AKENTEN APPIAH-MENKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT ASANTE MAMPONG

IMPROVING THE QUALITY OF SHARED SANIITARY THROUGH REWARD SCHEME IN LOW-INCOME URBAN SETTLEMENTS IN GA CENTRAL MUNICIPALITY ACCRA GHANA

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AKENTEN APPIAH-MENKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT

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A thesis submitted to the Faculty of Environment and Health Education, Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development in partial fulfillment of the requirements for the award of a Master of Philosophy degree in Environmental and Occupational Health Education

JULY, 2024

DECLARATION

CANDIDATE'S DECLARATION

I, Ummukulsum Yakoub, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE …….

DATE……

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of thesis/dissertation/project as laid down by the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development.

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DEDICATION

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ABSTRACT

Sanitation facilities in low-income settlements often face significant challenges related to maintenance, cleanliness, and accessibility. Shared sanitation facilities are particularly prevalent in these areas, raising concerns about hygiene practices. This study aimed to determine the quality of shared sanitation facilities and effectiveness of a reward scheme in promoting low-income settlement better sanitation outcomes. A mixed-methods approach was employed, involving both qualitative and quantitative. Surveys, observation checklists and key informant interviews with environmental health officers in the Ga Central Municipality (Ablekuma and Anyaa). A sample of 100 households was chosen, with 50 households participating in a reward scheme and 50 households serving as a control group. Households were selected based on their sanitation facility types, cleaning arrangements, and maintenance practices. The majority of respondents used pour-flush toilets to pit latrines (30%), traditional pit latrines with concrete slabs (18%), and ventilated improved pits (15%). 97% of toilet facilities were located within the compound, ensuring convenient access. Facilities with rewards exhibited significantly better hygiene outcomes compared to those without rewards. Specifically, rewarded facilities had lower percentages of visible fecal matter (20% vs. 76%, p=0.000), flies (8% vs. 32%, p=0.002), noticeable odor (24% vs. 76%, p=0.000), visible urine/saliva on the floor (6% vs. 38%, p=0.000), and maggots (16% vs. 40%, p=0.007). Targeted interventions, including the implementation of reward schemes, are recommended to improve the maintenance and cleanliness of shared sanitation facilities. These interventions should be gender-sensitive and address the specific challenges identified. The findings highlighted the need to tailored into sanitation practices and the effectiveness of interventions in low-income settlements. Understanding the current arrangements and challenges allows for the design of more effective strategies to enhance sanitation outcomes and improve community well-being.

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Access to sanitation is a fundamental human right and an essential component of public health and well-being(Langford *et al*., 2014). Despite significant progress in many parts of the world, a substantial portion of the global population, particularly in low-income and urban settings, continues to struggle with inadequate access to clean and safe sanitation facilities (Saleem *et al*., 2019). Shared sanitation facilities are often the primary means of meeting the sanitation needs of these communities. Shared sanitation refers to sanitation facilities, such as toilets and latrines, that are used by multiple households or individuals (Heijnen *et al*., 2014). These facilities are typically communal and may serve several households within a community or residential area. Shared sanitation can include public toilets, community latrines, or facilities shared within a household compound.

However, these shared facilities' quality, cleanliness, and effective management often fall short of the desired standards, creating pressing health and environmental concerns. Globally, the target of the sixth Sustainable Development Goal (SDG) is to achieve access to adequate and equitable sanitation for all by 2030 (Sarkar and Bharat, 2021). Due to increasing urbanization and informality, however, providing adequate sanitation in low-income settlements is increasingly becoming a challenge (Satterthwaite *et al*., 2015). Inadequate household sanitation facilities in low-income settlements force residents to share the few available facilities, a practice that some authors have proposed as the most practical alternative (Simiyu *et al*., 2017). In addition to cleanliness and maintenance, studies have also highlighted the importance of aspects such as the hygienic status of sanitation facilities, the state of the superstructure, the presence of smell, the presence of flies, and the state of the slab (especially in the case of pit latrines) in defining the quality

of shared sanitation (Musa, 2018, Simiyu *et al*., 2017). The inadequate state of shared toilets has been attributed to several factors, including poor management, lack of resources, and low community involvement (Mazeau, 2013). Many of the shared toilets are privately owned, and their maintenance and management are the responsibility of the landlords. However, due to the low-income nature of the settlement, landlords often lack the resources and incentives to maintain the facilities adequately. In the case of low-income settlements, the problem of shared toilet facilities arises due to inadequate access to individual sanitation amenities. Shared facilities, while serving multiple households, often face challenges related to maintenance, cleanliness, and privacy. These challenges can lead to hygiene risks, discomfort, and inequalities in sanitation access among residents. Addressing the problem of shared toilet facilities is crucial for promoting equitable access to safe and hygienic sanitation infrastructure, thereby improving the overall well-being of communities in low-income settings.

Shared sanitation refers to facilities like toilets and latrines used by multiple households, commonly found in low-income areas. Several studies have explored shared toilet facilities in these areas, examining access, exclusion, and maintenance challenges (Musa, 2018, Simiyu *et al*., 2017, Kabange and Nkansah, 2015, Antwi-Agyei *et al*., 2020). However, no study has explored the use of reward schemes to improve sanitation conditions, marking a significant research gap. This study addresses this gap by evaluating the effectiveness of a reward scheme on sanitation practices. By comparing rewarded and non-rewarded facilities, the research provides valuable insights into how incentives can enhance cleanliness and hygiene in shared sanitation environments. The rationale for this study stems from the pressing need to address sanitation challenges in low-income settlements, particularly concerning shared toilet facilities. With inadequate access to individual

sanitation amenities, residents often rely on shared facilities, which present various maintenance, cleanliness, and privacy issues. Understanding the effectiveness of existing sanitation arrangements, interventions, and policies is vital for informing targeted interventions and improving sanitation outcomes in these settings.

1.2 Problem Statement

Shared sanitation facilities, which are commonly used in low-income communities, are often marred by issues related to cleanliness, maintenance, and hygiene (Waterkeyn and Cairncross, 2005). The inadequate quality and cleanliness of shared sanitation facilities contribute to the spread of waterborne diseases, including diarrhea, cholera, and dysentery (Manetu and Karanja, 2021). These diseases disproportionately affect vulnerable members of the community, such as children and the elderly. Poor sanitation perpetuates cycles of illness, increasing healthcare costs and reducing economic productivity due to lost workdays. Consequently, it exacerbates the already challenging circumstances faced by low-income populations.

Since shared sanitation facilities are often the only option available for most residents in low-income areas, it is feared that users may revert to open defecation practices if the facilities are inaccessible or unclean (Rheinländer *et al*., 2015). Equally, it is acknowledged that 'high quality' shared sanitation facilities may be the best interim solution in low-income settlements (Mazeau *et al*., 2013), and thus, interventions to improve the cleanliness of these sanitation facilities are needed. Studies focusing on such interventions are few, thereby limiting the available options to learn from in developing relevant interventions. Reward schemes can encourage community participation in maintaining and cleaning shared facilities, promoting a sense of ownership and responsibility. Reward

schemes can also reduce the cost of sanitation services by incentivizing households to contribute to the cost of maintenance and cleaning (Joshi, 2011). The aim of this study was to develop sustainable sanitation solutions by exploring the potential of reward schemes in improving the quality of shared sanitation facilities in low-income urban settlements in the Ga central municipal of Ghana.

1.3 Aim of the study

The main of the study was to evaluates the effectiveness of reward schemes in improving the cleanliness of shared facilities in Ga Central Municipality communities.

1.4 Specific objectives

Specifically, the study seeks to:

1. Assess the existing arrangement for cleaning and maintaining sanitation facilities.
2. Examine the quality of shared sanitation facilities in low-income settlements.
3. Test the effectiveness of a reward scheme in improving the quality of shared sanitation facilities.
4. Assess the effectiveness of existing strategies to promote the uptake of sanitation facilities.

1.5 Research questions

1. What is the existing arrangement for cleaning and maintaining sanitation facilities?
2. What is the current quality status of shared sanitation facilities in low-income settlements?
3. How does the implementation of a reward scheme impact the quality of shared sanitation facilities?

4. What is the effectiveness of existing strategies to promote the uptake of sanitation facilities?

1.6 Justification of the study

Despite sustained efforts to improve access to sanitation facilities, numerous challenges persist in low-income urban settlements. Issues such as insufficient maintenance, inadequate supplies, and poor hygiene practices continue to detrimentally affect the health and well-being of residents in these areas (Musa, 2018, Simiyu *et al*., 2017, Kabange and Nkansah, 2015, Antwi-Agyei *et al*., 2020). Despite initiatives aimed at enhancing access to sanitation facilities, the situation remains a significant challenge. A key issue contributing to this challenge is the lack of maintenance, with shared facilities often falling into disrepair due to limited resources and inadequate infrastructure (Meili *et al*., 2022). This not only compromises the functionality of the facilities but also contributes to unsanitary conditions and increased health risks.

Low-income urban areas with inadequate sanitation facilities present major health and safety hazards, which are made worse by a lack of clean water, toilet paper, and sanitary habits. Unsanitary behavior is encouraged by a lack of sanitation education, which increases the spread of disease. Facilities that are remote and poorly lit put women at higher risk for harassment and violence. Children have stunted development, poor health, and inadequate education. Urgent interventions such as routine maintenance, adequate supplies, hygiene promotion, and gender-sensitive solutions are needed to address these issues. Making these actions a priority will enhance general well-being and provide urban settlements with the most vulnerable populations with safer, healthier surroundings.

