5 | 5.1 |
| Total | 98 | 100.0 |

*Source: Researcher, (2023)*

It was noted that more married people (63.3%) took part in the study compared to the unmarried. The primary goal of marriage is to have a family and household size could differ per family. The frequency of toilet use is dependent on the number of household members (Hawkins *et al*., 2019; Temesgen *et al*., 2021), where the more the number, the more the need to use sanitation facilities. Addressing sanitation needs of many people particularly in low-income contexts could nearly be impractical which could also be compounded by the

special needs of some people like women and girls who require private and special provisions for dignified menstrual hygiene management (Das & Baker, 2017).

### 4.2.4 Respondents' level of education

Participants were asked to indicate their level of education and the responses given were as shown in Table 4.5.

**Table 4. 5:**

*Education Level*

| Level | Frequency | Percent |
|---|---|---|
| No formal education | 11 | 11.2 |
| Primary | 20 | 20.4 |
| Secondary | 45 | 45.9 |
| Tertiary | 22 | 22.4 |
| **Total** | **98** | **100.0** |

*Source: Researcher, (2023)*

The results in Table 4.5 indicate that only 11.2% of the participants engaged in the survey lacked formal education, which implied that most of the residents understood basic hygiene and sanitation principles as taught in schools. Globally, people embrace education as a way of being empowered and countries, Kenya included, have promoted free education especially at the primary school level, which could explain the reason why only a few respondents were not educated.

### 4.2.5 Respondents' economic status

To understand the participants' economic status, respondents were asked to indicate their status of employment and the findings were as shown in Table 4.6.

**Table 4. 6**:

*Economic status*

| Status | Frequency | Percent |
|---|---|---|
| Employed | 19 | 19.4 |
| Self-employed | 38 | 38.8 |
| Unemployed | 41 | 41.8 |
| **Total** | **98** | **100.0** |

*Source: Researcher, (2023)*

Only 19.4% of participants had a formal employment while the rest depended on self-employment or were unemployed at all. The number of participants from the unemployed category (41.8%) was dominating. Slums are often characterized by overpopulation and there could have been a high competition for the scarce employment opportunities which left majority of the slum dwellers unemployed and others engaging in self-employment opportunities for livelihood. The findings meant that income levels in the slums were generally low given the fewer number of people who were employed.

### 4.3 Performance of Shared Sanitation Facilities

The study aimed at assessing the performance of shared toilets in slums in terms of toilet utilization, preference or acceptability and hygiene.

#### 4.3.1 Toilet utilization

The researcher sought to find out whether participants were using shared toilets or non-shared facilities. The responses were as shown in Table 4.7.

**Table 4. 7:**

*Use of shared toilets*

| | Frequency | Percent |
|---|---|---|
| Yes | 76 | 77.6 |
| No | 22 | 22.4 |
| **Total** | **98** | **100.0** |

*Source: Researcher, (2023)*

Majority (77.6%) of participants reported that they had utilized shared toilets at the household level and 22.4% of the population used other options. It can be deduced from the findings that shared toilets were the predominant sanitation solutions in slums probably because of the challenges encountered in slums related to space and financial resources. Landlords in the Focus Group Discussion explained that establishment of shared toilets was more cost-friendly as the cost of erecting private toilets for each unit was more than they could afford. A landlord in the Focus Group Discussion reported that:

> *"The cost of constructing a toilet for each of the families housed here can be too high and I cannot afford construction materials, cement and wood needed to lay the slabs. So I think the shared toilets serve the residents well."*

Similar findings were reported in Kenya where a study by Simiyu *et al*. (2020) reported that shared sanitation facilities were the most common options for slum residents because they cut the cost of adopting household toilets.

The study found out that some residents did not share toilets as some (15; 68.2%) had private toilets while 7 (31.8%) used *flying toilets* as indicated in Table 4.8.

**Table 4. 8:**

*Method of faecal disposal*

| | Frequency | Percent |
|---|---|---|
| Flying toilets | 7 | 31.8 |
| Private | 15 | 68.2 |
| **Total** | **22** | **100.0** |

*Source: Researcher, (2023)*

The use of private toilets indicated that a number of people were more comfortable using personal toilets which were unshared. It was noted from the Focus Group Discussion that some slum residents adopted private toilets to fit the usual urban lifestyle as reported:

> *"Several people, an example is I, have toilets inside their houses. That is how we know that although we are in slums, we do not live a rural lifestyle."*

In the absence of shared toilets or private sanitation facilities, findings showed that a few members opted for *flying toilets* which meant that the use of bags for defecation was also a sanitation solution in the slums. The use *flying toilets* could be attributed to lack of access to toilets or access to unacceptable toilet facilities. The use of *'flying toilets'* in slums was also noted in a systematic study by Hazare and Tholiya (2023), which made the slum environment anesthetic and exposed the population to sanitation-related diseases.

Participants in the Focus Group Discussion reported that for many people, the use of shared toilets in slums was by default not by choice. A participant in the Focus Group Discussion argued that:

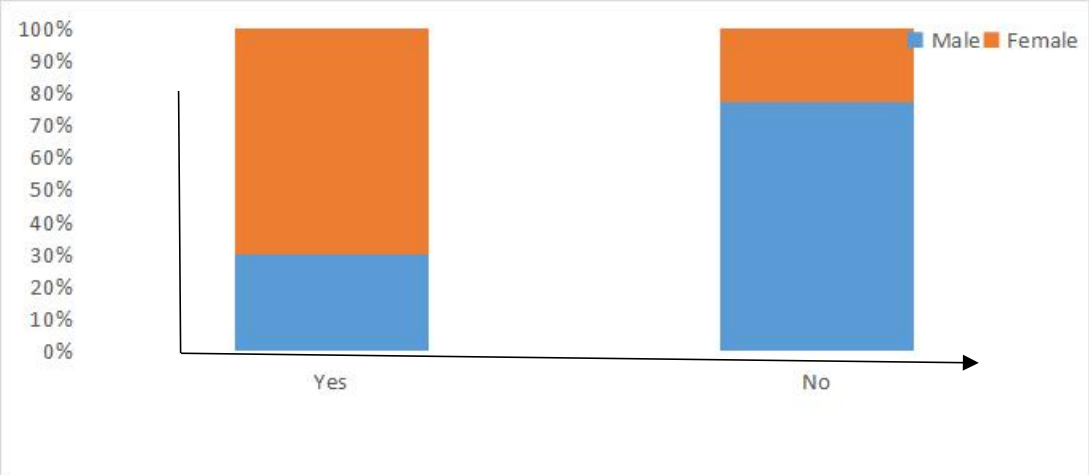
*"If it was within my means, I could use my own toilet. It is not always comfortable to use a toilet that is used by so many other people. But we have to use what the landlords provide because we have no other options." indent quotes*

The findings suggested that residents had to use shared toilets as they were mostly the sanitation options which were provided in slums although they were sometime uncomfortable for use.

A cross tabulation on gender versus use of shared sanitation facilities was done to identify the gender which frequently used the shared toilets in slums. The findings were as shown in Figure 4.1.

**Figure 4. 1**

*Use of shared toilets by gender*




*Source: Researcher, (2023)*

It was established that more females (≥ 50 %) than males used shared sanitation facilities which could be related to the fact that men mostly moved to work for their families and would use the toilets provided in the workplace during the day. However, for women who mostly resided in homesteads to perform household chores, they had no other sanitation

option other than using the available shared sanitation facilities hence the higher number of women users. The findings were explained by in the focus group discussion where a member said:

*Indent*

> *"For women or girls, they do home duties, so they have to use toilets at home, which are used by everyone else in their plots. For men who go to work, other alternatives are available in their places of work. They spend less time in their homes."*

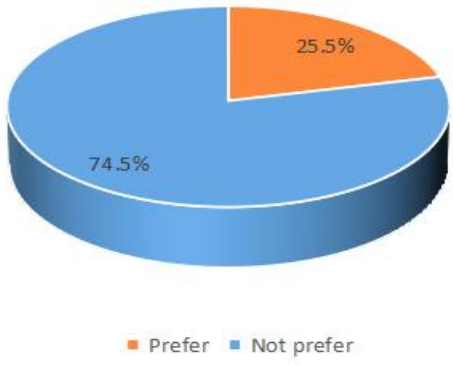
The findings suggested that women mostly used shared toilets compared to men because they spent more time in their households. If the condition of sanitation facilities was unacceptable, it would affect latrine utilization for the women left in households. Similar findings were noted by Akpabio et al. (2021) in Nigeria.

### 4.3.2 Preference of shared toilets

Participants were requested to indicate whether they would prefer using shared toilets to non-shared toilet facilities and the results were as shown in Figure 4.2.

**Figure 4. 2**

*Preference of shared slum toilets*




*Source: Researcher, (2023)*

Majority of the participants in the slums (74.5%) reported that they would not prefer to use shared sanitation facilities while only 25.5% of the population would prefer using the shared toilets. The findings implied that the preference for toilets which were shared was low for most of the slum residents. The reduced preference to shared toilets could have been as a result of their poor maintenance status. Respondents from the FGD raised concerns regarding poor cooperation of toilet users to maintain hygiene in the available shared sanitation facilities as indicated:

> *"It is always discouraging to visit the toilet in the afternoon after you cleaned it in the morning and find so many flies and faeces and urine of a person who misused the toilet. They don't even remember to keep it clean."*

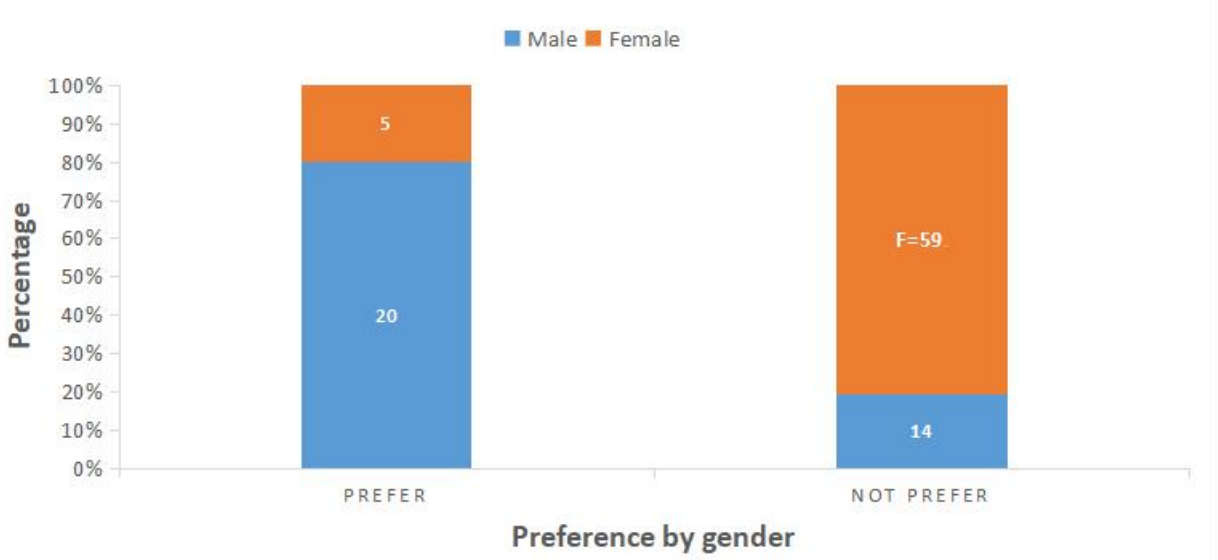
The results meant that residents would avoid the availed shared toilets because of their poor hygiene conditions. Toilets whose hygiene conditions were poor were avoided possibly because they exposed users to flies, odour and contaminated floors. Similar findings were noted by Lenka (2024) who established that Indian slum residents did not like shared toilets because of their low hygiene levels. Participants who were landlords reported that establishment of shared toilets was more cost effective compared to installation of individual toilets in the slums as follows:

> *"So many landlords around preferred providing to residents' toilets which they could share. I would cut the costs of emptying and of construction materials."*
>
> *"I could not imagine of constructing toilets for all the households in the plots I have. I would be struggling with maintenance costs."*

A cross tabulation between gender and preference of shared toilets was done to find out the difference in preference of shared toilets between males and females and findings were as displayed in the clustered bar chart in Figure 4.3.

**Figure 4. 3**

*Preference of shared toilets by gender*




*Source: Researcher, (2023)*

Findings as indicated in Figure 4.3 showed a significant variation in the preference to shared toilets by gender where 59 females indicated that they did not prefer the shared toilets compared to only 14 males. On the other hand, more males (20) reported preference to shared sanitation facilities compared to only 5 women who indicated that they would prefer using shared toilets. It was concluded from the results that women were less contented with using shared sanitation options in slums. In India, a similar study by O'reilly and Budds (2023) identified high reluctance to use shared toilets among the female gender compared to males.

### 4.3.3 Acceptability of shared sanitation facilities in slums

The researcher aimed at finding out the views of respondents on whether the available shared toilets were acceptable for use and whether they were actively being utilized. In a five-point likert scale, participants were requested to rate their degree of agreement to the statements shown in Table 4.9.

**Table 4. 9:**

*Acceptability of shared sanitation facilities in slums*

| **Prompt** | **Strongly disagree** | **Disagree** | **Uncertain** | **Agree** | **Strongly agree** | **Total** | **Mean (SD)** |
|---|---|---|---|---|---|---|---|
| Shared toilets are acceptable for use by all | 38 (38.8) | 22(22.4) | 6(6.1) | 22(22.4) | 10 (10.2) | 98(100%) | 2.43(1.45) |
| Women are involved in decision making in sanitation | 54(55.1) | 22(22.4) | 5(5.1) | 10(10.2) | 7(7.1) | 98(100%) | 1.92(1.29) |
| Shared toilets have led to decreased OD | 10(10.2) | 5(5.1) | 9(9.2) | 41(41.8) | 33(33.7) | 98(100%) | 3.84(1.24) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| The presence of shared toilets has increased the use of toilets | 21(21.4) | 6(6.1) | 6(6.1) | 33(33.7) | 32(32.7) | 98(100%) | 3.50(1.53) |

*Source: Researcher, (2023)*

When asked whether shared toilets were acceptable for use by all members, more than 50% of the respondents were of the contrary opinion. The mean recorded for the question was 2.43 (standard deviation=1.45) which implied that the available toilets in slums were not suitable for every slum dweller. As reported in the qualitative study, the toilets were less acceptable or suitable for use especially by women because they averagely addressed their menstruation and safety needs. A participant engaged in the Focus Group Discussion said:

> *"Changing menstrual materials in several of our toilets around here is uncomfortable. The doors have gaps and you even fear being peeped at by men or children. I encourage my girls who have reached the age of menstruation to wrap pads in polyethene papers, put in a dustbin to be thrown away with the other waste."*

The results suggested the need to have toilets in slums which could best address the menstruation and safety needs of women to ensure that they managed menstruation with utmost dignity.

As a follow up question to understand whether the views of women were considered when planning for sanitation interventions and solutions in slums, respondents were requested to rate women involvement. Results showed a very low mean of 1.92 (standard deviation=1.29) which suggested minimal women involvement in slum sanitation programming which could explain the reason why some slum toilets were unacceptable for use by some members. The

minimal involvement of women in slums could be related to the issue of gender roles where decision making was the role of men. . Similar findings were noted in Bihar by Ashraf *et al*. (2022).

Participants were further requested to give their views on whether shared toilets had led to decreased open defecation cases in slums. At a mean of 3.84(standard deviation=1.24), the respondents agreed which denoted that open defecation cases in slums reduced as a result of presence of shared toilets in slums. These findings were supported in the Focus Group Discussion where a participant argued that:

> *"At least we have a toilet, even if we have to use it with other neighbors, we are not equal to people who do not have and who defecate openly due to lack of toilets."*

The results showed that introduction of shared toilets in slums was a viable solution to minimize cases of open defecation in the informal settlements.

Regarding the question on whether presence of shared toilets in slums had increased toilet use, a mean of 3.50 (standard deviation=1.53) was recorded. The suggestion of the findings was that most residents made use of the available shared sanitation facilities provided in slums. Although the toilets could have been uncomfortable for use by some residents, providing at least a toilet for the slum dwellers encouraged them to use toilets and to avoid poor sanitation practices such as defecation in the open places.

### 4.3.4 Hygiene of shared sanitation facilities in slums

The study also aimed at gauging participant's perception on the hygiene levels in shared sanitation facilities provided in slums. Table 4.10 outlines the responses obtained from rating questions presented to participants.

**Table 4. 10:**

*Hygiene of shared sanitation facilities in slums*

| Prompt | Strongly disagree | Disagree | Uncertain | Agree | Strongly agree | Total | Mean (SD) |
|---|---|---|---|---|---|---|---|
| The hygiene levels in shared toilets are high | 46 (46.9) | 17(17.3) | 5(5.1) | 16 (16.3) | 14 (14.3) | 98(100%) | 2.34(1.54) |
| Shared toilets are characterized by nuisances like foul smell and flies | 6(6.1) | 9(9.2) | 10(10.2) | 28(28.6) | 45(45.9) | 98(100%) | 3.99(1.22) |

*Source: Researcher, (2023)*

As shown in Table 4.10, at a mean of 2.34 (standard deviation=1.54), participants disagreed that the hygiene levels in shared toilets were high. A high mean of 3.999 (standard deviation=1.22) was attained after asking participants to respond on the issue of presence of nuisances like foul smell and flies in shared toilets. The results denoted that the maintenance status of the toilets was poor which could have an implication on toilet use especially for women who would fear acquiring Urinary Tract Infections from the contaminated toilet slabs as reported in the Focus Group Discussion where a member said:

*"It is dangerous to squat over pits with urine everywhere. You see women can easily get infections when using such toilets. Not like men who have urinals and do it while standing."*

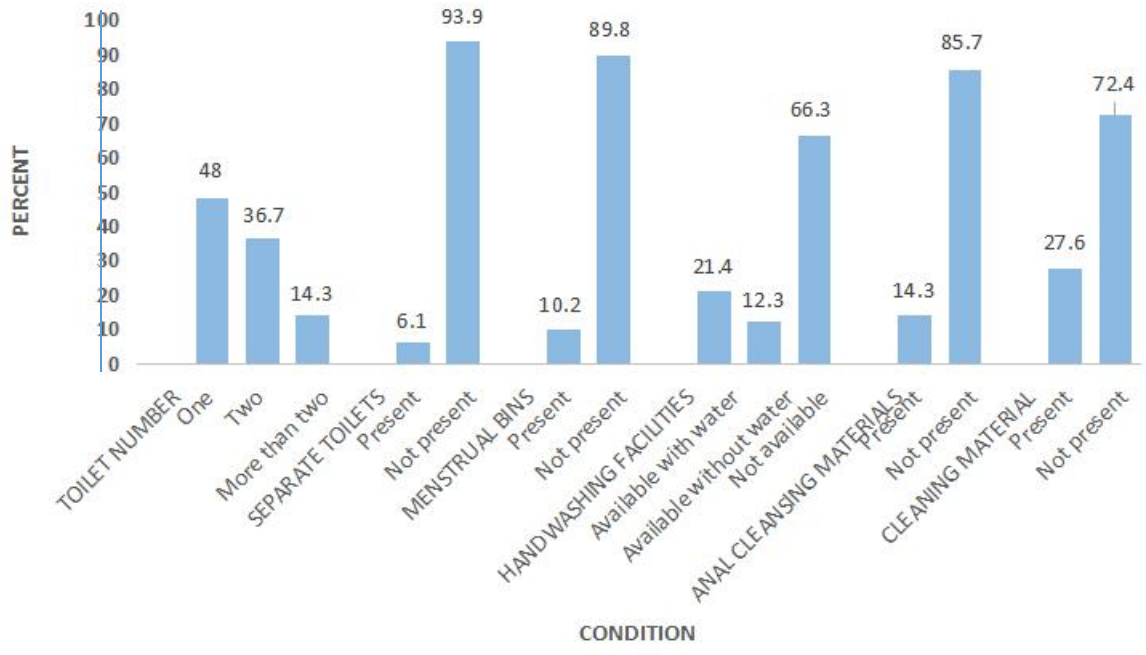
The results showed that women would struggle to use shared sanitation facilities with poor hygiene status which corresponded with the findings of Simiyu *et al*. (2017) in Kenya.

### 4.3.5 General condition, provisions and status of sanitation facilities in the slums

The condition of sanitation facilities with regard to number, separation by gender, presence of menstrual hygiene management bins, anal cleansing materials and toilet cleaning materials in the facilities was examined through observation. The findings were graphically summarized in Figure 4.4.

**Figure 4. 4**

*Condition of/provisions in toilets*




*Source: Researcher, (2023)*

It was observed that almost half (48%) of the households in the slums shared a single toilet, 36.7% had two toilets for sharing while a few (14.3%) had more than two toilets. Majority of the toilets present in the slums (93.8%) were not separated by gender, 89.8% lacked menstrual hygiene management bins and many (66.3%) lacked hand washing facilities. Some of the toilets had hand washing facilities and 12.3% of such toilets had no water for hand hygiene management. Anal cleansing materials were not provided in 85.7% of the toilets, and 72.4% of the toilets had no materials for toilet cleaning.

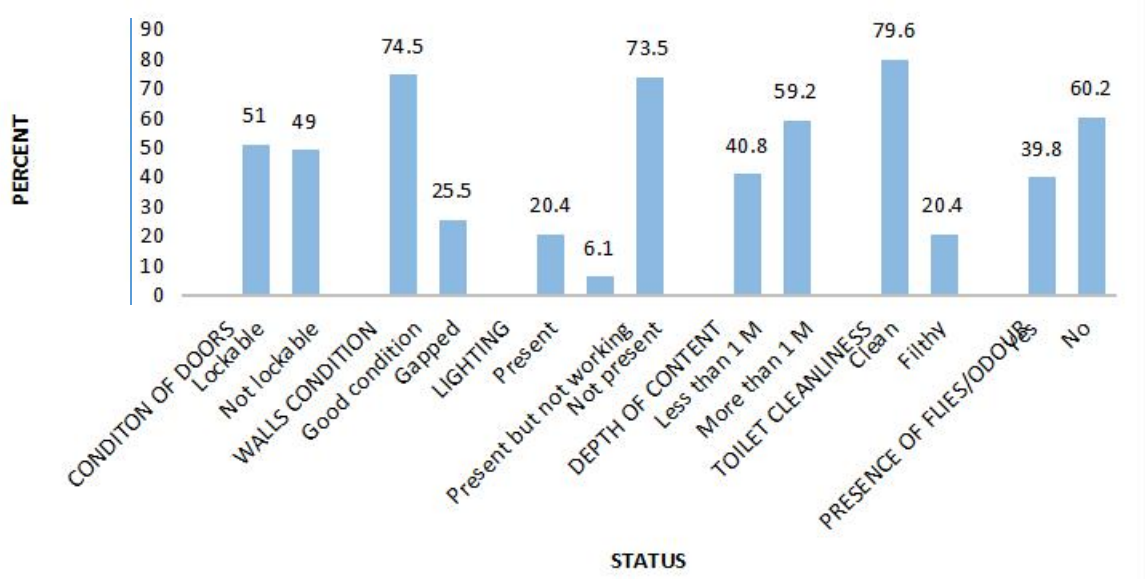
The results in Figure 4.4 demonstrated that many slum dwellers had insufficient toilets for use at the household level since construction of many toilets to match the number of users might have been costly. Presence of inadequate toilets could attract queuing and waiting in toilets for extended time and could interfere with work schedules for both men and women. Concerning separation of toilets by gender, the results suggested that there were mostly no specific toilets for males or females as toilets constructed in the slums were rarely separated by gender.

The reasons for lack of gender-separated toilets could be related to the absence of sufficient space in the slums which limited construction of separate toilets for males and females. The use of unseparated toilets by gender has been associated with reduced user comfortability to both men and women, but with higher influence on women who embrace privacy and safety as established in Pakistan in a study by Feyyaz *et al*. (2022). Women required high level of privacy and safety in toilets as could be victims to sexual abuse while using unsafe toilets.

The study also assessed the status of toilet facilities in slums in relation to condition of doors and walls, lighting, depth of pit contents, toilet maintenance status as well as presence of nuisances in the toilets. The findings were as shown in Figure 4.5.

**Figure 4. 5**

*Status of toilets*




*Source: Researcher, (2023)*

Slightly more (51%) toilets had lockable doors than those whose doors were unlockable (49%). About three quarters of the toilets' wall conditions were good (complete with no holes) but slightly higher than a quarter of the toilets (25.5%) had gapped walls. Although 20.4% of the available toilets had lighting, other 6.1% had light sources which were not working and a higher number (73.5%) had no lighting options at all. Even though the depth of pit contents in 59.2% of the sanitation facilities' pits was more than 1-meter-deep, 40.8% of the pit contents were observed to be less than one meter. Majority of the toilets (79.6%) were observed to be clean, however, 20.4% were characterized by faeces and urine presence on the floors and 39.8% had flies and odour nuisances.

Status of sanitation facilities could have an implication on the usability of the toilets. The results implied that various toilet users could struggle to use toilets that could not lock. As reported in the focus group discussion, people innovated ways to ensure that they could pull

the doors while inside the toilets to minimize the chances of other toilet users opening the toilets while inside. A Focus Group Discussion participant argued that:

> *"Using toilets without the inside latch is stressful. One time I got into one without, I kept on squatting and standing because I feared that another person would open the toilet while I was inside. I tied a piece of cloth which users, even now, pull when inside the toilets. A person would know that there was a user inside."*

It was agreed in the Focus Group Discussion that accessing unlockable toilets was stressful for both men and women but that women bore more stresses especially when they needed to change their menstrual materials in such toilets as indicated by Focus Group members who said:

> *"No one wishes to enter into a toilet without a door lock, whether a woman or man. But for us women, we do not like it when we have to change our pads in such toilets. Suppose a man opens the toilet while changing pads? That would be a shame."*
>
> *"It stresses me to know that the next time I am changing my sanitary materials I will have to do it from a toilet that cannot lock. I think that is the reason why some may decide to change the materials from their bed rooms and carry them to throw in the toilets."*

These results implied that the needs of women especially during menstruation needed to be addressed in facilities which ensured maximum privacy. The findings agreed with those of Hennegan *et al*. (2019) who also found out that toilets in the slums lacked door latches and that residents especially women struggled to utilize the available toilets when menstruating. The presence of unlit toilets as well as toilets with gaps or holes around the walls demonstrated that a number of slum toilets did not guarantee safety and privacy respectively.

In Uganda, a similar study by Fisher *et al*. (2018) established that the use of toilets without lighting especially at night attracted cases of sexual harassment especially for women and girls. In addition, a similar study by Panchang (2021) also encountered toilets with tattered walls in slums which made people avoid using the toilets as they could be seen while using the toilets.

The results on pit contents demonstrated that a significant number of toilets in the slums were not emptied at the right time which left the contents in pits nearly full. Further, although majority of the toilets were categorized as clean, the findings that some toilets were filthy cannot be ignored as unmaintained toilets could attract nuisances and discourage users from utilizing the toilets. In Kenya, toilet users especially women feared contracting diseases from toilets which were dirty (Simiyu *et al*., 2017). The depth of pit contents, poorly maintained toilets and presence of nuisances such as flies or odour could make toilets unusable. When toilets are unusable, residents could be tempted to look for alternative solutions including defecation in the open.

### 4.4 Influence of Gender in Toilet Access on Performance of Shared Sanitation Facilities

The study sought to establish how gender in toilet access influenced performance of shared sanitation facilities. The indicators assessed included access to a shared toilet, time of the day, toilet location, access to adequate toilets and access to toilets which addressed user needs.

#### 4.4.1 Access to shared sanitation facilities

Participants were requested to indicate whether they had access to shared sanitation facilities and the findings were as shown in Table 4.11.

**Table 4. 11:**

*Access to shared toilets*

| | Frequency | Percent |
|---|---|---|
| Yes | 76 | 77.6 |
| No | 22 | 22.4 |
| Total | 98 | 100.0 |

*Source: Researcher, (2023)*

From the findings, more than ¾ of the residents accessed shared sanitation facilities in slums. The findings suggested that shared sanitation solutions were the common sanitation options in slums which agreed with the results obtained in Dhaka by Alam *et al*. (2017). The issues of limited space, finances and resources in informal settlements could explain the reason why it was more practical to ensure access to shared toilets in the slums compared to private toilets.

### 4.4.2 Toilet distance from home

Respondents were asked to range the distance of their toilets from their homesteads and the results were as indicated in Table 4.12.