1.7 Organization of the Study

The study is structured into five chapters for an organized and comprehensive investigation of the research topic. Chapter one introduces the significance of addressing issues surrounding shared sanitation facilities, highlighting their implications for public health, the environment, and social equity. Within this context, the problem statement defines the key issues and emphasizes the importance of the research objectives. Hypotheses corresponding to the research objectives are presented to guide the investigation, along with the main aim and specific research objectives. Chapter Two explores theoretical foundations related to sanitation quality, community ownership, and reward schemes. It investigates global sanitation challenges, focusing on their impact on public health, environmental sustainability, and social inequalities. Specifically, the section on shared sanitation facilities analyzes existing literature to shed light on issues concerning cleanliness, hygiene, and maintenance.

Additionally, innovative interventions, particularly the role of reward schemes in addressing sanitation challenges, are examined. Chapter three outlines the research design and details the methods used for data collection and analysis. It describes the process of selecting low-income settlements for the study and the criteria for sample inclusion. Chapter four examines the data gathered regarding the quality of shared sanitation facilities in low-income communities. It presents findings on cleanliness, maintenance, and hygiene. The Chapter also involves a detailed discussion of the analyzed data, particularly focusing on the results obtained from the implementation of reward schemes in low-income settlements. It delves into the effectiveness of these schemes in improving sanitation quality, drawing connections with relevant literature to contextualize and interpret the findings. Chapter five serves as a conclusion of the study, providing a

summary of the key findings, drawing conclusions based on the results obtained, and offering recommendations for practice and policy. Additionally, it outlines potential directions for future research in the field of sanitation and community development.

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CHAPTER TWO: LITERATURE REVIEW

2.1 Sanitation in Ghana

Sanitation remains a critical issue in Ghana despite notable progress in enforcing high-level sanitation measures and improving access to safe drinking water (Mensah, 2020). One of the persistent challenges is the prevalence of open defecation, particularly in rural areas, which contributes to unsanitary conditions and health risks (Abudulai *et al*., 2021). Additionally, a significant portion of the population, approximately 85%, relies on shared sanitation facilities, highlighting the need for improved access to individual facilities(Adams *et al*., 2016). However, inadequate funding for the operation and maintenance of sanitation infrastructure poses a major obstacle to addressing these challenges. Rapid urbanization and population growth further exacerbate the demand for proper housing and sanitation facilities, yet sanitation has not always been prioritized by governments (Kabange, 2017).

Existing sanitation policies and laws are often insufficient and lack comprehensive provisions to ensure universal access to sanitation services, as outlined in the national sanitation policy (Mensah *et al*., 2023). This gap in policy implementation hampers efforts to achieve comprehensive sanitation coverage. Solid and liquid waste management is another significant issue, posing environmental and health risks in many areas (Amoah and Kosoe, 2014). The inadequate disposal of waste, both domestic and commercial, directly or indirectly impacts the environment and public health. Despite regulations mandating local assemblies to generate their own funds for sanitation projects, many rely heavily on the government budgets, leading to inefficiencies and delays in project implementation (Sensau, 2017). There is the need for Ghana to work towards achieving

universal access to safe and hygienic sanitation facilities, thereby improving public health and environmental sustainability.

2.1.1 Sanitation Challenges in Low-Income Urban Settlements in Ghana

Low-income urban settlements face a multitude of sanitation challenges, which significantly impact the lives of their residents (Lüthi *et al*., 2009). These challenges are characterized by inadequate access to clean and safe sanitation facilities, leading to severe health and environmental implications. One of the most pressing issues in low-income urban areas is the lack of access to proper sanitation facilities. A significant portion of the population residing in these settlements lacks access to basic amenities like toilets and wastewater management systems (Owusu, 2010). The scarcity of such facilities forces residents to resort to open defecation and the improper disposal of waste. The absence of proper sanitation infrastructure not only degrades the quality of life for residents but also perpetuates the spread of diseases (Weimann and Oni, 2019) .

Inadequate sanitation facilities have grave health consequences for the population. Contaminated water sources and improper waste disposal contribute to the prevalence of waterborne diseases, such as cholera and diarrhea (Akinyemi *et al*., 2020). The lack of access to sanitation also poses risks to maternal and child health. Women and children are particularly vulnerable to infections, and girls, in particular, often miss school due to the lack of private and hygienic toilets. The environmental implications of poor sanitation practices in these areas are equally concerning. Open defecation and untreated waste disposal lead to pollution of water bodies and the surrounding environment (Odipe *et al*., 2019). The contamination of water sources not only endangers human health but also impacts the ecosystem, affecting plant and animal life. Moreover, the accumulation of

waste in these settlements contributes to unsanitary living conditions, fostering a breeding ground for pests and diseases (Bilal *et al*., 2020).

2.2 Theoretical Review

The theoretical review focuses on understanding behavior change through established models: the Health Belief Model, the Theory of Planned Behavior, and Social Cognitive Theory. These theories provide frameworks for predicting and influencing health behaviors by examining individual beliefs, social influences, and perceived control over actions. By applying these models to sanitation practices, the review highlights how personal attitudes, social norms, and observational learning can drive the adoption of improved sanitation behaviors. This understanding aids in designing effective interventions to enhance sanitation in low-income settlements, ultimately leading to better health outcomes.

2.2.1 Theories of Behavior Change

2.2.1.1 Health Belief Model

The Health Belief Model (HBM) is a psychological model developed in the 1950s by social psychologists Hochbaum, Rosenstock, and Kegels (Devi *et al*., 2022a). The HBM attempts to explain and predict health behaviors by focusing on the attitudes and beliefs of individuals. It suggests that health behavior is influenced by personal beliefs or perceptions about a disease and the strategies available to decrease its occurrence (Braide, 2022). According to the HBM, individuals will take a health-related action if they believe they are susceptible to the condition, believe the condition has serious consequences, believe taking a specific action would reduce their susceptibility to or severity of the condition, believe the benefits of taking the action outweigh the costs or barriers, are exposed to

factors that prompt action (e.g., a health campaign), and believe in their ability to successfully perform the action (Maseko *et al*., 2021). In the context of sanitation, the HBM can explain why individuals or communities might adopt better hygiene practices if they believe they are at risk of disease from poor sanitation and perceive the benefits of improved sanitation to outweigh any barriers.

2.2.1.2 Theory of Planned Behavior

The Theory of Planned Behavior (TPB), proposed by Icek Ajzen in 1985, builds on the Theory of Reasoned Action by adding a third determinant of behavioral intention (Ajzen and Schmidt, 2020): perceived behavioral control. The TPB posits that an individual's intention to engage in a behavior is the primary predictor of whether they will actually perform that behavior. This intention is influenced by the attitude toward the behavior, which is the degree to which a person has a favorable or unfavorable evaluation of the behavior; subjective norms, which are the perceived social pressure to perform or not perform the behavior; and perceived behavioral control, which is the perceived ease or difficulty of performing the behavior and can also directly influence behavior (Conner, 2020). In sanitation practices, the TPB can be used to understand the role of attitudes, societal norms, and perceived control in individuals' decisions to maintain or improve sanitation facilities.

2.2.1.3 Social Cognitive Theory

Social Cognitive Theory (SCT), developed by Albert Bandura, emphasizes the importance of observational learning, imitation, and modeling in behavior change (Hikmah *et al*., 2023). SCT posits that behavior is influenced by the interaction between personal factors, environmental influences, and behavior itself. Key concepts in SCT include observational

learning, which is learning by observing the actions and outcomes of others' behavior; self-efficacy, which is the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations; reciprocal determinism, which is the dynamic and reciprocal interaction of personal factors, behavior, and the environment; and outcome expectations, which are beliefs about the likely results of the action (Devi *et al*., 2022b).

2.2.1.3 Application of Behavior Change Theories to Sanitation Practices

The application of behavior change theories to sanitation practices is pivotal in designing effective interventions. Behavior Change Communication (BCC) employs principles from various behavior change models to influence individual and community sanitation behaviors. By leveraging the Health Belief Model, BCC initiatives emphasize the perceived severity and susceptibility of poor sanitation-related diseases, thereby motivating individuals to adopt better sanitation practices. These initiatives also incorporate elements of the Theory of Planned Behavior, addressing attitudes, subjective norms, and perceived behavioral control to foster positive sanitation habits.

Community-Led Total Sanitation (CLTS) is another approach that effectively applies behavior change theories to sanitation. Rooted in the principles of Social Cognitive Theory, CLTS encourages communities to collectively recognize and address their sanitation challenges. This method relies on observational learning, where community members observe the positive behaviors of their peers, which in turn motivates them to change their practices (Harter *et al*., 2020). By fostering a sense of collective efficacy, CLTS helps communities realize their ability to achieve open defecation-free status through mutual support and collective action.

The Diffusion of Innovations Theory also plays a crucial role in enhancing sanitation practices. This theory focuses on how new ideas and behaviors spread within a community or society (Hendrix, 2020). In the context of sanitation, it examines how innovative practices and technologies, such as improved toilet designs or novel waste management systems, are adopted over time. By understanding the stages of adoption—knowledge, persuasion, decision, implementation, and confirmation sanitation programs can tailor their strategies to facilitate the dissemination of these innovations (Adamu and Ali, 2020). Early adopters and opinion leaders within communities are often targeted to help promote and normalize new sanitation practices, accelerating their acceptance and integration.

2.2.1.4 Conceptual Framework

The study's conceptual framework incorporates key behavior change theories, including the Social Cognitive Theory (SCT), the Theory of Planned Behavior (TPB), and the Health Belief Model (HBM), to better understand and improve sanitation practices in low-income urban settlements. The framework implies that the adoption of improved sanitation practices is influenced by individual perceptions and social norms in addition to environmental factors. Included in the framework is the function of reward schemes as an external motivator to encourage positive behavior change. Combining these elements provides a thorough approach to addressing the issues surrounding shared restrooms, emphasizing the importance of community engagement training and incentives in promoting sustainable sanitation practices.

2.3 Overview of Sanitation Facilities and Maintenance Practices

Sanitation facilities and maintenance practices in Ghana play a critical role in public health and community well-being. This section examines the current state of maintenance

practices, emphasizing the importance of proper upkeep in ensuring effective sanitation. By understanding the existing landscape, challenges, and innovations in sanitation facilities and maintenance, we can develop targeted strategies to enhance sanitation services, promote hygiene, and improve health outcomes for all communities in Ghana

Sanitation facilities are essential components of public health infrastructure, providing individuals and communities with access to safe and hygienic methods for human waste disposal (World Health, 2020). An overview of sanitation facilities encompasses various aspects, including the types of facilities available, regional variations in their distribution, and the historical development of sanitation systems. Sanitation facilities include a range of structures and systems designed to collect, transport, treat, and dispose of human waste. Common types of sanitation facilities include flush toilets connected to centralized sewer systems, pit latrines, composting toilets, and bucket toilets. Each type of facility has unique characteristics, advantages, and limitations depending on factors such as population density, geographical location, and cultural preferences.

For example, flush toilets are prevalent in urban areas with access to piped water and sewage infrastructure, while pit latrines are more common in rural and peri-urban settings where centralized sanitation systems are unavailable (Verma *et al*., 2020). In low-income settlements, residents often rely on shared or communal sanitation facilities due to limited space, inadequate infrastructure, and economic constraints (Simiyu *et al*., 2020). These shared facilities may include public toilets, communal pit latrines, or community-managed sanitation blocks. Equally, wealthier neighborhoods and urban centers are more likely to have individual household toilets connected to sewer networks or septic tanks. Disparities in sanitation infrastructure highlight the unequal distribution of resources and the need for targeted interventions to improve access and service delivery in underserved communities.

The historical development of sanitation systems traces the evolution of human waste management practices from ancient civilizations to modern-day innovations. Early sanitation systems, such as the Indus Valley Civilization's sophisticated drainage systems and ancient Roman aqueducts, laid the foundation for urban sanitation infrastructure (Angelakis *et al*., 2023). Over time, advancements in engineering, public health, and sanitation technology led to the widespread adoption of flush toilets, sewer networks, and wastewater treatment plants in industrialized nations. However, many developing countries continue to struggle with inadequate sanitation infrastructure, resulting in health disparities, environmental pollution, and social inequities (Abrams *et al*., 2021).

2.3.1 Efforts to improve sanitation in low-income urban areas

Efforts to improve sanitation in low-income urban areas in Ghana have seen significant contributions from various organizations and projects. Among these, Clean Team Ghana Limited, the Greater Accra Metropolitan Area (GAMA) Sanitation and Water Project, and Water & Sanitation for the Urban Poor (WSUP) stand out for their impactful work. Clean Team Ghana Limited focuses on providing affordable and accessible sanitation solutions to low-income communities. Their model involves the provision of portable toilets that are serviced regularly, ensuring cleanliness and proper waste disposal (Tidwell *et al*., 2022). This approach not only addresses the immediate need for sanitation facilities but also creates employment opportunities within the community. The organization's efforts are aimed at reducing open defecation and improving overall hygiene standards, thereby contributing to better health outcomes. The GAMA Sanitation and Water Project, a collaborative effort between the World Bank and the Government of Ghana, targets the improvement of sanitation infrastructure in the Greater Accra Metropolitan Area (Bishoge, 2021). This project has been instrumental in constructing household toilets and communal

sanitation facilities, particularly in densely populated urban slums. GAMA's approach includes both the provision of physical infrastructure and community engagement initiatives to promote behavioral change and ensure the sustainability of the facilities (Smith *et al*., 2020). By integrating these components, the project aims to create lasting improvements in sanitation and hygiene practices. Water & Sanitation for the Urban Poor (WSUP) is another key player in enhancing sanitation in low-income urban areas of Ghana. WSUP works in partnership with local authorities and utilities to develop and implement sustainable sanitation solutions (Gould and Brown, 2020). Their initiatives often involve upgrading existing facilities, building new infrastructure, and improving waste management systems.

WSUP also focuses on capacity building, providing training and support to local communities and service providers to maintain and manage sanitation facilities effectively (Clemenz *et al*., 2020). This comprehensive approach ensures that improvements in sanitation are not only immediate but also sustainable in the long term. These efforts collectively contribute to addressing the significant sanitation challenges faced by low-income urban areas in Ghana. By focusing on both infrastructure development and community engagement, these organizations and projects are making strides in improving access to sanitation, enhancing public health, and promoting environmental sustainability. The successes and lessons learned from these initiatives can serve as valuable models for other regions facing similar challenges, highlighting the importance of multi-faceted and collaborative approaches in tackling urban sanitation issues.

2.3.2 Maintenance Practices for Sanitation Facilities

Maintenance practices for sanitation facilities are crucial to ensuring their functionality and sustainability, particularly in low-income urban areas where resources are often limited. Regular maintenance not only prolongs the lifespan of sanitation infrastructure but also plays a vital role in preventing health hazards and ensuring a clean environment (Bishoge, 2021). The importance of maintenance cannot be overstated. Properly maintained sanitation facilities help prevent the spread of diseases by reducing exposure to pathogens. They also promote dignity and comfort for users, which is particularly important in densely populated areas where access to clean sanitation can significantly impact the quality of life (Willetts *et al*., 2020). Regular maintenance helps to identify and rectify issues such as blockages, leaks, and structural damage before they become major problems, ensuring that facilities remain operational and safe for use. Community involvement in maintenance is essential for the sustainability of sanitation facilities. When community members take ownership of maintenance activities, there is a greater likelihood of continued care and responsibility (Nelson *et al*., 2021).

This involvement can be fostered through training and capacity-building initiatives that equip community members with the skills needed to carry out basic maintenance tasks. Additionally, establishing community committees or groups dedicated to sanitation management can enhance accountability and ensure that maintenance schedules are adhered to Such community-driven approaches also foster a sense of ownership and pride, encouraging the proper use and upkeep of the facilities. Maintenance scheduling and practices are critical components of effective sanitation management. Scheduled maintenance involves routine inspections and servicing of facilities at regular intervals to prevent breakdowns and ensure optimal performance, this can include cleaning, emptying

waste containers, repairing fixtures, and treating water sources to prevent contamination (Schrecongost *et al*., 2020). Effective scheduling requires a well-organized plan that takes into account the frequency of use, the number of users, and the specific needs of each facility. Having a documented maintenance plan helps ensure that tasks are performed consistently and systematically, reducing the likelihood of neglect.

2.3.3 Innovations in Sanitation Maintenance

Innovations in sanitation maintenance are transforming how communities manage and sustain their sanitation facilities, particularly in low-income urban areas. These innovations, driven by technological advances and novel practices, aim to enhance efficiency, effectiveness, and sustainability. Technological advances are pivotal in modernizing sanitation maintenance (Narayan *et al*., 2021). Smart technologies have enabled real-time monitoring and management of sanitation facilities. For instance, sensors can detect the fill levels of waste containers, leaks, or malfunctions, triggering automatic alerts for maintenance personnel.

This proactive approach helps address issues before they escalate, reducing downtime and ensuring continuous service. Additionally, mobile applications are being used to schedule maintenance tasks, track the progress of repairs, and report issues, streamlining communication and coordination among maintenance teams (Zhang *et al*., 2020). Case studies of innovative practices demonstrate the practical application and benefits of these technological advancements. In Kenya, for example, the Fresh Life initiative employs a franchise model where local entrepreneurs manage public sanitation facilities equipped with waste-separation and recycling technologies (Nyankone, 2022). This model not only ensures regular maintenance but also creates employment opportunities and promotes

environmental sustainability. Another example is Sanergy in Nairobi, which uses a similar model but incorporates a full-cycle approach, turning human waste into valuable products like organic fertilizer and animal feed (Shields and Ruehle, 2016). This approach addresses sanitation and waste management while contributing to the local economy. In India, the Swachh Bharat Mission has implemented large-scale community toilets with built-in maintenance plans (Iyer *et al*., 2023). These facilities are monitored using digital tools, ensuring they remain clean and operational. Community members are trained to use and maintain the technology, fostering a sense of ownership and responsibility. In Bangladesh, the Community-Led Total Sanitation (CLTS) approach integrates local innovations such as low-cost latrine designs and community mapping to enhance sanitation maintenance (Ahmed, 2011). These community-driven initiatives have significantly improved hygiene and sanitation standards in participating areas.

2.4 Quality of Shared Sanitation Facilities in Low-Income Settlements

The quality of shared sanitation facilities in low-income settlements is a critical issue influenced by various challenges. Overcrowding leads to excessive use, resulting in rapid deterioration and unsanitary conditions. Infrastructure deficiencies, such as inadequate water supply and poor drainage systems, further exacerbate the problem(Simiyu *et al*., 2017). These deficiencies contribute to the spread of waterborne diseases like cholera and diarrhea, posing significant health risks. Social and economic barriers, including financial constraints and cultural practices, hinder efforts to improve sanitation quality. Addressing these challenges requires a comprehensive approach that includes infrastructure improvements, regular maintenance, health education, and addressing social inequalities to ensure safe and effective sanitation for all residents.