**Table 4. 12:**

*Toilet distance from home*

| | Frequency | Percent |
|---|---|---|
| >0-10M | 57 | 58.2 |
| 10-30M | 35 | 35.7 |
| >30M | 6 | 6.1 |
| Total | 98 | 100.0 |

*Source: Researcher, (2023)*

From the findings, 58.2% of the residents accessed toilets located 10 meters or less, 35.7% had access to toilets located 10 to 30 meters away from households while 6.1% had access to toilets situated more than 30 meters away from households. The suggestion of the findings was that toilets for many residents were not too far to access. However, having some, although few, toilets located farther than 30 meters demonstrated that there were residents who accessed sanitation facilities far from where they resided. Access to toilets situated far from households could have an implication on women's safety as confirmed in a study in Kenya by Eliud *et al*. (2023).

The reason behind location of toilets near households could have been for easy accessibility when residents need to use toilets. On the other hand, toilets might have been situated far from the households to minimize interaction with odour and smell from toilets.

The study enquired whether the slum dwellers were comfortable with the distance for shared sanitation facilities. Results as shown in Table 4.13 showed a mean of 3.57 (SD=1.59) implying that the majority of the residents in slums were comfortable with toilet distance from households. Location of toilets in a reasonable point from households limits fear of visiting toilets and could boost comfortability in accessing the toilets for all members.

**Table 4. 13:**

*Comfortable with toilet distance*

| Response | | Frequency | Percent |
|---|---|---|---|
| **Mean=3.57** | Strongly disagree | 22 | 22.4 |
| **(SD=1.59)** | Disagree | 6 | 6.1 |
| | Uncertain | 3 | 3.1 |
| | Agree | 28 | 28.6 |

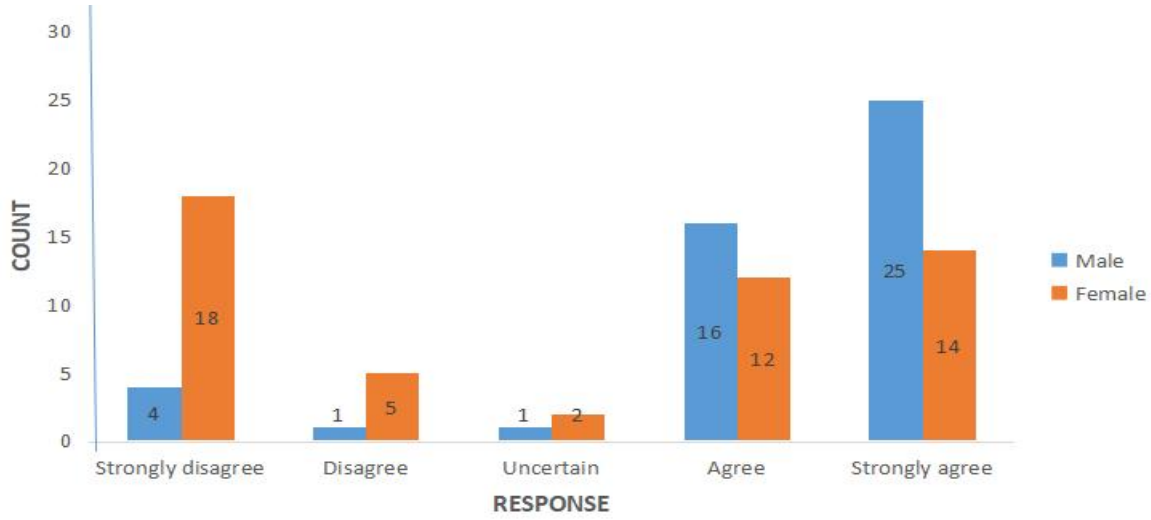
| | | |
|---|---|---|
| Strongly agree | 39 | 39.8 |
| **Total** | **98** | **100.0** |

*Source: Researcher, (2023)*

A cross tabulation of gender and comfortability with toilet location from households was done and findings were as indicated in Figure 4.6.

**Figure 4. 6**

*Gender and comfortability with toilet location/distance*




*Source: Researcher, (2023)*

The cross tabs presented in a graphical manner revealed that 18 respondents who were women strongly disagreed that they were comfortable with where toilets were located from households compared to only 4 men. On the other hand, many (25) men agreed that they were comfortable with the toilets location compared to fewer (14) women. These findings demonstrated that women were more concerned with toilet distance far from the households. Similar findings were noted by Kulkarni *et al*. (2017) in India where women were not comfortable with visiting toilets which were situated away from their households due to fear

of crimes and assaults. Women could have feared going to lonely defecation sites which were far from dwellings in fear of attacks from men.

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### 4.4.3 Time of day for accessing toilets

Table 4.14 show the responses obtained on comfortability with visiting toilets at night for women and men.

**Table 4. 14:**

*Comfortable visiting toilets at night*

| Prompt | Strongly disagree | Disagree | Uncertain | Agree | Strongly agree | Total | Mean (SD) |
|---|---|---|---|---|---|---|---|
| Women can comfortably visit the toilets at night | 44 (44.9) | 11(11.2) | 23(23.5) | 9 (9.2) | 11 (11.2) | 98(100%) | 2.31(1.41) |
| Men can comfortably visit the toilets at night | 6(6.1) | 6(6.1) | 17(17.3) | 17(17.3) | 52(53.2) | 98(100%) | 4.05(1.23) |

*Source: Researcher, (2023)*

Table 4.14 show that at a mean of 2.31 (standard deviation=1.41), respondents reported that women were not comfortable visiting the toilets at night. When asked whether men could comfortably visit toilets at night, a mean of 4.05 (standard deviation=1.23) was recorded implying agreement to the statement. The results showed that while women would prefer accessing or visiting toilets mostly during the day, men were okay with visiting the toilets

even at night. The results could be explained by the fact that the toilets were dark and scary and some were located at a distance considered far by women as reported in the Focus Group Discussion where a participant argued that:

> *"Some of the reasons why women would fear going to toilets at night are that the toilets do not have sources of light and others are a distance away from where we live. This is dangerous to women when they access such toilets alone at night."*

### 4.4.4 Access to adequate toilets

The study aimed at finding out participants' views on adequacy of toilets in the slums. The respondents rated their opinions in a five-point Likert scale as shown in Table 4.15.

**Table 4. 15:**

*Toilets are adequate for use by all members*

| | | **Frequency** | **Percent** |
|---|---|---|---|
| | Strongly disagree | 38 | 38.8 |
| **Mean=2.94** | Disagree | 7 | 7.1 |
| **(SD=1.74)** | Uncertain | 5 | 5.1 |
| | Agree | 19 | 19.4 |
| | Strongly agree | 29 | 29.6 |
| | **Total** | **98** | **100.0** |

*Source: Researcher, (2023)*

From Table 4.15, a mean of 2.94 (Standard deviation=1.74) on the statement concerning toilet adequacy was recorded which suggested that most of the respondents disagreed. The findings implied that residents deemed the shared toilets as inadequate for their sanitation needs. It was reported in the Focus Group Discussion that women were more affected by

toilets insufficiency than men due to their anatomy and difference in sanitation needs for the genders. A participant in the Focus Group Discussion said that:

> *"Women have to always use toilets whether they need them for long call or short call because of the need to squat. Men could use urinals for short call and only visit the toilets for long calls. Do they even need to go to urinals every time? They can actually turn behind you or a lorry and be done, not like women."*

These Findings demonstrated the need to ensure that adequate toilets were provided in slums to make conditions equally favorable for both men and women.

### 4.4.5 Access to toilets which met sanitation needs

Respondents were to rate in a scale of 1 to 5 whether the toilets they accessed met their sanitation needs and the findings were as presented in Table 4.16.

**Table 4. 16:**

*Toilet meet sanitation needs*

| | | Frequency | Percent |
|---|---|---|---|
| | Strongly disagree | 34 | 34.7 |
| | Disagree | 9 | 9.2 |
| **Mean= 2.83** | Uncertain | 15 | 15.3 |
| **(SD=1.58)** | Agree | 20 | 20.4 |
| | Strongly agree | 20 | 20.4 |
| | **Total** | 98 | 100.0 |

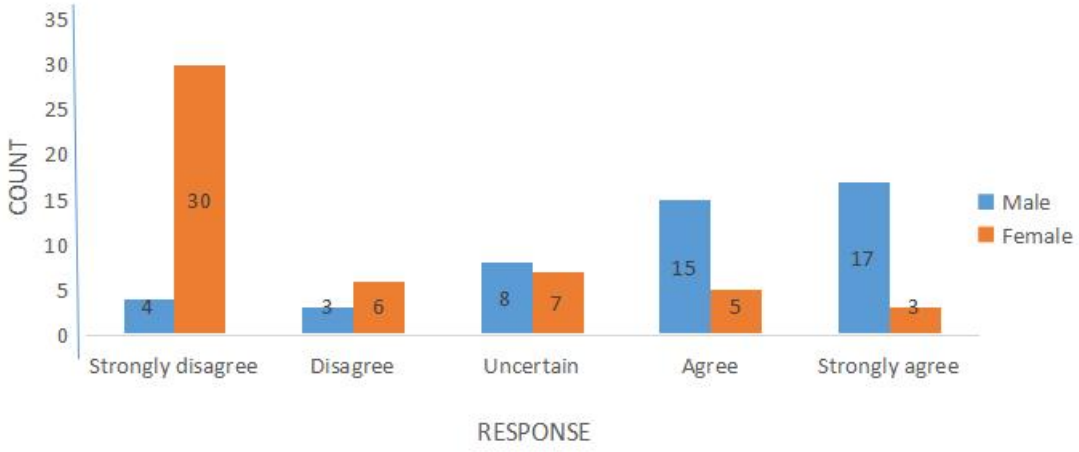
*Source: Researcher, (2023)*

The resultant mean of responses was 2.83 (standard deviation=1.58). The findings implied that the available sanitation facilities did not meet the sanitation needs of majority of the

slum residents. A cross tabulation was done to examine the rating of the statement by gender and results presented in the graph in Figure 4.7.

**Figure 4. 7**

*Comparison of responses on toilets ability to meet needs by gender*




*Source: Researcher, (2023)*

Many women (30) compared to men (4) strongly rated their toilets as unable to meet their sanitation needs. Men rating was higher on the positive end with 17 strongly agreeing and 15 agreeing compared to 3 and 5 women for the same ratings respectively. Women needs such as the need for menstrual hygiene management materials, clean toilets and handwashing facilities for hygiene management during menstruation differed from the needs for men. The results unveiled the fact that the needs for women were not adequately addressed in the toilets which made women rate them as poor in meeting their needs. Men mostly required toilets for long calls and often used urinals for short calls and their positive response could be associated with their less needs in toilets.

### 4.5 Influence of Gender in Toilet Use on Performance of Shared Sanitation Facilities

Another aim of the study was to establish the relationship between gender in toilet use and performance of shared sanitation facilities in slums. The variables examined to achieve this

objective included use of separate toilets by gender, privacy, safety concerns and queuing and waiting time in the toilets.

### 4.5.1 Influence of separate toilets by gender on use

Table 4.17 show responses from the participants engaged in the study show responses from the participants engaged in the study on the question of whether separation of toilets by gender encouraged toilet use.

**Table 4. 17:**

*Toilet separation by gender encourage use*

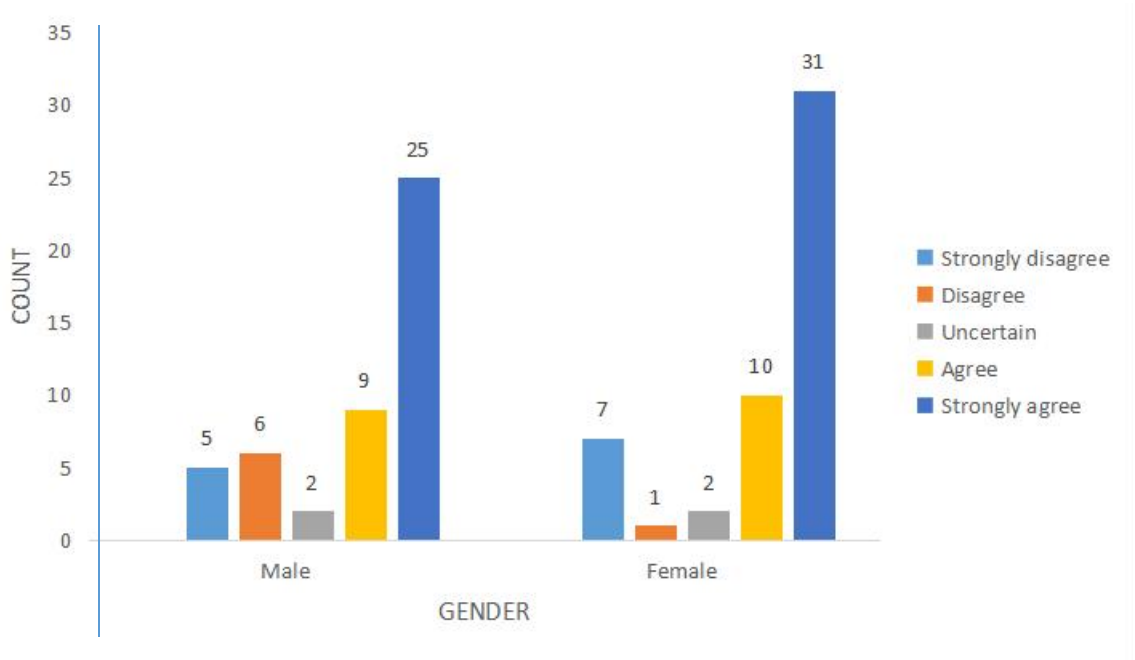
| | Frequency | Percent | Mean | Std. Deviation |
|---|---|---|---|---|
| Strongly disagree | 12 | 12.2 | | |
| Disagree | 7 | 7.1 | | |
| Uncertain | 4 | 4.1 | | |
| Agree | 19 | 19.4 | | |
| Strongly agree | 56 | 57.1 | | |
| Total | 98 | 100.0 | 4.02 | 1.42 |

*Source: Researcher, (2023)*

Findings showed a mean of 4.02 (standard deviation=1.42) a suggestion that toilet use was likely to be boosted through having different toilets for men and for women. To find out the degree of agreement to the statement by gender, a cross tabulation was performed and the results were as summarized in Figure 4.8.

**Figure 4. 8**

*Response by gender on ability of separate toilets to encourage use*




*Source: Researcher, (2023)*

The bars on figure 4.8 illustrate that participants who were females showed a higher support (at frequency=31) to the statement. Men also supported the statement (frequency=25 and 9) more than the way it was objected (frequency=5 and 6), though at a lower rate compared to women. The meaning of these findings was that residents in slums especially women would be more comfortable using toilets that had separate entries for males and females. When separated toilets for men and women are provided in slums, the differing needs for both gender could adequately be addressed as reported in the Focus Group Discussion by a participant who said:

> *"I know that if we had specific toilets for male and female, urinals would be provided in males toilets and bins for managing menstrual materials would be*

*present in women toilets. These would encourage men and women to make use of their respective toilets with less struggles."*

The results implied that there was need to ensure separation of toilets by gender to boost toilet use by both gender. Similar assertions on the influence of toilet separation by gender on utilization were also made by Singh and Mishra (2019) in their study in Delhi.

### 4.5.2 Influence of toilet privacy on use

Table 4.18 summarizes results obtained after participants rated their possibility of using toilets with holes around the walls.

**Table 4. 18:**

*I can use a toilet that has holes around the walls*

| | **Frequency** | **Percent** |
|---|---|---|
| Strongly disagree | 73 | 74.5 |
| Disagree | 14 | 14.3 |
| Uncertain | 4 | 4.1 |
| Agree | 1 | 1.0 |
| Strongly agree | 6 | 6.1 |
| Total | 98 | 100.0 |
| Mean/ Standard deviation= (1.50; SD=1.07) | | |

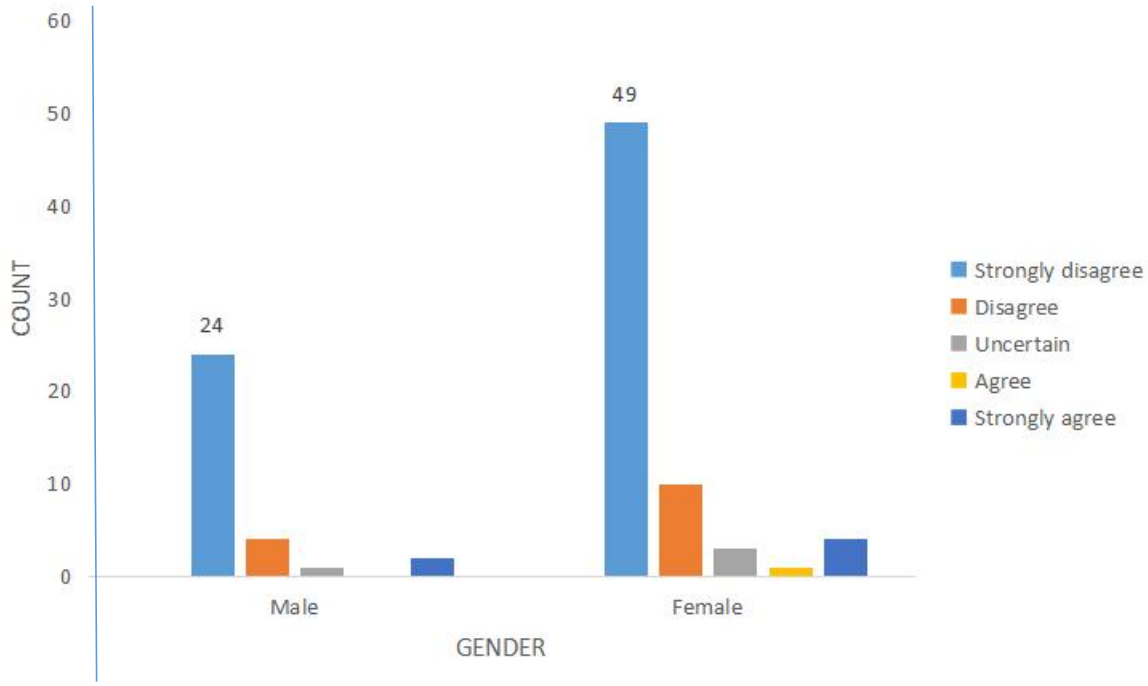
*Source: Researcher, (2023)*

A mean of 1.50 (standard deviation=1.07) was obtained on the statement implying that majority of the respondents would not use toilets with minimal privacy. An analysis of the responses by gender was done and a higher (49) response frequency for women on the strongly agree category compared to only 24 for men was noted as illustrated in Figure 4.9.

The findings showed that women were more concerned of privacy issues in toilets compared to men which agreed with the results obtained by Winter *et al*. (2019) in Nairobi, Kenya. Using toilets with holes around the walls could subject toilet users to the risk of being seen while using toilets which made women express high concern on the wall condition of the toilets. As obvious, women take time for instance in changing menstrual materials and doing so in less privacy could be uncomfortable.

**Figure 4. 9**

*Response by gender on possibility of using toilets with holes around walls*




*Source: Researcher, (2023)*

### 4.5.3 Safety concerns and use of toilets

The degree of agreement on safety level of the toilets for use by men and women was examined in a scale which ranged from 1=strongly disagree through 5 for strongly agree. The findings were as presented in Table 4.19.

**Table 4. 19:**

*Safety of toilets for use by men and women*

| Prompt | Strongly disagree | Disagree | Uncertain | Agree | Strongly agree | Total | Mean (SD) |
|---|---|---|---|---|---|---|---|
| Toilets available are safe for use by women | 52 (53.1) | 14(14.3) | 11(11.2) | 16 (16.3) | 5 (5.1) | 98(100%) | 2.06(1.33) |
| Toilets available are safe for use by men | 2(2.0) | 5(5.1) | 24(24.5) | 33(33.7) | 34(34.7) | 98(100%) | 3.94(0.99) |

*Source: Researcher, (2023)*

A mean score of 2.06 (standard deviation=1.33) was recorded from the statement that tested if the available toilets were safe for use by women. The results implied a general disagreement to the statement suggesting that toilets in slums were considered unsafe for use by the female gender. On the hand, when asked to rate their degree of agreement to the statement on toilet safety for use by men, a significantly higher mean of 3.94(0.99) was obtained.

The suggestion of the findings was that the toilets were mostly safe for use by men. Overall, a comparison of ratings for both statements showed that women felt more unsafe using toilets than men. The findings were echoed in the Focus Group Discussion conducted in the area which revealed that some toilets were constructed next to pathways and that users especially women would feel unsafe when people were passing along the pathways while using toilets. A woman respondent from the Focus Group Discussion reported that:

*"One time I was using the toilet and I had to always stand when I heard people and especially boys passing behind it. The toilet had a gap between the floor and the wall which made me fear getting seen by passersby."*

The implication of the findings was that slum toilets were less comfortable for use by women when safety was poorly guaranteed.

### 4.5.4 Queues, waiting time and use of toilets

The responses presented in Table 4.20 were obtained from participants who were requested to indicate their level of agreement or disagreement on the statement that toilets were avoided due to queues and waiting time.

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**Table 4. 20:**

*Avoidance of toilets due to queues and waiting time*

| | **Frequency** | **Percent** |
|---|---|---|
| Strongly disagree | 25 | 25.5 |
| Disagree | 18 | 18.4 |
| Uncertain | 24 | 24.5 |
| Agree | 16 | 16.3 |
| Strongly agree | 15 | 15.3 |
| **Total** | **98** | **100.0** |
| Mean & Standard deviation (SD) (2.78; SD=1.40) | | |

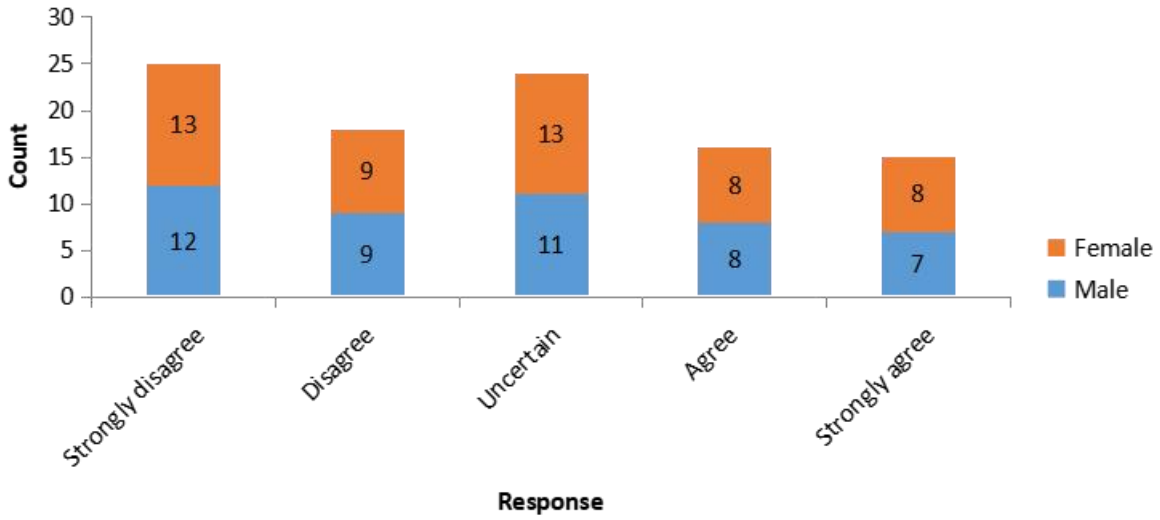
*Source: Researcher, (2023)*

The mean obtained for the statement was 2.78 (standard deviation=1.40) which was demonstrated a general disagreement to the statement. The findings showed that residents

did not mostly struggle with issues of having to wait for long in toilets. The mean score was however near neutral which indicated that some people had concerns on queues or waiting time in toilets which affected toilet use. An analysis on the responses obtained was done per gender and the results were as shown in Figure 4.10.

**Figure 4. 10 indicate the source of the figure**

*Response by gender on queues/waiting time in toilets*




*Source: Researcher, (2023)*

The graph revealed that both women and men had almost equal ratings on the influence of queues and waiting time on toilet use. Although many responses lied in the disagree category, few men and women demonstrated agreement to the matter because toilets use especially in the morning could be a struggle when everybody else wanted to use toilets which interfered with both males' and females' time for other duties as reported in the Focus Group Discussion that:

> *"I don't know why in the morning everybody wants to go to the toilet. You may go there and find several people waiting and even children. If you also decide to wait*

*like them your time for washing utensils, say for a woman, and for going to work for men and even women could be interfered with."*

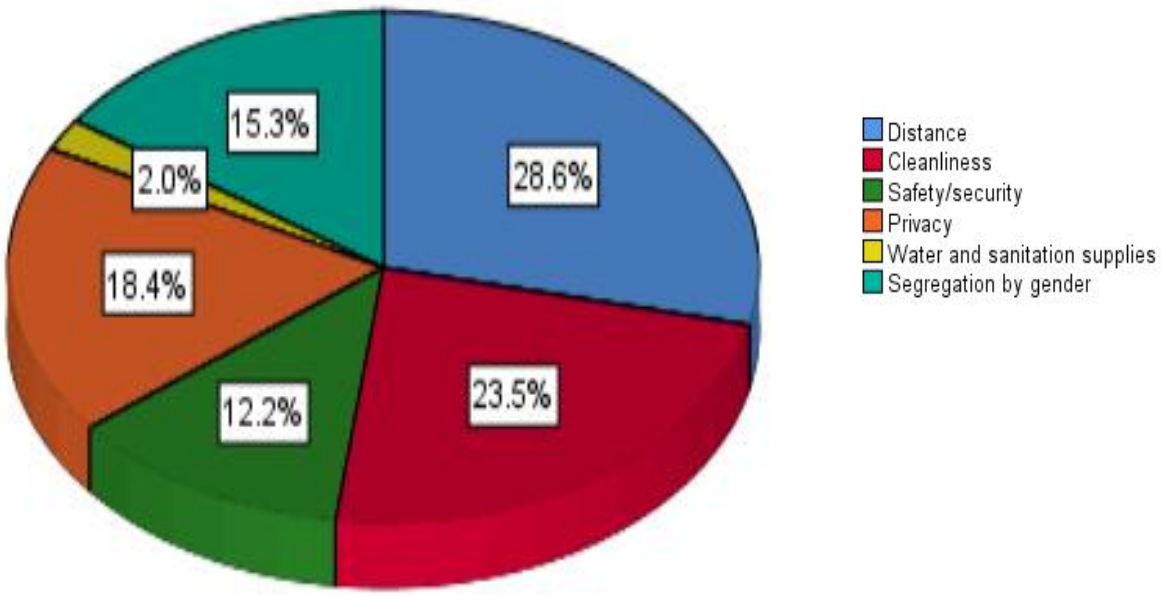
The findings showed the need to construct toilets which corresponded with the number of users in slums for ease of use by all residents without unnecessary delays. Sanitation programmers in the slums, including landlords needed to match the user-toilets ratio through addition of more toilets as most residents were paying for occupancy.

### 4.5.5 Factors influencing choice to use toilets in slums

In general, the study examined the specific factors that would influence choice of people to use shared toilets in slums and the findings were as shown in Figure 4.11.

**Figure 4. 11**

*Factors that influenced choice to use toilets*



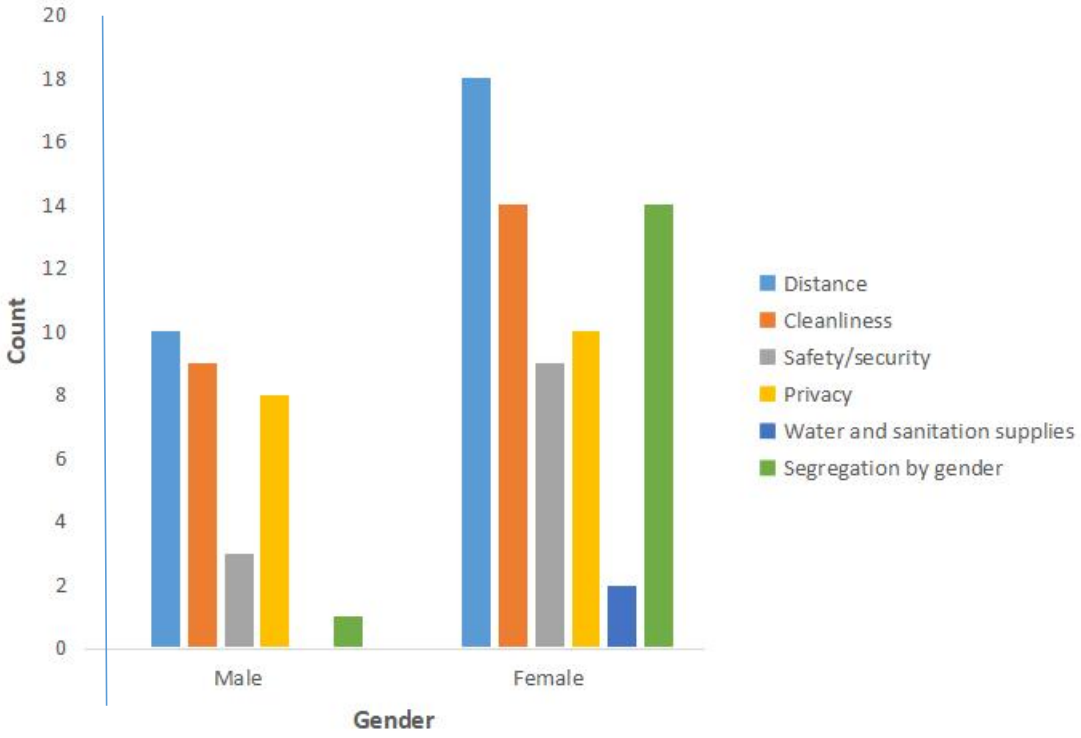

*Source: Researcher, (2023)*

Distance to toilets recorded the highest concern at 28.6% followed by toilet cleanliness (23.5%), privacy (18.4%), segregation by gender (15.3%), safety and security issues (12.2%)

and lastly provision of water and sanitation supplies in toilets (2.0%). Results demonstrated that different aspects in toilets could deter or interfere with toilet use. The results summarized in Figure 4.12 show response by gender to the question.