2.4.1 Challenges in Low-Income Settlements

Overcrowding is a significant challenge in low-income settlements. High population density in these areas leads to excessive use of shared sanitation facilities, which often exceeds their designed capacity (Average, 2019). This overuse results in rapid wear and tear, frequent breakdowns, and inadequate maintenance. The limited number of facilities cannot meet the needs of the growing population, leading to long waiting times and forcing residents to resort to open defecation or other unsafe practices, further exacerbating health risks. Infrastructure deficiencies also significantly impact the quality of shared sanitation facilities. Many low-income settlements lack the basic infrastructure required for effective sanitation management (Andrés *et al*., 2021). Inadequate water supply, poor drainage systems, and substandard construction materials are common problems (Banerjee and Morella, 2011). These deficiencies lead to frequent blockages, leaks, and unsanitary conditions, making it difficult to maintain cleanliness and hygiene. Moreover, the lack of regular maintenance and repair services worsens the situation, resulting in deteriorating facility conditions over time.

Health implications arising from poor-quality shared sanitation facilities are severe. Inadequate sanitation facilities contribute to the spread of waterborne diseases such as cholera, diarrhea, and typhoid (Holcomb *et al*., 2020). The presence of fecal matter, flies, and maggots in and around these facilities creates a breeding ground for pathogens, posing significant health risks to residents (Nuetey and Supply, 2014). The lack of proper sanitation also leads to environmental contamination, affecting water sources and increasing the likelihood of disease outbreaks. Social and economic barriers further hinder efforts to improve the quality of shared sanitation facilities in low-income settlements (Sinharoy *et al*., 2019). Residents often lack the financial resources to invest in better

sanitation infrastructure or pay for maintenance services. Additionally, social stigmas and cultural practices can affect the use and maintenance of shared facilities. For example, gender-specific practices may prevent women from using certain facilities, leading to unequal access and additional health risks for female residents.

2.4.2 Evaluating Facility Quality

Evaluating the quality of shared sanitation facilities involves assessing various indicators. Key indicators include the presence of visible fecal matter, flies, noticeable odor, and other hygiene-related factors. Additionally, structural aspects like the condition of toilet superstructures, availability of handwashing facilities, and regular maintenance schedules are critical. User satisfaction and perceived safety also serve as important indicators of quality. Quality assessment methodologies encompass both qualitative and quantitative approaches. Surveys and interviews with users provide qualitative insights into the perceived quality and satisfaction levels. Quantitative methods include systematic observation and scoring systems that rate facilities based on predefined hygiene and structural criteria. Regular monitoring and inspections by health officials also contribute to quality assessment, ensuring compliance with sanitation standards.

2.4.3 Impact of Poor Sanitation Quality

Poor sanitation quality has severe public health consequences. Inadequate sanitation facilities are breeding grounds for pathogens, leading to the spread of diseases such as cholera, diarrhea, and dysentery (Kulshrestha and Mittal, 2003). These illnesses particularly affect vulnerable populations, including children and the elderly, leading to high morbidity and mortality rates (Ashbolt, 2004). Furthermore, the lack of proper sanitation can contribute to the proliferation of vectors such as flies and mosquitoes, which

can transmit other diseases like malaria and dengue fever. Chronic exposure to unsanitary conditions also increases the risk of long-term health problems and weakens community health resilience. Also, the social and economic impacts of poor sanitation are profound. Socially, inadequate sanitation facilities undermine dignity and privacy, disproportionately affecting women and girls (Mills and Cumming, 2016). The absence of safe and clean toilets can lead to increased risk of sexual harassment and assault, as individuals might resort to open defecation in secluded areas (Manisha, 2015). Economically, the burden of disease due to poor sanitation can strain healthcare systems and reduce workforce productivity (Mills and Cumming, 2016). Households may face significant medical expenses, and the loss of productive days due to illness can hinder economic progress. Additionally, poor sanitation can deter investment and tourism, further limiting economic opportunities in affected regions.

2.5 Effectiveness of Reward Schemes in Improving Sanitation

Reward schemes in the context of sanitation aim to incentivize communities and individuals to adopt better hygiene practices and maintain cleaner facilities. These schemes are designed to promote positive behavior change by offering tangible and intangible rewards for achieving specific sanitation goals. The primary purpose is to enhance public health by reducing the incidence of sanitation-related diseases and improving overall cleanliness in communities, particularly in low-income urban areas. Reward schemes can utilize various types of rewards, which may include financial incentives, recognition, and material benefits (Srinivasan, 2015). Financial rewards can be direct cash payments or vouchers for goods and services. Recognition-based rewards may involve public acknowledgment, certificates, or awards given to individuals or groups who maintain high standards of cleanliness. Material benefits can include hygiene products, improved

sanitation infrastructure, or other resources that directly contribute to better sanitation practices. Each type of reward serves to motivate different segments of the population, ensuring broad participation and sustained engagement.

2.5.1 Implementation Strategies of Reward Scheme

Successful implementation of reward schemes requires careful planning and community involvement (Spiteri and Nepalz, 2006). Key strategies include establishing clear criteria for rewards, engaging community leaders, and ensuring transparency in the reward process. Initial steps involve identifying the specific behaviors or outcomes to be rewarded, such as the regular cleaning of toilets, reduction in open defecation, or proper waste disposal practices. Community engagement is crucial, as it fosters ownership and accountability. Regular monitoring and feedback mechanisms help in assessing progress and making necessary adjustments (Chenhall and Langfield-Smith, 2003). Additionally, collaborating with local governments, NGOs, and other stakeholders can enhance resource mobilization and program sustainability.

2.5.2 Case Studies of Successful Implementations of Reward Scheme

Various regions have demonstrated the effectiveness of reward schemes in improving sanitation. For example, in India, the Swachh Bharat Mission (Clean India Mission) has successfully used reward schemes to encourage villages to become open defecation-free (Bhanot *et al*., 2017). Communities achieving this status receive financial grants and public recognition, which has significantly improved sanitation outcomes. Similarly, in Kenya, the Nairobi City Water and Sewerage Company implemented a reward program for informal settlements, offering incentives such as subsidized water connections and sanitation facilities for maintaining cleanliness standards (Ater, 2009). These case studies

highlight the potential of reward schemes to drive substantial improvements in sanitation, foster community participation, and create lasting behavior change. Empirical evidence from these case studies indicates significant improvements in sanitation outcomes. In India, villages participating in the Swachh Bharat Mission have shown a marked reduction in open defecation, leading to enhanced public health and reduced incidences of sanitation-related diseases. Kenya's reward scheme has resulted in better-maintained sanitation facilities, increased access to clean water, and higher levels of community engagement in hygiene practices. In Ghana, households involved in the Clean Team Ghana initiative have reported cleaner toilets and improved overall sanitation (Tidwell *et al*., 2022). These measured outcomes emphasize the potential of reward schemes to drive substantial improvements in sanitation practices and public health.

Despite their successes, reward schemes also face challenges and limitations. One significant challenge is ensuring the sustainability of these initiatives. Financial incentives, while effective, require continuous funding, which can be difficult to maintain in low-resource settings (Kullappa, 2008, Hunter *et al*., 2018). Additionally, there is a risk of dependency, where communities may only engage in sanitation practices when rewards are provided, leading to potential lapses when incentives are withdrawn (Vlaev *et al*., 2019). Ensuring transparency and fairness in the distribution of rewards is also crucial, as perceived bias or favoritism can undermine the effectiveness of the program. Furthermore, reward schemes must be carefully designed to address cultural and social factors that influence sanitation practices, as a one-size-fits-all approach may not be effective across diverse communities. Addressing these challenges is essential for the long-term success and impact of reward schemes in improving sanitation.

2.6 Strategies for Promoting Uptake of Sanitation Facilities

Promoting the uptake of sanitation facilities in low-income urban settlements is crucial for improving public health and overall well-being. Effective strategies must be multifaceted, involving community engagement, education, supportive policies, and collaborative efforts between public and private sectors. These strategies aim to address the unique challenges faced by low-income communities, ensuring sustainable improvements in sanitation practices.

2.6.1 Existing Strategies

Community-led initiatives play a significant role in promoting sanitation uptake. Programs like Community-Led Total Sanitation (CLTS) mobilize communities to eliminate open defecation and adopt improved sanitation practices (Zuin *et al*., 2019). These initiatives empower residents to take ownership of their sanitation facilities, fostering a sense of responsibility and collective action. By involving community members in the decision-making process, these initiatives ensure that solutions are culturally appropriate and sustainable.

Educational campaigns are vital for raising awareness about the importance of proper sanitation and hygiene practices (Biran *et al*., 2009). These campaigns, often conducted through schools, community centers, and media, provide essential information on the health risks associated with poor sanitation and the benefits of using improved facilities. By educating individuals and communities, these campaigns aim to change behaviors and encourage the adoption of safe sanitation practices. Government policies and regulations are critical for creating an enabling environment for improved sanitation. Policies that mandate the provision of sanitation facilities in public spaces, schools, and households can

significantly enhance access to sanitation services. Additionally, government subsidies and incentives for low-income families to construct and maintain toilets can reduce financial barriers and promote widespread adoption of sanitation facilities(Shako). In Ghana, policies like the National Environmental Sanitation Policy provide a framework for improving sanitation infrastructure and services across the country. Public-private partnerships (PPPs) leverage the strengths and resources of both sectors to improve sanitation services. These collaborations can facilitate the construction, maintenance, and management of sanitation facilities in low-income areas. For instance, partnerships between local governments and private sanitation companies can enhance the efficiency and sustainability of sanitation projects (Lengwe, 2014). PPPs can also attract investment and innovation, leading to the development of cost-effective and scalable sanitation solutions. In Ghana, initiatives like the partnership between Clean Team Ghana Limited and local authorities demonstrate the potential of PPPs in addressing sanitation challenges.