**Figure 4. 12**

*Factors that influenced choice to use toilets by gender*




*Source: Researcher, (2023)*

As summarized in the graph, females showed a higher concern to all matters in question compared to men as evident from the different heights of the bars. Results implied that females were concerned about distance to toilets, privacy and separation of toilets by gender because of safety issues. Besides, findings implied that females desired dignified sanitation facilities with the necessary supplies provided as they had extra needs in toilets than the

needs for men. Implementers of sanitation solutions in slums must consider and address all the aspects which might interact to influence toilet use negatively in slums.

### 4.6 Influence of Gender in Toilet Maintenance on Performance of Shared Sanitation Facilities

The focus of this study also revolved around establishing whether gender in toilet management had an influence on performance of shared sanitation facilities in slums. The indicators that guided achievement of the objective included: availability of toilet cleaning resources, maintenance condition of the floor, depth of pit contents and toilet cleaning roles.

#### 4.6.1 Availability of toilet cleaning resources and frequency of toilet cleaning

Statements were given in a 5-point Likert scale to understand whether materials for toilet cleaning and water were available and to assess the frequency of cleaning toilets. Findings were as shown in Table 4.21.

**Table 4. 21:**

*Resources and frequency of toilet cleaning*

| Prompt | Strongly disagree | Disagree | Uncertain | Agree | Strongly agree | Total | Mean (SD) |
|---|---|---|---|---|---|---|---|
| Adequate toilet cleaning materials are available | 64 (65.3) | 12(12.2) | 2(2.1) | 13 (13.3) | 7 (7.1) | 98(100%) | 2.01(1.37) |
| Availability of water for toilet cleaning | 46(46.9) | 31(31.7) | 2(2.1) | 11(11.2) | 8(8.1) | 98(100%) | 1.98(1.35) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Shared toilets are frequently cleaned | 45(46) | 30(30.6) | 7(7.1) | 6(6.1) | 10(10.2) | 98(100%) 1.91(1.31) |

*Source: Researcher, (2023)*

When requested to rate their level of agreement to the statement on availability of adequate toilet cleaning materials, a mean of 2.01 (standard deviation=1.37) was obtained. The findings implied that materials required for cleaning toilets such as brooms and brushes were rarely provided in toilets. Regarding availability of toilet cleaning water, the responses showed a small mean of 1.97 (standard deviation=1.35) which also suggested that there was limited or no water supply for cleaning toilets. Although water is undeniably essential for improved management of toilets, it was scarce in slums which affected toilet maintenance. The findings were also noted in Dhaka by Saxton et at. (2019) where limited supply of water in slums facilitated poor hygiene in toilets.

The mean obtained from ratings on frequency of toilets cleaning of 1.91 (standard deviation=1.31) suggested that most of the toilets in slums were rarely cleaned. The fact that participants reported scarcity of water and limited access to toilets cleaning materials could explain why most of the toilets in slums were rarely cleaned.

Findings obtained from the Focus Group Discussion showed that there were cleaning schedules which targeted women and grown children but there was limited cooperation on toilets cleaning as reported due to the distance to water sources:

> *"Every household has a day in a week when either a woman or a grown child is supposed to clean toilets. But they don't cooperate to ensure that they perform the duties as expected."*

*"The toilets get too dirty to be cleaned. Other times there is no water for thorough cleaning because we buy it or fetch from a distance away from the slums because it disappears here. It is impossible for a woman like me to leave children at home and go fetch water for cleaning of toilets."*

### 4.6.2 Condition of the floor

The influence of maintenance condition of toilets floor on latrine use was examined and responses presented in a rating scale as shown in Table 4.22.

**Table 4. 22:**

*Cleanliness of the floor*

| Prompt | Strongly disagree | Disagree | Uncertain | Agree | Strongly agree | Total | Mean (SD) |
|---|---|---|---|---|---|---|---|
| Presence of urine and faeces on the floor discourages toilet use | 17 (17.3) | 14 (14.3) | 0(0.0) | 24(24.5) | 43 (43.9) | 98(100%) | 3.63(1.57) |
| Women fear using unclean toilets more than men | 10(10.2) | 8(8.2) | 8(8.2) | 36(36.7) | 36(36.7) | 98(100%) | 1.98(1.35) |

*Source: Researcher, (2023)*

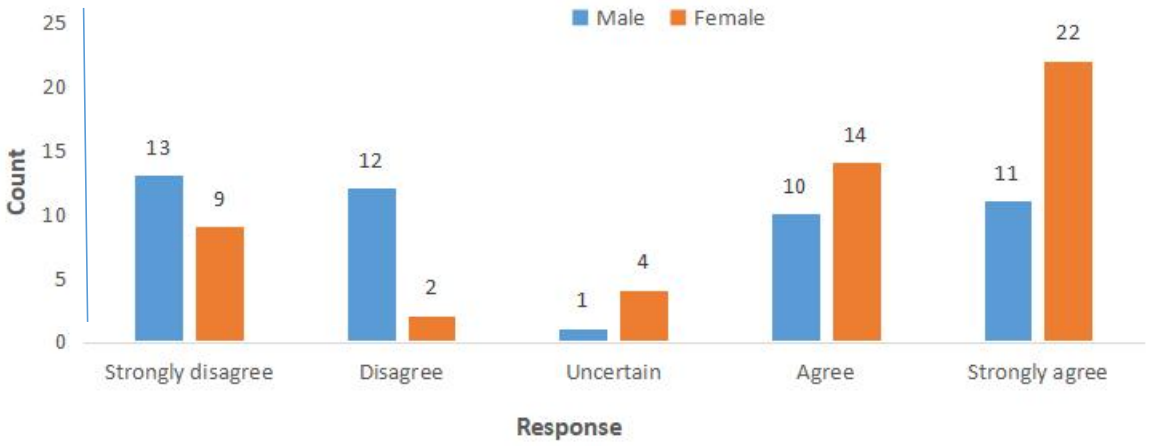
A high mean of 3.63 (standard deviation=1.57) was obtained from the prompt on whether urine and faeces presence on the floor discouraged toilet use. The results showed that most

of the responses were in the agree category. When toilets were characterized with faecal or urine contamination on the floors, residents could feel uncomfortable to use them. The results concurred with those obtained in China and South Africa by Bossut *et al*. (2020) where avoidance of toilets was as a result of contamination of apertures with faecal matter.

An analysis was done to compare response per gender on the statement and findings were as indicated in Figure 4.13.

**Figure 4. 13**

*Response on influence of faeces and urine stagnation on the floor by gender*




*Source: Researcher, (2023)*

The analysis by gender revealed that 22 women strongly agreed that presence of urine and faeces on the floor discouraged toilet use compared to 11 men who gave response on the same rating. The response on the agree category was also slightly higher for females (14) compared to men (10). The rating from men dominated the negative choice category to the statement. It could be deduced from these findings that women were more concerned of toilet cleanliness compared to men because they feared acquiring vaginal infections,

complications which men were not susceptible to as argued in the Focus Group Discussion that:

> *"Don't you also think that the faeces or urine left on floors can splash on the vagina and cause diseases?"*

### 4.6.3 Depth of pit contents

Residents were asked to rate how comfortable they would be using toilets whose pit contents were high. The responses for the question were as shown in Table 4.23.

**Table 4. 23:**

*Comfortability with using toilets whose depth of pit contents is high*

| | **Frequency** | **Percent** |
|---|---|---|
| Strongly disagree | 40 | 40.8 |
| Disagree | 35 | 35.7 |
| Uncertain | 8 | 8.2 |
| Agree | 4 | 4.1 |
| Strongly agree | 11 | 11.2 |
| Total | 98 | 100.0 |
| Mean, Standard deviation= 2.10; SD=1.30 | | |

*Source: Researcher, (2023)*

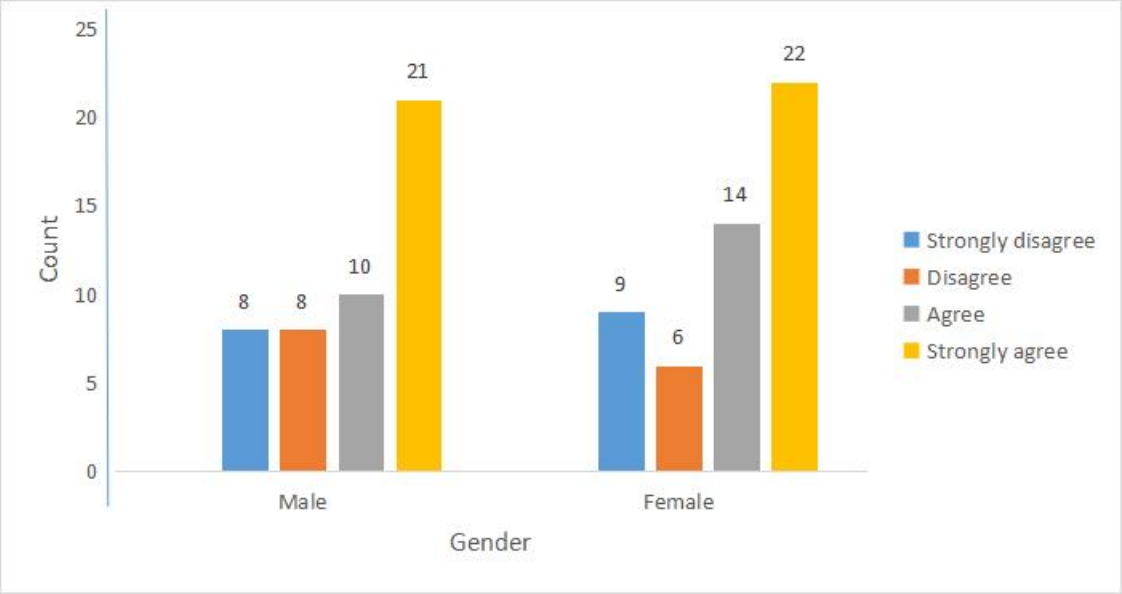
Overall results showed a mean of 2.10 (standard deviation=1.30). The suggestion of the findings was that comfortability to use toilets in slums reduced with access to toilets whose contents were high. Some pit contents could be too high that they can splash on people as they use toilets which could be an unpleasing encounter. The high depth of pit contents for most of the toilets could have been as a result of overutilization of toilets by the high slum

population which resulted in frequent filling up of toilet pits. Infrequent emptying of filled up pits could also explain why the depth of pit content was high and almost full in the shared toilet slums.

Analysis of the findings by gender was done in crosstabs and findings were as presented in Figure 4.14.

**Figure 4. 14**

*Response on influence of high pit contents and comfortability by gender*




*Source: Researcher, (2023)*

As evident from the Figure 4.14, the bars for most of the responses are higher on the strongly agree and agree categories and negligibly higher for females than for males. The findings signified that both gender had concerns with toilets whose contents was visible from the slab. Having toilets with high pit depth could be a concern to any toilet user because nearly full toilet pits could splash contents to users of toilets and could facilitate Urinary Tract Infections especially for females.

### 4.6.4 Cleaning roles

The study also aimed at exploring gender roles in toilet maintenance in slums. Table 4.24 summarizes the findings obtained.

**Table 4. 24:**

*Existence of gender-specific roles and expectations related to the maintenance of the shared toilet*

| | **Frequency** | **Percent** |
|---|---|---|
| Strongly disagree | 9 | 9.2 |
| Disagree | 10 | 10.2 |
| Uncertain | 11 | 11.2 |
| Agree | 11 | 11.2 |
| Strongly agree | 57 | 58.2 |
| Total | 98 | 100.0 |
| **Mean/Standard deviation (3.99; SD=1.40)** | | |

*Source: Researcher, (2023)*

At a high mean of 3.99 (standard deviation=1.40), participants agreed that there existed gender-specific roles and expectations in the slums which were related with maintenance of shared toilets. Such roles included toilet hygiene maintenance, fetching water for toilet maintenance, and emptying as indicated by Focus Group Discussion participants:

> *"One of the important roles of women is to oversee general hygiene at the household including hygiene of toilets. Sometimes men help us fetch water, but the duty is for women. You know they can carry jerry cans on their backs. Men are the ones who empty toilets."*

*"and we women fetch water for drinking. I prefer doing it in the morning so that I can get back and do other duties at home. It is not easy to tell your husband to fetch on your behalf because he has to prepare to go to work."*

*"Sometimes the toilets remain unemptied because those who are supposed to empty are always away from home during the day. They don't know the feeling of seeing 'shit' while using toilets."*

The results implied that poor maintenance status for toilets in the slums was facilitated by poor access to water, inadequate time to look for toilet cleaning water and lack of concern from men who were supposed to organize for toilet emptying.

As a follow-up question, participants were requested to state the gender that was primarily responsible for toilets cleaning and results were as shown in Table 4.25.

**Table 4. 25:**

*Person responsible for toilet cleaning*

| | Frequency | Percent |
|---|---|---|
| Males | 10 | 10.2 |
| Females | 88 | 89.8 |
| Total | 98 | 100.0 |

*Source: Researcher, (2023)*

From the findings, majority of the participants (89.8%) indicated females while only 10.2% stated males. It was clear from the results that the responsibility of toilet cleaning was much inclined to females than males. Traditionally and in many cultures, household chores especially those concerned with washing and cleaning are performed by women (Eliud *et al*., 2022). However, although cleaning roles were majorly for women, toilet cleaning required

water which was a scarce resource in the slums. Unavailability of water for toilet cleaning implied that toilets would stay uncleaned which affected user comfortability with the toilets, with more impacts on females.