2.6.2 Assessing Strategy Effectiveness

Assessing the effectiveness of strategies to promote the uptake of sanitation facilities is essential for understanding their impact and making necessary improvements. Evaluation involves various metrics, comparative analyses, and identifying best practices that can be replicated or scaled up. To gauge the success of sanitation promotion strategies, several metrics can be employed. These include measuring the increase in the number of households with access to and using improved sanitation facilities, assessing changes in sanitation-related behaviors such as a reduction in open defecation and increased handwashing with soap, and tracking improvements in health indicators like a decrease in the incidence of sanitation-related diseases (e.g., diarrhea, cholera). Additionally, evaluating the long-term maintenance and use of sanitation facilities ensures they remain

functional and are properly used over time (Nzioki and Korir, 2020). Gathering feedback from community members regarding their satisfaction with the sanitation facilities and the implemented strategies is also crucial. Comparative analyses help in understanding the relative effectiveness of different strategies in promoting sanitation uptake (Jenkins and Scott, 2007). This involves conducting studies before and after the implementation of strategies to compare the changes and measure the impact, comparing the effectiveness of strategies across different regions or communities to identify context-specific factors that influence success, and analyzing the outcomes of various strategies (e.g., community-led initiatives versus government policies) to determine which approaches are most effective in different settings.

Identifying and documenting best practices is crucial for replicating successful strategies and informing future interventions (Biran and Hagard, 2003). Effective strategies often involve strong community participation, ensuring that interventions are culturally appropriate and widely accepted. Combining multiple strategies, such as educational campaigns and government policies, to create a comprehensive sanitation promotion framework is also beneficial. Implementing robust monitoring and evaluation systems to continuously assess the effectiveness of strategies and make data-driven adjustments is essential. Designing strategies that can be adapted to changing circumstances and diverse community needs ensures their relevance and sustainability (Bolt *et al*., 2003).

2.6.3 Innovations in Promotion Strategies

Innovations in promoting sanitation facility uptake are increasingly leveraging modern technology and insights from behavioral economics to achieve better outcomes. Digital and social media campaigns have emerged as powerful tools in this domain (Madhumathi

et al., 2021). These campaigns use platforms such as Facebook, Twitter, and WhatsApp to spread awareness about the importance of sanitation and hygiene. They can reach a wide audience quickly and are particularly effective in engaging younger populations. Digital campaigns often include educational videos, infographics, and interactive content that make information about sanitation practices more accessible and engaging. Additionally, social media can facilitate community discussions and peer influence, which can further motivate individuals to adopt better sanitation practices. Behavioral economics approaches offer another innovative strategy by applying principles from psychology and economics to encourage behavior change.

Techniques such as nudging, which subtly guide people towards making better choices, can be employed to promote the use of sanitation facilities (Matjasko *et al*., 2016). For example, placing reminders in strategic locations or using default options (like automatically enrolling households in maintenance programs) can significantly improve sanitation behaviors. Incentives and rewards, as explored in other sections, also fall under this approach, where the right kind of motivation can lead to sustained improvements in sanitation practices. These innovative strategies, combining digital outreach and behavioral insights, hold significant promise for enhancing the uptake and proper use of sanitation facilities. By making sanitation promotion more engaging and tailored to human behavior, these approaches can lead to more sustained and impactful improvements in public health.

2.7 Policy and Governance in Sanitation Management

Effective sanitation management relies on a robust policy framework that guides actions and sets standards. National policies form the backbone of sanitation governance in Ghana.

These policies are designed to ensure equitable access to sanitation facilities, improve public health outcomes, and promote environmental sustainability (Akanchalabey, 2015). Key national policies include the Environmental Sanitation Policy, which outlines the principles and objectives for sanitation management, and the National Water Policy, which integrates water and sanitation strategies to ensure holistic management of water resources and sanitation services. These policies establish the regulatory framework and set targets for sanitation coverage, infrastructure development, and maintenance practices. International guidelines and agreements also play a crucial role in shaping sanitation policies in Ghana.

The country aligns its sanitation goals with global initiatives such as the United Nations Sustainable Development Goals (SDGs), specifically Goal 6, which aims to ensure the availability and sustainable management of water and sanitation for all. Ghana is a signatory to various international agreements that advocate for improved sanitation and hygiene practices, including the Ngor Declaration on Sanitation and Hygiene, which emphasizes the importance of creating an enabling environment for effective sanitation management (Adorsu-Djentuh, 2018). These international frameworks provide benchmarks and best practices that inform national policies and strategies, helping Ghana to align with global standards and enhance its sanitation management efforts.

2.7.1 Governance Structures

Local governments in Ghana play a pivotal role in the management and maintenance of sanitation facilities. They are responsible for implementing national sanitation policies at the community level, ensuring that sanitation services are accessible and effectively managed (Osumanu, 2008). Local governments oversee the construction and maintenance

of sanitation infrastructure, regulate waste management practices, and enforce sanitation laws and regulations (Osumanu, 2010). They also engage with communities to promote good hygiene practices and involve them in decision-making processes related to sanitation. By working closely with community members, local governments can address specific sanitation needs and challenges unique to each area, fostering a sense of ownership and accountability among residents. The collaboration between the public and private sectors is crucial for the successful management of sanitation facilities in Ghana. The public sector, primarily through government agencies and local authorities, provides the regulatory framework, funding, and oversight necessary to ensure that sanitation services meet established standards (Yeboah-Assiamah *et al*., 2017).

The private sector, including non-governmental organizations (NGOs) and private companies, contributes through the provision of services such as waste collection, facility maintenance, and sanitation product supply (Awortwi, 2004). Private entities often bring innovation, efficiency, and additional resources to sanitation projects, complementing public sector efforts. Partnerships between public and private sectors can enhance service delivery, promote sustainable practices, and address gaps in sanitation infrastructure, ultimately improving overall sanitation outcomes in Ghana.

2.7.2 Challenges in Policy Implementation

One of the primary challenges in policy implementation is the presence of institutional barriers within governmental bodies responsible for sanitation management (Adorsu-Djentuh, 2018). Bureaucratic hurdles, inefficient coordination among different departments, and overlapping mandates can hinder the effective implementation of sanitation policies. Additionally, inadequate capacity and expertise within institutions may

limit their ability to develop and enforce regulations, monitor compliance, and address emerging sanitation issues (Aparcana, 2017). Overcoming these institutional barriers requires reforms aimed at streamlining administrative processes, enhancing inter-agency collaboration, and strengthening institutional capacity through training and resource allocation. Insufficient funding and resource allocation present significant challenges to the successful implementation of sanitation policies in Ghana. Limited financial resources allocated to sanitation programs often lead to delays in infrastructure development, inadequate maintenance of existing facilities, and a lack of access to essential sanitation services, particularly in marginalized communities (Appiah-Effah *et al*., 2019). Moreover, competing priorities for government funding may result in sanitation initiatives being deprioritized, further exacerbating the problem (Thrift, 2007). Addressing these challenges requires increased investment in sanitation infrastructure, improved budgetary planning, and innovative financing mechanisms, such as public-private partnerships and donor support, to ensure sustainable funding for sanitation projects.

2.8 Socio-Cultural Factors in Sanitation Practices

Cultural norms, traditions, and beliefs significantly influence sanitation practices in Ghanaian communities. Cultural traditions and beliefs shape attitudes towards sanitation, influencing practices such as toilet usage, waste disposal, and hygiene behaviors (Yamauchi, 2022). For instance, cultural taboos surrounding the handling of human waste may impact the acceptance and utilization of modern sanitation facilities (Akpabio, 2012). Understanding and respecting these cultural norms are essential for the successful implementation of sanitation interventions. Gender dynamics play a crucial role in sanitation practices, with women often bearing the primary responsibility for household sanitation tasks (Fisher, 2006). Traditional gender roles and societal expectations may

influence women's access to sanitation facilities, their involvement in decision-making processes, and their ability to advocate for improved sanitation conditions (Thrift, 2007). Addressing gender inequalities and promoting gender-sensitive approaches are vital for ensuring equitable access to sanitation facilities and fostering sustainable behavior change initiatives.

2.8.1 Impact of Socio-Cultural Factors on Sanitation Uptake

The influence of socio-cultural factors on sanitation uptake can be observed through various case studies. For instance, in some Ghanaian communities, traditional beliefs and taboos surrounding human waste have been found to impede the use of modern sanitation facilities. A case study from the Greater Accra Region of Ghana revealed that cultural perceptions of cleanliness and pollution prevented many households from adopting pit latrines, as these were perceived to contaminate the living environment (Abraham *et al*., 2016). In contrast, a community-led sanitation initiative in the Upper East Region successfully integrated local cultural practices and involved traditional leaders, resulting in higher acceptance and usage rates of improved sanitation facilities (Ayamga, 2022).

Comparative analyses across different regions and communities in Ghana illustrate how socio-cultural factors vary and impact sanitation practices differently. In urban areas, the influence of modern education and exposure to diverse cultures tends to reduce the impact of traditional beliefs on sanitation behaviors. Equally, in rural settings, deeply ingrained cultural norms continue to dictate sanitation practices. For example, a comparative analysis between urban Accra and rural Eastern Region highlighted that urban residents were more likely to use and maintain sanitation facilities due to higher levels of education and exposure to sanitation campaigns, while rural residents adhered more strictly to

traditional practices, resulting in lower uptake of modern facilities (Appiah-Effah *et al*., 2024). These case studies and comparative analyses highlight the importance of understanding and addressing socio-cultural factors in sanitation initiatives. Tailoring sanitation interventions to align with local cultural contexts, involving community leaders, and addressing gender-specific barriers are essential strategies for enhancing the uptake and sustainability of sanitation facilities. By integrating cultural sensitivity into sanitation programs, stakeholders can effectively promote behavioral changes that lead to improved public health outcomes and overall community well-being. Understanding the complex interplay of socio-cultural factors ensures that sanitation interventions are not only technically sound but also socially acceptable and sustainable in the long term.