### 4.7 Regression Analysis

The study used binary logistic regression to find out the relationship between indicators of the dependent variable and the independent variables. The relationship between use, preference and acceptability of shared toilets with indicators of toilet access such as distance from home, time of day for toilet use, adequacy and ability to meet sanitation needs; indicators of choice to use toilets/usability like separation by gender, toilet privacy, safety concerns and queues and waiting time; and with indicators of toilet maintenance which included availability of toilet cleaning materials, floor condition, pit contents depth and cleaning roles was assessed. The results were presented in unadjusted (for the univariable analysis) and adjusted (for the multivariable analysis) odd ratios at 95% Confidence intervals.

#### 4.7.1 Odds of use of shared sanitation facilities

Table 4.26 shows results obtained from univariable and multivariable analysis of the relationship between toilet use, gender and indicators of the dependent variable.

**Table 4. 26:**

*Odds of shared toilets use in Nanyuki slums (n=98)*

| **Variable** | **Toilet use** | | | | | |
|---|---|---|---|---|---|---|
| | **Unadjusted ORs (95% CI)** | **P-value** | **Adjusted ORs (95% CI)** | **P-value** | **S.E** | **Constant ($\beta_0$)** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Gender*** | | | | | | | | |
| Female | 1.83 | (0.31- | 0.001 | 1.14 | (0.05- | 0.090 | 0.17 | 1.09 |
| | 2.43) | | | 1.92) | | | | |
| ***Toilet location*** | | | | | | | | |
| Toilets located | 0.14 | (0.53- | 0.217 | 0.33 | (0.72- | 0.256 | 1.56 | 0.13 |
| 10-30 M from | 3.17) | | | 3.97) | | | | |
| H/Hs | | | | | | | | |
| Toilets >30 | 0.89 | (0.22- | 0.006 | 0.32 | (0.15- | 0.530 | 0.12 | 0.29 |
| meters from | 1.43) | | | 1.43) | | | | |
| households | | | | | | | | |
| Females use of | 0.54 | (0.71- | 0.000 | 0.43 | (0.70- | 0.000 | 0.04 | 0.38 |
| toilets at night | 3.77) | | | 3.78) | | | | |
| Access to | 7.02 | (1.60- | .010 | 4.95 | (0.98- | 0.032 | 1.27 | 3.50 |
| adequate toilets | 4.76) | | | 4.40) | | | | |
| Toilets that meet | 6.07 | (0.70- | <0.001 | 5.73 | (0.70- | <0.001 | 1.04 | 4.04 |
| needs | 4.49) | | | 4.15) | | | | |
| Toilet separation | 2.55 | (0.36- | 0.090 | 1.98 | (0.51- | 0.056 | 1.13 | 1.55 |
| by gender | 4.09) | | | 4.11) | | | | |
| Toilets with holed | 0.43 | (0.11- | 0.005 | 0.40 | (0.10- | 0.026 | 0.14 | 0.32 |
| walls | 3.87) | | | 3.48) | | | | |
| Access to unsafe | 0.78 | (0.09- | <0.001 | 0.64 | (0.04- | <0.001 | 0.023 | 0.41 |
| toilets | 1.59) | | | 2.39) | | | | |
| Toilets | 0.18 | (0.53- | 0.017 | 0.23 | (0.60- | 0.026 | 1.09 | 0.17 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| contaminated with urine/faeces | 3.27) | | | 3.99) | | | | |
| Toilets with pit contents >1M high | 0.79 | (0.12-1.53) | 0.006 | 0.82 | (0.05-1.23) | 0.030 | 0.56 | 0.67 |

*Source: Researcher, (2023)*

A regression analysis of gender versus use of shared sanitation facilities (Table 4.26) showed that females had 1.83 higher chances of utilizing shared toilets compared to men (Unadjusted OR 1.83, 95% CI: 0.31-2.43, p= 0.001<0.05). A univariable analysis for the odds of toilet use demonstrated that increasing toilet distance from home to more than 30 meters seemed to be linked with decreased odds of toilet use compared to when toilets were located less than 30 meters from households.

For instance, visiting toilets located between >30M away from households had 11% likelihood of minimizing chances for toilet use (OR=0.89, 95% CI: 0.22-1.43, p= 0.006<0.05). Regarding time of day for toilets use, females had decreased odds of utilizing toilets at night compared to males and to daytime (OR=0.54, 95% CI: 0.71-3.77, p= 0.000<0.05). The use of toilets had 7.02 chances of increasing with access to adequate sanitation facilities compared to when residents accessed inadequate sanitation facilities (Unadjusted OR 7.02, 95% CI: 1.60-4.76, p= 0.010<0.05).

People who accessed toilets which met their sanitation needs had 6.07 odds of using toilets compared to those whose toilets poorly or hardly addressed their sanitation needs (Unadjusted (OR 6.07, 95% CI: 0.70-4.49, p<0.001). The odds of toilet use when separated by gender was 2.55 times higher than when unseparated. However, the relationship was non-

significant (p>0.05). In addition, the odds of using toilets would reduce by 57% with access to toilets with holes around the walls (Unadjusted OR 0.43, 95% CI: 0.11-3.87, p= 0.005<0.05) and by 22% when slum residents accessed unsafe toilets (Unadjusted OR 0.78, 95% CI: 0.09-1.59, p<0.001) compared to the reference categories. Contamination of floors with faeces and urine was associated with reduced odds of toilet use (Unadjusted OR 0.18, 95% CI: 0.53-3.27, p= 0.017<0.05). Similarly, the use of shared toilets was likely to reduce by 21% when their pit contents were higher than 1 meter (Unadjusted OR 0.79, 95% CI: 0.12-1.53, p= 0.006<0.05). Separation of toilets by gender had non-significant relationship with toilet us (p>0.05%).

In the multivariable (adjusted model) for the odds of toilet use as shown in Table 4.26, the variables which appeared to be significant in the univariable model were also significant apart from location/distance of toilets (p>0.05). The adjusted analysis for the odds of toilet use showed a statistically significant association between toilet use and time of day for toilet utilization especially by females (adjusted OR 0.43, 95% CI: 0.70-3.78, p= 0.000<0.05), adequacy of toilets (adjusted OR 4.95, 95% CI: 0.98-4.40, p= 0.032<0.05), ability of toilets to meet sanitation needs (adjusted OR 5.73, 95% CI: 0.70-4.15, p= <0.001), access to toilets with holed walls (adjusted OR 0.40, 95% CI: 0.10-3.48, p= 0.026<0.05), unsafe (adjusted OR 0.64, 95% CI: 0.04-2.39, p= <0.001), toilets contaminated with urine and faeces on the floor (adjusted OR 0.23, 95% CI: 0.60-3.99, p= 0.026 <0.001) and facilities with pit content higher than 1 meter (adjusted OR 0.82, 95% CI: 0.05-1.23, p= <0.030). Regarding gender and toilet use, the multivariable analysis showed a significant association (adjusted OR 1.14, 95% CI: 0.05-1.92, p= 0.009<0.05).

The relationship between toilets use and indicators of the independent variables can be substituted using *equation i* as follows:

$$y_i=\beta_{0+}\beta_i x_I+\beta_{ii}x_{ii}...+\epsilon \quad (7)$$

Toilet use= 1.15+0.32L+0.43T+4.95Ad+5.73Ab+1.98Sg+0.40P+0.64S+0.23UFs+0.82Pd +e

Where, y is the dependent variable, $\beta 0$ is the constant term, $\beta i,ii...$ is the coefficient of the independent variables, L denotes location of toilet>30M, T is time of day for toilet use, Ad is access to adequate toilets, Ab is ability to meet needs, Sg is separation by gender, P is privacy, S stands for safety, UFs is Urine and faeces stagnation on floors, Pd is pit contents>1 meter and e is the error.

The findings on toilet use implied that shared toilets located far from households would be avoided as people like women would fear possible attacks while going to such toilets alone. Findings also implied that the most preferred time for toilet use especially by females was during the day as some toilets were far and visiting them at night was an insecurity concern. Further, the ability of toilets to address the needs of all users improved chances of toilet use because residents would have not face difficulties in disposing the special materials used for hygiene and sanitation management. The use of toilets depended on their ability to guarantee privacy because toilet users never wished to be seen while using toilets.

### 4.7.2 Odds of acceptability of shared sanitation facilities

Regression analysis was also done to examine the likelihood of acceptability of shared sanitation facilities. The findings for both univariable and multivariable analyses were as shown in Table 4.27.

**Table 4. 27:**

*Odds of shared toilets acceptability in Nanyuki slums (n=98)*

| Variable | Toilet acceptability | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Unadjusted ORs (95% CI)** | | **P-value** | **Adjusted ORs (95% CI)** | | **P-value** | **S.E** | **Constant ($\beta_0$)** |
| ***Gender*** | | | | | | | | |
| Female | 0.63(0.52- | | 0.003 | 0.76 | (0.64- | 0.027 | 1.37 | 1.20 |
| | 2.81) | | | 2.78) | | | | |
| Toilets | 0.67 | (1.02- | 0.107 | 0.74 | (1.76- | 0.445 | 1.98 | 1.77 |
| located 10-30 | 2.89) | | | 2.96) | | | | |
| M from H/Hs | 0.74 | (1.32- | <0.001 | 0.68 | (1.56- | 0.045 | 1.28 | 0.70 |
| Toilets >30 | 2.99) | | | 3.01) | | | | |
| meters from | | | | | | | | |
| households | | | | | | | | |
| Toilets that | 4.92 | (0.29- | 0.002 | 4.88 | (0.23- | <0.001 | 0.91 | 0.59 |
| meet needs | 3.69) | | | 3.63) | | | | |
| Toilet | 1.80 | (0.24- | 0.042 | 1.86 | (0.14- | 0.056 | 1.22 | 0.78 |
| separation by | 3.96) | | | 3.80) | | | | |
| gender | | | | | | | | |
| Urine and | 0.71 | (0.44- | 0.450 | 0.78 | (0.42- | 0.893 | 1.43 | 0.45 |
| faeces | 2.98) | | | 3.01) | | | | |
| stagnation on | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| the floor | | | | | | | | |
| Toilets with holed walls | 0.93 | (1.42-2.80) | 0.025 | 0.82 | (1.23-2.63) | 0.011 | 1.15 | 0.33 |
| Access to unsafe toilets | 0.95 | (0.24-3.96) | 0.042 | 0.86 | (0.34-3.89) | 0.096 | 1.04 | 0.76 |
| Toilets with pit contents >1M high | 0.52 | (1.52-3.76) | 0.787 | 0.72 | (0.99-3.78) | 0.865 | 0.52 | 0.66 |

*Source: Researcher, (2023)*

The acceptance probability of shared toilets for females was 37% lower than for their counterparts (Unadjusted OR 0.63, 95% CI: 0.52-2.81, p= 0.003<0.05). In the unadjusted model (univariable) for the odds of toilet acceptability (Table 4.27), chances that toilets situated more than 30 meters away from households were acceptable were 26% lower than those situated <10 meters near households (Unadjusted OR 0.74, 95% CI: 1.32-2.99, p<0.001).

Acceptability of toilets was 4.92 times higher for toilets which met user sanitation needs compared to those toilets which did not meet the needs of users (Unadjusted OR 4.92, 95% CI: 0.29-3.69, p= 0.002<0.05). As well, separation of toilets by gender appeared to increase the likelihood of toilet acceptability by 1.80 compared to when toilets were not separated by gender (Unadjusted OR 1.80, 95% CI: 0.24-3.96, p= 0.042<0.05). However, toilets with holes around the walls (Unadjusted OR 0.93, 95% CI: (1.42-2.80, p= 0.025<0.05) and the sanitation facilities which were deemed unsafe for use (Unadjusted OR 0.95, 95% CI: 0.24-

3.96), p= 0.042<0.05) had minimal likelihood of being accepted than toilets that ensured user privacy and safety respectively. Accessing toilets with contaminated floors and whose pit contents were higher than 1 meter showed reduced odds of acceptability (Unadjusted OR 0.71, 95% CI: 0.44-2.98, p= 0.450>0.05; Unadjusted OR 0.52, 95% CI: 1.52-3.76, p= 0.787>0.05 respectively but the association was non-significant.

The multivariable analysis showing adjusted odd ratios for toilets acceptability revealed a significant relationship between toilet distance (adjusted OR 0.68, 95% CI:1.56-3.01, p= 0.045<0.05), ability to address sanitation needs (adjusted OR, 4.88, 95% CI: 0.23-3.63, p<0.001) and privacy in toilets (adjusted OR 0.82, 95% CI: 1.23-2.63, p=0.011<0.05). Although toilet acceptability in the univariable model had a significant association with safety of toilets and separation of toilets by gender, the variables were statistically non-significant in the adjusted model (p=>0.05). All variables which appeared non-significant in the univariable model were also non-significant in the multivariable analysis.

The association between toilets acceptability and indicators of the independent variables can be substituted as in *equation ii* as follows:

$$y_{ii}=\beta_{0+}\beta_i x_i+\beta_{ii} x_{ii}...+\epsilon \quad (8)$$

Acceptability of toilets= 0.68+0.74 L+4.88Ab+1.86Sg + 0.78UFs + 0.82P+ 0.86S+ 0.72 Pd+e

Where, L denotes location of toilet>30M, Ab is ability to meet needs, Sg is separation by gender, UFs is Urine and faeces stagnation on floors, P is privacy, S stands for safety, Pd is pit contents>1 meter.

### 4.7.3 Odds of preference of shared sanitation facilities

Results for the regression analysis done to explore the association between independent variables and preference of shared sanitation facilities in the slums of Nanyuki were as presented in Table 4.28 in adjusted and unadjusted odd ratios.