2.9 Research gap and the rationale of the study

Despite numerous interventions aimed at improving sanitation in low-income urban areas, there remains a significant gap in understanding the nuanced effectiveness of reward schemes and other innovative strategies in enhancing shared sanitation facilities. Existing research predominantly addresses broad sanitation challenges and general solutions, often overlooking the specific impacts of reward-based incentives on community behavior and facility maintenance. Additionally, there is a paucity of longitudinal studies examining the sustainability and long-term effectiveness of these reward schemes. This study aims to bridge these gaps by providing an in-depth analysis of the current quality of shared sanitation facilities in the Ga Central Municipal area and assessing the effectiveness of reward schemes in driving improvements. By filling these research gaps, this study seeks to offer a more detailed and practical understanding of how targeted incentives can catalyze behavior change and improve sanitation outcomes in low-income urban settings, thus contributing to better public health and overall well-being.

CHAPTER THREE: METHODOLOGY

3.1 Study area

Ga Central is one of the sixteen (16) Metropolitan/ Municipal/District Assemblies in the Greater Accra Region. Ga Central Municipal Assembly (GCMA) covers a total land area of about 48.997 square kilometers with a population of 332, 232 according to the 2021 Population and Housing Census. The Municipality shares boundaries with the Accra Metropolitan Assembly to the South, Ga West to the East and North, and Ga South Assembly to the west. There are about 52 communities in the municipality with a high population concentration mainly along the urban and peri-urban areas of the Municipality (GSS, Population and Housing Census, 2021). The study area included Ablekuma and Anyaa, which were selected due to their high population density, rapid urbanization, and challenges in managing shared facilities.

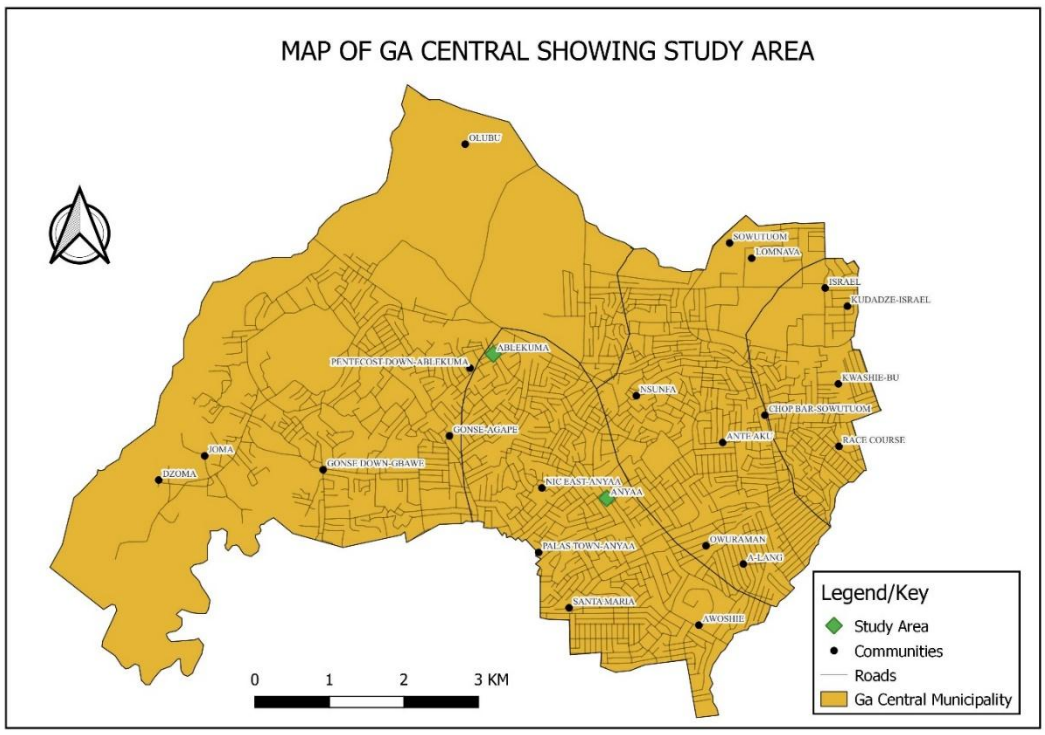

Figure 3.1: Map of Ga Central Municipal (GSS, Population and Housing Census, 2014)

3.2 Study design

A longitudinal study design was employed, which involved the utilization of both interviews and questionnaires. The study sought to investigate changes and trends in shared sanitation facilities and the impact of reward schemes over an extended period. By collecting data at multiple points in time, the longitudinal approach enabled a comprehensive examination of how the quality of shared sanitation facilities evolved over the course of the study. Both interviews and questionnaires were instrumental in gathering valuable informations from participants at different periods, providing a rich and in-depth understanding of the long-term effects of reward schemes on the cleanliness, maintenance, and hygiene of these facilities.

3.3 Development of the reward scheme

The reward scheme, consisting of essential items such as soap, toilet roll, and tissue paper, was distributed over the second and third visits preceding the data collection. 50 individuals, with 25 recipients selected from each community, received these items purposefully. The selection aimed to ensure equitable access and maximum impact across both communities. By addressing immediate sanitation needs and promoting hygienic practices, the scheme sought to motivate behavior change.

3.4 Sampling and sample size

For this longitudinal study, the sample size was determined using the formula

n = $\frac{N}{1+Ne^2}$. Where n represents the sample size, N is the known population size, and assumptions include a precision level (e) of 5%

Sample size calculation for Ablekuma, with population size as 49,635 (Ghana Statistical Service, 2021) = n = $\frac{49{,}635}{1+(49635)\times 0.05^2}$, n = 400

Sample size calculation for Anyaa, with a population size of 55,301 (Ghana Statistical Service, 2021) = n = $\frac{55,301}{1+(55,301)\times 0.05^2}$, n = 400

Therefore, out of the initial 800 planned samples, this percentage brought the sample size down to 350. Due to financial constraints, only 100 houses were selected for the study. To ensure a balanced approach, 50 houses were chosen for the reward scheme and 50 for the non-reward scheme. Consequently, 100 compounds with shared sanitation facilities were selected. This adjustment maintains the integrity of the study while accommodating the limited resources available.

3.5 Data Collection

The research employed a combination of methods for data collection. While questionnaires were utilized to capture demographic information and assess the conditions of toilet facilities, direct observation by the researcher played a crucial role. The observation approach was used to ensure accurate and detailed recording of specific characteristics and conditions of the facilities, which aligned with the study objectives. This method allowed the researcher to directly observe and note the type of toilet facility, its location, the number of households sharing the facility, the cleaning arrangements, and the cleaning frequency. Additionally, interviews were conducted with relevant environmental officers to gain insights into sanitation practices and the effectiveness of existing schemes. This comprehensive approach allowed for a thorough examination of various aspects related to sanitation, ensuring that the data collected was both robust and relevant to the study's goals. The combination of questionnaires, observations, and interviews provided a well-rounded perspective on the challenges and opportunities in maintaining shared sanitation facilities in low-income urban settlements.

3.6 Data Analysis

The data collected from both questionnaires and interviews underwent analysis using Excel. Utilizing frequencies and percentages, insights were derived from questionnaire responses, offering a comprehensive view of various sanitation practices and perceptions. Interview data were also examined, focusing on key factors raised by participants, including opinions, experiences, and challenges related to sanitation schemes. Percentages were calculated to quantify prevalence and opinions expressed. To compare the effectiveness of the reward and non-reward schemes, Analysis of Variance (ANOVA) was used. ANOVA helped in determining any statistically significant differences between the two groups. Results were presented in tables for clear visualization and interpretation, providing an accessible summary of the data for stakeholders and aiding in the formulation of targeted interventions.

3.7 Ethical consideration

Ethical considerations played a pivotal role in the execution of this research study. The protection of human subjects and the communities involved was of utmost importance. Following ethical guidelines, informed consent was obtained from all participants, and their privacy and confidentiality were strictly maintained. The research was conducted with full transparency and adherence to research ethics, ensuring that participants were well-informed about the purpose and procedures of the study. Research protocols reviewed and approved by Committee on Human Research Publication and Ethics, KNUST, **CHRPE/AP/908/23, administration permission** from the Ga Central Municipal Assembly Directorate and **Introductory letter** obtained from department of Public Health Education.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Demographic characteristics of respondents

The demographic analysis of respondents provides a comprehensive overview of the population involved in the study. The data indicate a significant gender disparity, with females comprising 70% of the respondents and males 30%. This gender distribution suggests that women are more actively engaged or available for participation in surveys related to sanitation practices. In terms of occupancy status, the majority of respondents were landladies (38%), followed by tenants (33%), landlords (20%), and caretakers (9%). This distribution highlights the diverse ownership and occupancy dynamics within the community, which may influence sanitation practices and responsibilities. The age distribution of respondents reveals a broad age range, with the highest representation in the 30-39 years category (24%), followed by 50-59 years (21%), 40-49 years (19%), and 20-29 years (16%).

The lower representation in the 60-69 years (15%) and 70-79 years (5%) categories suggests a predominantly younger to middle-aged population actively participating in sanitation-related activities. Educational attainment among respondents varies significantly. A substantial portion of the population has not completed secondary education, with 33% having some secondary education but not completing it, and 26% having only completed basic or primary education. Those with no formal education account for 13%, while 11% have completed basic or primary education. Respondents with tertiary education constitute 15%, indicating a smaller proportion of highly educated individuals within the community. Only 2% have completed secondary education.