**Table 4. 28:**

*Odds of shared toilets preference in Nanyuki slums (n=98)*

| **Variable** | **Toilet preference** | | | | | |
|---|---|---|---|---|---|---|
| | **Unadjusted ORs (95% CI)** | **P-value** | **Adjusted ORs (95% CI)** | **P-value** | **S.E** | **Constant ($\beta_0$)** |
| ***Gender:*** | | | | | | |
| Female | 0.72(0.12-2.81) | 0.003 | 0.75(0.14-2.88) | 0.020 | 0.09 | 0.54 |
| Toilets located 10-30 M from H/Hs | 0.95(0.67-3.37) | 0.117 | 0.89(0.52-3.99) | 0.567 | 2.56 | 0.73 |
| Toilets >30 meters from households | 0.93(0.32-2.98) | 0.001 | 0.85(0.27-2.89) | 0.010 | 0.26 | 0.64 |
| Separation by gender | 3.73(0.96-3.92) | <0.001 | 2.09(0.64-3.28) | 0.020 | 0.75 | 1.24 |
| Toilets that meet needs | 7.02(1.62-4.76) | 0.010 | 4.95(0.98-4.40) | 0.032 | 1.04 | 3.49 |
| Toilets with | 0.62(0.52-1.89) | <0.00 | 0.47(0.54-1.78) | <0.001 | 1.09 | 0.49 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| holed walls (less privacy) | 1 | | | | | | |
| Access to unsafe toilets | 0.88(0.09-2.59) | 0.005 | 0.86(0.13-2.76) | <0.001 | 0.05 | 0.69 | |
| Toilets with pit contents >1M | 0.92(0.42-2.70) | 0.582 | 0.08(0.33-2.53) | 0.071 | 1.24 | 0.23 | |

*Source: Researcher, (2023)*

In both univariable and multivariable analyses, females demonstrated a reduced preference to shared sanitation facilities compared to men (Unadjusted OR 0.72, 95% CI: 0.12-2.81, p= 0.003<0.05; adjusted OR 0.75, 95% CI: 0.14-2.88, p=0.020<0.05). From the regression analysis results shown in Table 4.28 for both unadjusted and adjusted models, preference to shared toilets decreased with increased distance from households (unadjusted OR 0.93, 95% CI: 0.32-2.98, p=0.001<0.05; adjusted OR 0.85, 95% CI: 0.27-2.89, p=0.010<0.05), access to unsafe toilets (unadjusted OR 0.88, 95% CI: 0.09-2.59, p=0.005<0.05; adjusted OR 0.86, 95% CI: 0.13-2.76, p<0.001) and to toilets with reduced privacy (unadjusted OR 0.62, 95% CI: 0.52-1.89, p<0.001; adjusted OR 0.47, 95% CI: 0.54-1.78, p<0.001). Separation of toilets by gender (unadjusted OR 3.73, 95% CI: 0.96-3.92, p<0.001; adjusted OR 2.09, 95% CI: 0.64-3.28, p=0.020<0.05) and ability of toilet to meet sanitation needs for users (unadjusted OR 7.02, 95% CI: 1.62-4.76, p=0.010<0.05; adjusted OR 4.95, 95% CI: 0.98-4.40, p=0.032<0.05) seemed to increase the likelihood of toilets preference. The association between preference of toilets which had pit contents higher than 1 meter was insignificant (p>0.05).

The model in *equation iii* was used to summarize the association between indicators of the independent variables and preference of toilets as an indicator of performance of shared sanitation facilities as follows:

$$y_{iii}=\beta_{0+}\beta_i x_i+\beta_{ii}x_{ii}...+\epsilon \quad (9)$$

Preference of toilets= 1.15+0.85L+2.09Sg+4.95Ab+0.47P+ 0.86S+ 0.08Pd +e

Where, L denotes location of toilet>30M, Sg is separation by gender, Ab is ability to meet needs, P is privacy, S stands for safety, Pd is pit contents>1 meter.

### 4.7.4 Odds of improved hygiene of shared sanitation facilities

The association between hygiene of shared sanitation facilities and indicators of the dependent variables particularly of maintenance was examined and the results were as presented in Table 4.29 as adjusted and unadjusted odd ratios. The link between gender and hygiene in sanitation facilities in slums was also established.

**Table 4. 29:**

*Odds of hygiene in shared toilets in Nanyuki slums (n=98)*

| **Variable** | **Hygiene of toilets** | | | | | |
|---|---|---|---|---|---|---|
| | **Unadjusted ORs (95% CI)** | **P-value** | **Adjusted ORs (95% CI)** | **P-value** | **S.E** | **Constant ($\beta_0$)** |
| **Gender:** Females and cleaning roles | 1.53(0.06-3.01) | 0.007 | 1.83(0.06- 2.68) | 0.001 | 0.49 | 1.04 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Unavailability of toilet cleaning materials | 0.75(0.12-3.01) | 0.017 | 0.53(0.10-2.96) | 0.003 | 0.08 | 0.41 |
| Urine and faeces stagnation on the floor | 0.29(0.24-2.99) | 0.002 | 0.18(0.20-3.26) | 0.000 | 0.11 | 0.12 |
| <1 Meter pit content depth | 0.88(0.34-3.31) | 0.000 | 1.78(0.32-3.28) | 0.166 | 0.33 | 1.26 |

*Source: Researcher, (2023)*

For the univariable model for hygiene of shared sanitation facilities, hygiene in toilets was 1.53 times more likely to be higher when women took cleaning roles compared to men (unadjusted OR 1.53, 95% CI: 0.06-3.01, p=0.007<0.05). Unavailability of toilets cleaning materials appeared to be associated with minimal toilet hygiene (unadjusted OR 0.75, 95% CI:0.12-3.01, p=0.017<0.05). Stagnation of urine and faeces on the floors reduced hygiene probability in toilets by 71% (unadjusted OR 0.29, 95% CI: 0.24-2.99, p=0.002<0.05). Similarly, hygiene in toilets was 12% lower for toilets whose pit contents depth was less than one meter from the slab compared to the reference category (toilets whose pit content depth was more than 1 meter) (unadjusted OR 0.88, 95% CI: 0.34-3.31, p=0.000<0.05).

All the variables that tested significant in the univariable model were also significant in the multivariable model except for depth of pit contents (p>0.05). For lack of toilets cleaning materials, the adjusted OR was 0.53, 95% CI: 0.10-2.96, p=0.003<0.05; for toilets having urine and faeces stagnation on the floors adjusted OR was 0.18, 95% CI: 0.20-3.26,

p=0.000<0.05 and for females taking toilet cleaning roles, the multivariable OR was 1.83, 95% CI: 0.06-2.68, p=0.001<0.05.

The study used the model in *equation iv* to summarize the association between indicators of toilet maintenance and performance of shared sanitation facilities in slums and was substituted as shown: $y_{iv}=\beta_{0+}\beta_i x_I+\beta_{ii}x_{ii}...+\epsilon$ (10)

Hygiene in toilets= 0.71+1.83 (Females taking toilet cleaning roles) +0.53 (unavailability of toilet cleaning materials+0.18 (stagnation of urine and faeces on floors+1.78 (Pit content depth>1 meter) +e

Overall, to understand the direct influence of gender and performance of shared sanitation facilities, the summarized *equation v* was used to demonstrate the relationship as four independent equations, for each dependent variable as shown:

$$y_{i/ii/iii/iv}=\beta_{0+}\beta_1 g+\epsilon \quad (11)$$

Toilet use= 1.09 +1.14Gender+e

Toilet acceptability= 1.20+0.76 Gender+ e

Toilet preference= 0.54+0.75 Gender+ e

Toilet hygiene= 1.04+1.83 Gender+ e

The regression analyses results demonstrated that issues surrounding access to toilets, use of toilets and maintenance had an influence on slum sanitation issues, and were compounded by gender differences which required to be addressed to ensure access to acceptable and user-friendly toilets for both male and female slum dwellers.

# CHAPTER FIVE: CONCLUSION, RECOMMENDATIONS AND PUBLICATION

## 5.1 Introduction

This chapter begins by summarising the findings of the study conducted in Nanyuki slums to lay a foundation for conclusion and recommendations which were made based on the findings. The section also outlines suggestion for future studies and the plan for publication.

## 5.2 Summary of Findings

The study focused on examining how performance of shared sanitation facilities in Nanyuki slums depended on usability, access and maintenance of the toilets in relation to gender. It was established that most of the residents in the slums used shared toilets because it was cost-effective and was also the only solution available for use by many people. Other options for people who did not access shared toilets included the use of private toilets. Issues of fitting in urban lifestyle and improved comfortability for use surrounded the justification for use of private toilets for some residents.

The use of '*Flying toilets'* was also noted but uncommon. Women were the most users of shared toilets as they were mostly found at their households performing household chores and some men would use other sanitation alternatives such as those in their places of work or relieve themselves in the open in case of short calls which was difficult for women due to their urinary system anatomical structure.

Almost 3/4 of the participants reported that they did not prefer to use shared toilets with women dominating. The available toilets were minimally acceptable to members particularly women as they did not adequately address their needs. The hygiene levels in the slum toilets were averagely rated as low and had a higher implication to women than men. The physical

characteristics for most of the toilets provided included: inadequacy in number per households, lack of separation by gender, absence of menstrual management options, of handwashing facilities, lack of anal cleansing and toilet cleaning materials. Additionally, other toilets had unlockable doors, absence of lighting and poor hygiene conditions in terms of toilet cleanliness which informed men and women's choice to use toilets although with an amplified concern by females.

Females were more concerned with toilet distance compared to men and some showed low preference to toilets and some would avoid toilet use at night especially those located farther than 10 meters from households. More women reported inability of the available toilets to meet their sanitation needs, such as those of menstruation, privacy and safety compared to men which affected their preference to the toilets. Women could be more concerned with extended time spent going to toilets or waiting time as it would translate to delayed performance of the many household chores. Toilets were also rated as poorly maintained which was compounded by inadequacy of toilet cleaning materials in toilets, water for cleaning the toilets and poor coordination of households in cleaning toilets based on the made schedules. The hygiene conditions seemed to have more impact on women than men, who preferred use of toilets with clean floors.

### 5.3 Conclusion

The study concluded that although sanitation was among the important issues, it was poor in the slums and its impact varied across gender. The findings suggested that gender-based complex issues came into play to affect the choice to use toilets, access and maintain the toilets in slums.

The study also concluded that females were the most users of shared toilets and their acceptance to toilets was subject to toilet adequacy and their ability to meet users' needs. The toilets in slums therefore needed to be located near households for easy usability by males and females both at night and during the day, to guarantee users' privacy and be adequately maintained for increased acceptance, preference and use.

The study also concluded that there was unequitable access to sanitation for women compared to men in slums due to gender differences in needs. Gender-based physical concerns in toilets such as on safety, the need for special provisions and privacy were higher for girls and women than for men which suggested the need to address and accommodate the uniqueness of gender needs beyond just provision of toilets.

There existed gendered sanitation barriers in slums which affected performance of slum toilets. The sanitation barriers included access to unmaintained toilets. Toilet maintenance could motivate or limit toilet utilization along gender line because of differences in morphological structures which suggested the need for designing slum sanitation facilities in a gender-responsive manner to promote improved hygiene and acceptability of the toilets for use by all.

### 5.4 Recommendations

From the findings obtained in this study, the following recommendations were made:

The National Government and County water and Sanitation Ministries should put more emphasis on provision of data on sanitation service delivery which is separated by gender to avail transparent statistics which could inform appropriate interventions. This could help sanitation providers to understand gender specific needs and concerns related to hygiene and sanitation for appropriate actions to address poor sanitation in slums.

Sanitation programmers in slums should appreciate the contribution of gender in sanitation and the gender-related aspects that could constrain residents from accessing or using sanitation facilities. The role of advocacy and community cohesion to ensure that their needs are adequately addressed is essential.

Policy makers should strengthen the voice of women through agency and leadership in sanitation leadership as they are the most affected by issues of user non-compatibility with the provided toilets.

Women engagement in the issues that profoundly shape their livelihood could result in acceptability of the availed toilets as well as sustainability of the desired sanitation behavior in slums. Amplifying the voice of women could call for actions by the public sanitation sectors to validate institutional accountability frameworks so as to strengthen accountability on gender empowerment. Although strengthening the voice of women could be a practical solution towards gender-responsive solutions, there is need for political will to advance and promote an enabling environment for women to take part in decisions regarding sustainable sanitation in slums.

The Ministry of Water, Sanitation and Irrigation should embrace gender mainstreaming as a way of empowering women to have strategic choices in relation to services which accommodate the uniqueness of their needs to promote a healthier population. Awareness creation to landlords in the slums is recommended to ensure that they understand and appreciate the sanitation needs for women in slums, and consider the needs when providing sanitation facilities in the slums,

### 5.4.1 Suggestion for future studies

There is need for future studies which focus on common gender differences in relation to sanitation to enhance development of policies capable of propelling sustainable access to gender-responsive sanitation solutions in slums. This study used a margin of error of 0.1 and recommends use of a less margin of error in future studies.

## 5.5 Publication

Joseph Irungu Maina, Lillian Mukiri Kirimi, Elijah Walubuka, Grace Kasiva Eliud, Influence of gender in toilet access on performance of shared sanitation facilities in slums: *A case of Nanyuki Slums, Kenya*, *African Journal of Science, Technology and Social Sciences*, 4 (2) 2025, ss 174-183. https://doi.org/10.58506/ajstss.v4i2.304

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# APPENDICES

## Appendix A:Informed consent

Dear Participant,

I am a Masters student at Meru University of Science and Technology, conducting research for my thesis on influence of gender in toilet access, use, and maintenance in Nanyuki slums. Your voluntary participation is sought for this study. Your privacy and confidentiality are paramount, as all data collected will used solely for research purposes and kept anonymous.

You have the right to refuse or withdraw from the study at any time, without any negative consequences. This research carries no direct benefits or risks to participants.

For questions or clarifications, please contact **Joseph Irungu Maina** at **+254721967137** or irungusan@gmail.com

**Appendix B: Questionnaire**

**Section 1: Demographic Information**

1. Gender:

    A. Male

    B. Female

2. Age

    A. 18- 28 years ( )

    B. 29-39 years ( )

    C. 40-50 years ( )

    D. over 50 years ( )

3. Marital Status:

    A. Single

    B. Married

    C. Divorced

    D. Widowed

4. Education Level:

    A. No formal education

    B. Primary education

    C. Secondary education

    D. Tertiary education

5. How long have you been living in the nanyuki slum area?

    A. below 1 year ( )

    B. 2 years ( )

C. 3 years ( )

D. For more than 3 years ( )

6. Economic status:

A. Employed ( )

B. Self-employed ( )

C. Unemployed ( )

7. Type of sanitation facility:

A. Traditional pit latrine ( )

B. Flush toilets ( )

C. Ventilated Improved pit latrines ( )

D. Open defecation ( )

E. Bucket latrine ( )

F. None of the above ( )

**Section 2: Influence of gender in toilet access**

1. Do you have access to a shared sanitation facility (e.g., communal toilets, public toilets) in your locality?

A. Yes

B. No

2. If YES, how far is the nearest shared sanitation facility from your home?

A. 0 – 10 meters

B. 10- 30 meters

C. More than 30 meters

3. If NO, what method of fecal disposal do you use?

A. flying toilets

B. open defection

C. private

4. What time of the day do you prefer using the shared toilet facility?

A. day

B. night

C. Both

5. Give reasons why you would adopt the preferred time?

A. Privacy

B. Terrain to the toilet

C. Safety

6. **Please indicate the extent to which you agree with the following aspects of gender in toilets Access to Shared Sanitation Facilities by <u>marking</u> the appropriate box. <u>Kindly answer all the statements.</u> Use the scales as shown below:**

**1 = strongly agree, 2 = agree, 3 = Uncertain, 4 = disagree,**
**5 = strongly disagreed**

| | **STATEMENT** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| a | The toilets are adequate for use by all members | 1 | 2 | 3 | 4 | 5 |
| b | I am comfortable with the distance to the toilet facility available | 1 | 2 | 3 | 4 | 5 |
| c | Women can comfortably visit the toilets at night | 1 | 2 | 3 | 4 | 5 |
| d | Men can comfortably visit the toilets at night | 1 | 2 | 3 | 4 | 5 |
| e | The toilets location is adequately secured | 1 | 2 | 3 | 4 | 5 |
| f | I can easily access toilets when I need them | 1 | 2 | 3 | 4 | 5 |
| g | shared toilet meet our sanitation needs | 1 | 2 | 3 | 4 | 5 |
| h | I am comfortable with using the toilets at night | 1 | 2 | 3 | 4 | 5 |

**Section 3: Gender in toilets Use on Shared Sanitation Facilities**

1. Do you use shared sanitation facility?

   A. Yes ( ) B. No ( )

2. would you/would not prefer using shared toilets in slums?