Table 4.1: Demographic characteristics of participants

Demographic information	Frequency	Percentage (%)
Gender		
Male	30	30.0
Female	70	70.0
Occupancy status		
Landlord	20	20.0
Landlady	38	38.0
Tenant	33	33.0
Caretaker	9	9.0
Age		
20-29 years	16	16.0
30-39 years	24	24.0
40-49 years	19	19.0
50-59 years	21	21.0
60-69 years	15	15.0
70-79 years	5	5.0
Level of education		
No formal education	13	13.0
Basic/Primary (not completed)	26	26.0
Basic/Primary (completed)	11	11.0
Secondary education	2	2.0
Secondary education (not completed)	33	33.0
Tertiary education	15	15.0

Field survey 2024

4.2 Demographic analysis

The demographic analysis of the respondents in Table 2 provides valuable insights into their marital status, employment status, income levels, tenure status of the compound house, and duration of residence, shedding light on the socio-economic characteristics of the study participants. Regarding marital status, the majority of respondents were married (64.0%), followed by those who were widowed (18.0%). This distribution indicates a predominantly stable family structure among the respondents, with a significant proportion having experienced marriage or partnership.

In terms of employment status, the data shows a diverse range of occupations among respondents. The majority identified as self-employed (71.0%), indicating a reliance on entrepreneurial activities for income generation. Additionally, a notable portion reported formal employment (11.0%), while a smaller proportion identified as unemployed (16.0%). This diversity in employment status underscores the varied economic circumstances within the study population. Analysis of monthly income levels reveals further disparities among respondents. A significant portion reported monthly incomes below Ghc 500 (38.0%), highlighting financial constraints among a large segment of the population. On the contrary, a considerable proportion fell within the income range of Ghc 500-1000 (29.0%), indicating a moderate level of financial stability among some respondents.

Tenure status of the compound house is also varied among respondents, with the majority residing in properties shared between tenants and landlords (69.0%). This arrangement suggests a mix of rental and ownership structures within the study population, influencing factors such as property management and maintenance responsibilities. Regarding the duration of residence, a significant portion of respondents reported living in their current residence for 1-9 years (40.0%), followed by those who had resided for 10-19 years (34.0%). This indicates a relatively stable residential pattern among the respondents, with many having established long-term roots in their respective communities.

Table 4.2: Demographic characteristics

Demographic information	Frequency	Percentage (%)
Marital status		
Divorced/separated	3	3.0
Married	64	64.0
Single	15	15.0
Widowed	18	18.0
Employment status		
Casual worker	2	2.0
Formal employment	11	11.0
Unemployed	16	16.0
Self-employed	71	71.0
Monthly income (Gh)		
<500	38	38.0
500-1000	29	29.0
1001-1500	19	19.0
<1500	14	14.0
Tenure status of compound house		
Tenants and landlord	69	69.0
Tenants only	26	26.0
Tenants with caretakers	5	5.0
Years in the house		
Less than a year	4	4.0
1-9 years	40	40.0
10-19 years	34	34.0
20-29 years	17	17.0
30-39 years	5	5.0

Field survey 2024

4.2.1 Analysis of the existing arrangement for cleaning and maintaining sanitation facilities

The analysis of existing arrangements for cleaning and maintaining sanitation facilities in Table 3 reveals a varied range of sanitation arrangements among the respondents. The most prevalent type is the pour-flush toilet to a pit latrine, representing 30% of the facilities, indicating its popularity due to affordability and ease of installation. Additionally, traditional pit latrines with concrete slabs and ventilated improved pits are common choices, each comprising 18% and 15% of the facilities, respectively. Compositing toilets and pour-flush toilets to aseptic tanks are less prevalent, each representing 12% and 25% of the facilities, respectively. In terms of location, an overwhelming majority (97%) of toilet facilities are within the compound, ensuring convenient access for household members. This arrangement is favorable for maintaining privacy and reducing contamination risks compared to facilities located outside the compound, which account for only 3% of the total.

The data also reveals variations in the number of households sharing toilet facilities. The majority (55%) of facilities are shared by 1-4 households, indicating relatively manageable usage and maintenance. However, a significant portion (38%) of facilities is shared by 5-9 households, suggesting higher demand and potential pressure on the sanitation infrastructure. Smaller proportions of facilities are shared by 10-14 households (5%) or more than 15 households (2%), reflecting diverse household arrangements and corresponding sanitation needs. Regarding cleaning arrangements, the majority of facilities (85%) are cleaned by women only, highlighting the gendered division of labor in household sanitation tasks. This finding emphasizes the importance of considering gender dynamics in sanitation interventions to ensure equitable participation and distribution of

responsibilities among household members. Also, the data indicates variations in cleaning frequency for toilet facilities. Weekly cleaning is most common (59%), followed by daily cleaning (26%), suggesting a regular maintenance schedule contributing to hygiene and sanitation standards within households. However, smaller proportions of facilities are cleaned every other day (6%) or twice per week (9%), indicating differing practices and preferences among respondents.

Table 4.3: Existing arrangement for cleaning and maintaining sanitation facilities

Maintenance of sanitation facilities	Frequency	Percentage (%)
Type of toilet facility		
Compositing toilet	12	12.0
Ventilated improved pit	15	15.0
Pour-flush toilet to pit latrine	30	30.0
Pour-flush toilet to aseptic tank	25	25.0
Traditional pit latrine with concrete slab	18	18.0
Location of toilet		
Outside compound	3	3.0
Within compound	97	97.0
Number of households sharing the facility		
1–4	55	55.0
5–9	38	38.0
10–14	5	5.0
More than 15	2	2.0
Cleaning arrangement		
All tenants	12	12.0
All tenants and landlord	2	2.0
Specific tenants	1	1.0
Women only	85	85.0
Cleaning frequency		
Daily	26	26.0
Every other day	6	6.0
Twice per week	9	9.0
Weekly	59	59.0

Field survey 2024

I: Examination of shared sanitation facility quality in low-income settlements

The results in Table 4.4 represents the cleanliness levels of shared sanitation facilities over three consecutive days, categorized into four groups: **Clean, Very Clean, Dirty, and Very Dirty**. The results show that 48-59% of the facilities were classified as **clean**, with 15-17% rated as "clean" and 48-59% as "very clean." However, 27-28% were **dirty**, with 6-8% rated as "dirty" and 20-28% as "very dirty." These findings highlight the need for improved sanitation management in these areas.

Table 4.1: Examination of shared sanitation facility quality in low-income settlements

Rankings of cleanliness	Freq of Cleanliness 1	%	Freq of Cleanliness 2	%	Freq. of Cleanliness 3	%
Clean	17	17	15	15	15	15
Very clean	48	48	50	50	59	59
Dirty	7	7	8	8	6	6
Very dirty	28	28	27	27	20	20
Grand Total	**100**	**100**	**100**	**100**	**100**	**100**

Field survey 2024

II: Development and testing of reward scheme

The study aims to evaluate the effectiveness of a reward scheme by examining its impact on various sanitation. Specifically, it will assess the presence of visible fecal matter, flies, noticeable odor, visible toilet/saliva on the floor, and maggots in the facility. These indicators serve as representations for indicators of overall sanitation conditions and will be analyzed to determine the extent to which the reward scheme influences cleanliness and hygiene in the target area.

III: Presence of visible fecal matter

The analysis based on the provided data and p-values reveals insights into the presence of visible fecal matter on the slab under reward/incentive conditions compared to no reward/incentives. On Day 1, 60% of those with rewards and 72% without rewards showed visible fecal matter, with a p-value of 0.209, indicating no significant difference. Day 2 results showed 52% with rewards and 68% without rewards, yielding a p-value of 0.105, again indicating no significant difference. However, on Day 3, a substantial difference was noted: 20% with rewards versus 76% without rewards, with a highly significant p-value of 0.000. This suggests that the reward/incentive scheme significantly reduces the presence of visible fecal matter on the slab over time. The standard errors and 95% confidence intervals further support these findings, demonstrating the effectiveness of reward/incentive schemes in improving sanitation conditions.

Table 4.2: Presence of visible fecal matter

Rank	Reward/Incentives		No reward/incentives		SE	95% CI	P-value
	Yes	No	Yes	No			
Presence of visible fecal matter on the slab. Day 1	30 (60%)	20 (40%)	36 (72%)	14 (28%)			**0.209**
Presence of visible fecal matter on the slab. Day 2	26 (52%)	24 (48%)	34 (68%)	16 (32%)			**0.105**
Presence of visible fecal matter on the slab Day 3	10 (20%)	40 (80%)	38 (76%)	12 (24%)			**0.000**

Field survey 2024

Iv: Flies on the facility

The analysis of the presence of flies in the facility under reward/incentive conditions compared to no reward/incentives reveals significant insights. For Observation 1, 40% of those without rewards and 28% with rewards reported the presence of flies, with a p-value of 0.139, indicating no significant difference. Observation 2 showed 48% without rewards and 30% with rewards, yielding a p-value of 0.040, suggesting a statistically significant reduction in the presence of flies when rewards are provided. Observation 3 demonstrated a dramatic difference: 32% without rewards versus 8% with rewards, with a highly significant p-value of 0.002.

Table 4.3: Flies on the facility

	Rank	Presence of flies on the facility. Observation 1	Presence of flies on the facility. Observation 2	Presence of flies on the facility. Observation 3
No Reward/Incentives	Yes	20 (40%)	24 (48%)	16 (32%)
	No	30 (60%)	30 (52%)	34 (68%)
Reward/Incentives	Yes	14 (28%)	15 (30%)	4 (8%)
	No	36 (72%)	35 (70%)	46 (92%)
Sig. (P-value)		**0.139**	**0.040**	**.002**

Field survey 2024

V: Noticeable odor on the facility

The analysis of the presence of noticeable odor on the facility under reward/incentive conditions compared to no reward/incentives presents the following findings. In Observation 1, 46% of those without rewards and 40% with rewards reported noticeable odor, with a p-value of 0.549, indicating no significant difference. For Observation 2, the

presence of odor was reported by 72% of those without rewards and 28% with rewards, resulting in a highly significant p-value of 0.000. Similarly, in Observation 3, 76% of those without rewards and 24% with rewards reported noticeable odor, also yielding a highly significant p-value of 0.000.