   A. Yes - prefer ( ) B. No ( ) - not prefer

3. What are the factors that would influence your choice to use the shared sanitation facility or not? (Select all that apply)

   A. Distance from home

   B. Cleanliness of the facility

   C. Safety and security

   D. Privacy

E. Availability of water and sanitation supplies

F. Gender-segregated facilities

G. Cultural or religious reasons

4. Which gender do you think is affected more by inadequate sanitation facilities in slums?

A. Men ( ) B. Women ( ) C. Both are equally affected ( )

**Please indicate the extent to which you agree with the following aspects of use of shared sanitation facilities by <u>marking</u> the appropriate box. Use the scales as shown below:**

| 1 = strongly agree, 2 = agree, 3 = Uncertain, 4 = disagree, 5 = strongly disagree | | | | | | |
|---|---|---|---|---|---|---|
| | **STATEMENT** | **1** | **2** | **3** | **4** | **5** |
| a | I am/can be comfortable with using shared toilets in slums | 1 | 2 | 3 | 4 | 5 |
| b | I can use a toilet that has holes around the walls | 1 | 2 | 3 | 4 | 5 |
| c | People in this slum abandon even the available toilets for open defecation | 1 | 2 | 3 | 4 | 5 |
| d | Coping mechanisms for using shared toilets in slums are gendered (one gender is affected more than the other) | 1 | 2 | 3 | 4 | 5 |
| e | The toilets available are safe for use by men | 1 | 2 | 3 | 4 | 5 |
| f | The toilets available are safe for use by men | 1 | 2 | 3 | 4 | 5 |
| g. | Separated for both men and women shared toilets encourage members to using the toilets. | 1 | 2 | 3 | 4 | 5 |
| h. | Some members avoid using the toilets due to queues and waiting time | 1 | 2 | 3 | 4 | 5 |

**Section 4: Maintenance of Shared Sanitation Facilities**

**Please indicate the extent to which you agree with the following aspects of maintenance of shared sanitation facilities by <u>marking</u> the appropriate box. <u>Kindly answer all the statements.</u>**

**Use the scales as shown below:**

| 1 = strongly agree, 2 = agree, 3 = Uncertain, 4 = disagree, 5 = Strongly disagree | | | | | | |
|---|---|---|---|---|---|---|
| | **STATEMENT** | **1** | **2** | **3** | **4** | **5** |
| a | The shared sanitation facility is frequently cleaned and maintained. | 1 | 2 | 3 | 4 | 5 |
| b | Adequate cleaning material are available e.g. broom/water/brushes | 1 | 2 | 3 | 4 | 5 |
| c | There exists gender-specific roles and expectations related to the maintenance of the shared toilet? | 1 | 2 | 3 | 4 | 5 |
| d | Presence of Urine and faeces on the floor discourages toilet use | 1 | 2 | 3 | 4 | 5 |
| e | I am comfortable with using toilets whose depth of pit contents is high | 1 | 2 | 3 | 4 | 5 |
| f. | Women fear using unclean toilets more than men | 1 | 2 | 3 | 4 | 5 |
| g. | Cleanliness of shared toilets affect choice to use the toilets | 1 | 2 | 3 | 4 | 5 |

5. Who is primarily responsible for the maintenance of the shared toilet?
    A. Local authorities
    B. males
    C. females
    D. caretaker

**Section 5: performance of the shared sanitation facilities.**

**Please indicate the extent to which you agree with the following aspects of performance of the shared sanitation facilities by <u>marking</u> the appropriate box. <u>Kindly answer all the statements.</u> Use the scales as shown:**

| **1 = strongly agree, 2 = agree, 3 = Uncertain, 4 = disagree,5 = strongly disagreed** | | | | | | |
|---|---|---|---|---|---|---|
| | **STATEMENT** | **1** | **2** | **3** | **4** | **5** |
| a | The presence of shared toilets has increased the use of toilets. | 1 | 2 | 3 | 4 | 5 |
| b | Women are involved in decision making in matters of Shared sanitation | 1 | 2 | 3 | 4 | 5 |
| c | The hygiene levels in shared toilets are high | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| d | Shared toilets are acceptable for use by all members | 1 | 2 | 3 | 4 | 5 |
| e | I prefer using shared toilets to private toilets | 1 | 2 | 3 | 4 | 5 |
| f | Shared toilets are characterized by nuisances like foul smell and flies | 1 | 2 | 3 | 4 | 5 |
| g | Shared toilets have led to decreased open defecation | 1 | 2 | 3 | 4 | 5 |

**Thank you for taking the time to complete this questionnaire.**

**Appendix C:Observation checklist**

Name of slum Majengo Kanyoni Likii A Likii B

Physical observation: (tick √ where applicable)

1. Number of Toilets Available for Use

One Two More Than Two

2. Presence of separate toilets by gender

Present Not Present

3. Cleanliness level of the surroundings

Clean Filthy

4. Presence of flies and odour

Yes No

5. Presence of signs/instructions for users

Present Absent

6. Presence of foul odors or unpleasant smell

Yes No

7. Availability of menstrual hygiene bins in toilets

Present Not present

8. Availability of hand washing facilities with water

Available with water Available without water Not available

9. Availability of anal cleansing materials (e.g., toilet paper, bidets)

Present Not present

10. Presence of toilet cleaning materials

Present Not present

11. Condition of the toilets superstructure (walls)

Gapped In good condition

12. Condition of doors and locks for the toilets.

    Lockable  Not lockable

13. Adequate lighting and visibility within the toilet area.

    Present  Present but not working  not present

14. Depth of pit contents in latrines (Researcher to observe and approximate)

    <1 Meter

    >1 Meter

**Appendix D:Focus group discussion guide**

1. Are the available shared toilets in slums acceptable by both men and women? Explain your answer

……

……

2. Explain how the available shared toilets in slums meet/fails to meet the needs of men and women

……

……

3. Would you be comfortable using shared toilets which are not separated by gender? Why?

……

……

4. How can you describe the maintenance level of shared toilets? Does the maintenance level of shared toilets affect use?

……

……

5. What do you think affects maintenance of shared toilets in slums?

……

……

6. Between males and females, who would have more issues in using unmaintained toilets and why?

……

……

7. Would you prefer using shared slum toilets? Why?

……

……

8. How is the safety of shared toilets in slums? Between male and female, which gender is more affected by safety concerns in toilets? Why?

……

……

9. Are there people who avoid the available shared toilets even when provided? If yes, which solutions/options do they use?

……

……

10. Between men and women, who are likely to avoid using shared toilets? Explain why

……

……

## Appendix E:Introductory letter

MERU UNIVERSITY
OF SCIENCE & TECHNOLOGY

P.O Box, 972-60200 Meru-Kenya
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SCHOOL OF ENGINEERING AND ARCHITECTURE
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

**TO:** Whom It may concern **DATE:** 3rd November, 2023

Dear Sir/Madam,

**RE: INTRODUCTORY LETTER FOR JOSEPH IRUNGU MAINA REG NO. EG407/201143/20**

The above-named, is a student in the Department of Civil and Environmental Engineering at Meru University of Science and Technology, pursuing a Master's degree in Sanitation. He has been approved to conduct research on **"Influence of Gender in Toilet Access, Use and Maintenance on Performance of Shared Sanitation Facilities in Nanyuki Slums"** aimed at completing his studies. This is therefore, to request that you grant him any assistance needed to enable him meet the program requirements for his graduation.

Kindly contact us for any further enquiries.

Thank you

**Mirara simon w.**
**Chair of Department Civil and Environmental Engineering**
**Meru University of Science and Technology**

**Email:** CODcivilengineering@must.ac.ke
Smirara@must.ac.ke

## Appendix F:Research permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **169178**

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# Influence of gender in toilet access on performance of shared sanitation facilities in slums: A case of Nanyuki slums, Kenya

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ABSTRACT

The Sustainable Development Goals agenda 6 emphasizes on sanitation access alongside gender equality as a transformative strategy to improved sanitation. However, although the need for safe sanitation is a well-recognized agenda, sanitation in slums has become a global challenge with noticeable gender disparities in access to and choices of safe sanitation facilities which could present non-proportional difficult gender-related sanitation choices in slums. With the serious health consequences of poor sanitation, it is essential to understand the gender-related factors associated with ability to access, utilize and maintain shared sanitation facilities in slums. This paper examined the influence of gender in toilet access, on performance of shared sanitation facilities in Nanyuki slums. The field research employed a convergent research design where simultaneous collection and analysis of quantitative and qualitative data was used. A sample of 98 participants calculated using Yamane's formula was used. The number of household heads per cluster was determined using proportionate-to-size formula Quantitative data was collected using structured questionnaires from household heads who were selected using cluster and simple random sampling techniques. The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 26 in descriptive statistics and presented in frequencies, percentages, means and standard deviations and in inferential statistics like correlations and logistic regressions to unveil relationship between variables. Qualitative data was collected using focus group discussion guides from a purposively selected group consisting of women, men, landlords, Community Health Volunteers, a Public Health Officer and a sanitation representative. The data was analyzed in themes and presented in a narrative way. Findings revealed that females were the most users of shared toilets compared to men (Adjusted OR=1.14, 95% CI: 0.05-1.92, P=0.009<0.05) because they were left at their households due to commitments of carrying out household chores when men could use toilets in their places of work. Toilets were 0.76 times less acceptable and 0.75 less preferable for females than for males. Toilet location far from households, use of toilets at night for females, access to toilets with gapped super structures, unsafe and contaminated toilets significantly reduced the odds of toilet use (P<0.05). Adequacy of toilets (adjusted OR 4.95, 95% CI: 0.98-4.40, p= 0.032<0.05), and ability to meet user needs (adjusted OR 5.73, 95% CI: 0.70-4.15, p= <0.001) increased the chances of use of shared toilets. The odds for preference of toilets significantly increased by 4.95 and 2.09

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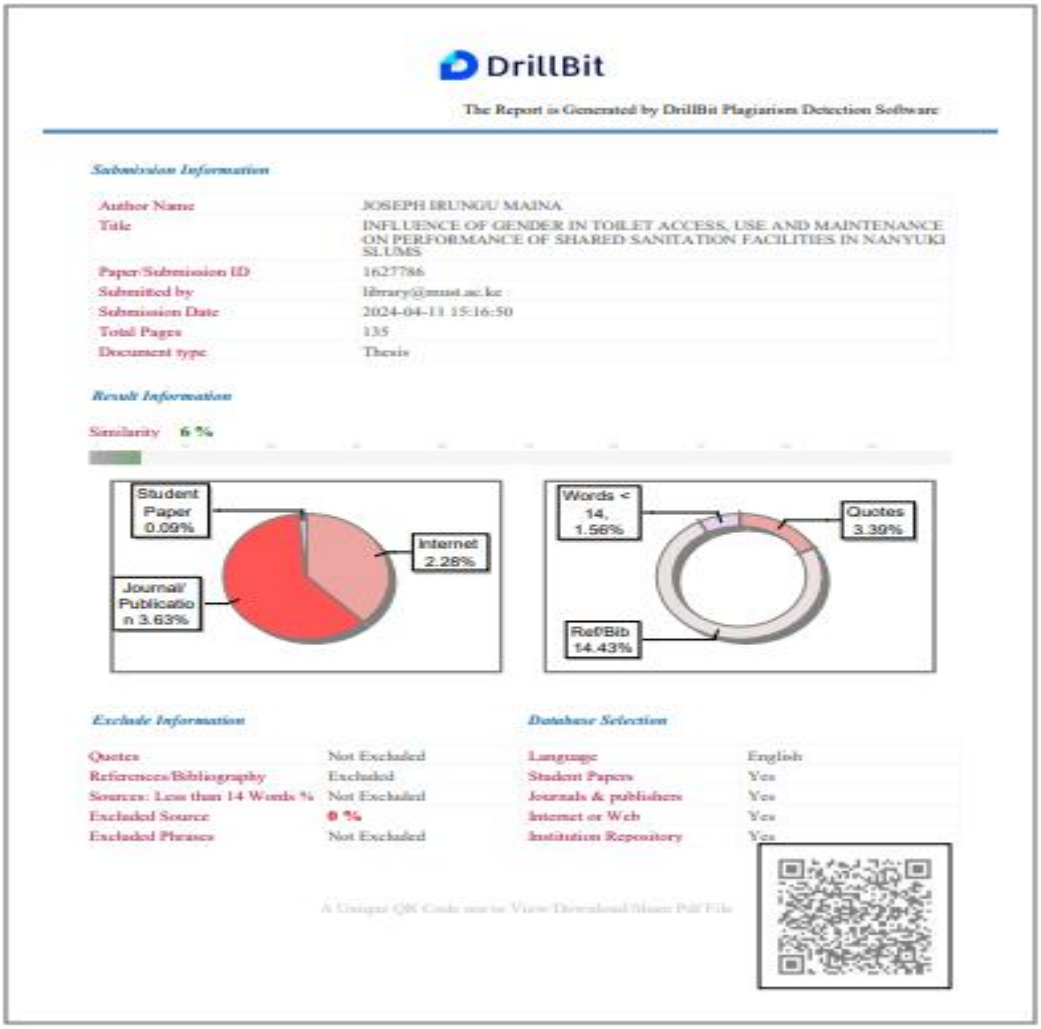
## Appendix I:Plagiarism Report



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