Table 4.4: Noticeable odor on the facility

	Rank	The presence of a noticeable odor in the facility Observation 1	The presence of a noticeable odor in the facility Observation 2	The presence of a noticeable odor on the facility Observation 3
No Reward/Incentives	Yes	23 (46%)	36 (72%)	38 (76%)
	No	27 (54%)	14 (28%)	12 (24%)
Reward/Incentives	Yes	20 (40%)	14 (28%)	12 (24%)
	No	30 (60%)	36 (72)	38 (76%)
Sig. (P-value)		**0.549**	**0.000**	**0.000**

Field survey 2024

Vi: Visible urine/saliva on the floor

The analysis of the presence of visible urine or saliva under reward/incentive conditions compared to no reward/incentives provides insightful results. In Observation 1, 30% of those without rewards and 18% with rewards reported visible urine or saliva, with a p-value of 0.163, indicating no significant difference. For Observation 2, the presence was reported by 34% of those without rewards and 14% with rewards, resulting in a significant p-value of 0.038. In Observation 3, 38% of those without rewards and 6% with rewards reported visible urine or saliva, with a highly significant p-value of 0.000. These findings suggest that the reward/incentive scheme significantly reduces the presence of visible urine or saliva, particularly as time progresses.

Table 4.5: Visible urine/saliva on the floor

	Rank	Presence of visible urine/saliva. Observation 1	Presence of visible urine/saliva Observation 2	Presence of visible urine/saliva Observation 3
No Reward/Incentives	Yes	15 (30%)	17 (34%)	19 (38%)
	No	35 (70%)	33 (66%)	31 (62%)
Reward/Incentives	Yes	9 (18%)	7 (14%)	3 (6%)
	No	41 (82%)	43 (86%)	47 (94%)
Sig. (P-value)		**0.163**	**0.038**	**0.000**

Field survey 2024

Vii: Maggots on the facility

The analysis of the presence of maggots in sanitation facilities under reward/incentive conditions compared to no reward/incentives reveals notable findings. In Observation 1, 34% of those without rewards and 20% with rewards reported maggots, with a p-value of 0.117, indicating no significant difference. For Observation 2, the presence was reported by 36% of those without rewards and 18% with rewards, resulting in a significant p-value of 0.043. In Observation 3, 40% of those without rewards and 16% with rewards reported maggots, with a highly significant p-value of 0.007.

Table 4.6: Maggots on the facility

	Rank	Presence of maggots in the facility observation 1	Presence of maggots in the facility observation 2	Presence of maggots in the facility observation 3
No Reward/Incentives	Yes	17 (34%)	18 (36%)	20 (40%)
	No	33 (66%)	32 (64%)	30 (60%)
Reward/Incentives	Yes	10 (20%)	9 (18%)	8 (16%)
	No	40 (80%)	41 (82%)	42 (84%)
Sig. (P-value)		**0.117**	**0.043**	**0.007**

Field survey 2024

Viii: Comparative analysis of the effectiveness of existing arrangements for cleaning and maintaining the facilities

The assessment of toilet facilities focused on privacy, security, and accessibility to determine effectiveness. This analysis aimed to evaluate existing arrangements for cleaning and maintenance to ensure optimal hygiene standards.

Privacy

The analysis of the frequency of privacy criteria fulfillment in sanitation facilities is presented as follows. Among the respondents, only 1% indicated that none of the privacy criteria were fulfilled. For those indicating that one criterion was fulfilled, the frequency was 13%. Four percent of respondents reported that two criteria were fulfilled. Eight percent indicated that three criteria were fulfilled. Fifteen percent of respondents reported that four criteria were fulfilled. The majority, 59%, indicated that all privacy criteria were fulfilled, making up the largest portion of the sample. This distribution highlights that while some facilities meet only a few privacy criteria, a significant proportion of the facilities fully meet all privacy criteria, indicating varying levels of privacy satisfaction among the respondents.

Table 4.7: Privacy

Rank	Freq. of Privacy
0 – None of the criteria fulfilled	1
1 – One criterion fulfilled	13
2 – Two criteria fulfilled	4
3 - Three criteria fulfilled	8
4 - Four criteria fulfilled	15
5 - All criteria fulfilled	59
Grand Total	**100**

Field survey 2024

Accessibility: The analysis of the frequency of accessibility criteria fulfillment for sanitation facilities is presented as follows. Among the respondents, 18% indicated that the toilet is not accessible at all times. Fourteen percent of the respondents reported that people have access to the toilet but it is not accessible at all times. The majority, 68%, indicated that everyone has access to the toilet and it is accessible at all times. This distribution highlights that while some facilities have limited accessibility, a significant proportion of the facilities are fully accessible to all individuals at all times, indicating varying levels of accessibility satisfaction among the respondents.

Table 4.12: Accessibility

Rank	Frequency of accessibility
0 – The toilet is not accessible at all times	18
1 – People have access to the toilet but not accessible at all times	14
2 – Everyone has access to the toilet and the toilet is accessible at all times	68
Grand Total	**100**

Field survey 2024

Safety: The analysis of the frequency of safety criteria fulfillment for sanitation facilities reveals the following distribution among respondents. 8% reported that none of the safety criteria were fulfilled. 38% indicated that only one safety criterion was fulfilled. 53% of the respondents noted that two safety criteria were met, while only 1% indicated that all safety criteria were fulfilled. This distribution suggests that while some safety measures are in place in most facilities, there is a significant need for improvement to ensure comprehensive safety across all sanitation facilities.

Table 4.13: Safety

Rank	Frequency of Safety
0 – None of the criteria fulfilled	8
1 – One criterion fulfilled	38
2 – Two criteria fulfilled	53
3 - All criteria fulfilled	1
Grand Total	**100**

Field survey 2024

4.2.2 Results from Key Information Interviews

The interview results provided valuable insights into the sanitation status and challenges in various municipalities. The ranks and experience levels of the respondents varied, with Principal Environmental Health Assistants having 11-12 years of experience, Environmental Health Officers typically having 3 years of experience, Environmental Health Analysts with 11 years of experience, Chief Environmental Health Assistants ranging from 17-26 years of experience, and Senior Environmental Health Assistants with 7 years of experience.

The sanitation status in the municipalities was mostly rated as "Fair" by the respondents. In terms of toilet availability, a majority indicated that 88% of houses had toilets while 12% did not. The open defecation rate was generally low, with percentages around 1-2%. The number of sanitary prosecutions varied significantly, ranging from 3 to 11 prosecutions. None of the respondents had tried the reward scheme approach, primarily due to a lack of resources. However, they believed that the reward scheme could be effective, although there were concerns about its sustainability given the limited resources available. Efforts to improve sanitation included frequent mentions of premises inspection

and law enforcement, health education and enforcement, and the GAMA Project. The GAMA Project was particularly cited as a major successful initiative, helping households gain access to toilet facilities by subsidizing costs. Challenges with shared toilet facilities were also highlighted, with poor maintenance, inadequate privacy, insanitary conditions, and discomfort being commonly noted issues. The GAMA Project emerged as a repeated success story, having provided toilets to over 2,000 households, with beneficiaries paying only 30% of the cost, which significantly encouraged uptake.

4.3 Discussion of the Findings

4.3.1 The existing arrangement for cleaning and maintaining sanitation facilities

The analysis of the existing arrangements for cleaning and maintaining sanitation facilities in low-income urban settlements revealed a diverse range of sanitation practices. The findings from this study align with previous literature, which emphasizes the challenges and variations in shared sanitation management. The results indicate that the most common sanitation facilities in the study area were pour-flush toilets to pit latrines (30%), followed by traditional pit latrines with concrete slabs (18%) and ventilated improved pits (15%). These findings are consistent with studies by Chiliboyi (2016) and Simiyu *et al*. (2020), which highlight the preference for these types of facilities due to their affordability and simplicity of installation (Chiliboyi, 2016; Simiyu *et al*., 2020).

Moreover, the study found that 97% of toilet facilities were located within the compound, ensuring convenient access. This finding aligns with Mazeau (2013), who emphasizes that locating sanitation facilities within the compound improves privacy and reduces open defecation rates (Mazeau *et al*., 2013). However, the small proportion of facilities located outside the compound (3%) highlights the need for targeted interventions to improve

sanitation infrastructure in such areas. One of the key challenges identified in this study is the issue of shared sanitation, where 55% of facilities are shared by 1-4 households, while 38% are shared by 5-9 households. This aligns with Isunju *et al*. (2011) and Simiyu *et al*. (2017), who note that higher numbers of users per facility can lead to maintenance issues, increased contamination, and hygiene concerns. The "tragedy of the commons" phenomenon applies here, as individuals benefit from the facility but often take little responsibility for its maintenance, leading to neglect (Isunju *et al*., 2011). The study revealed that 85% of sanitation facilities were cleaned by women only, underscoring the gendered division of labor in household sanitation. This finding is consistent with Chaplin (2017) and Simiyu *et al*. (2020), who report that women disproportionately bear the burden of maintaining sanitation facilities in low-income settlements.

This reinforces traditional gender roles and highlights the need for gender-sensitive sanitation interventions (Chaplin, 2017). Cleaning frequency varied among households, with 59% of facilities cleaned weekly, 26% daily, and smaller proportions cleaned every other day (6%) or twice per week (9%). While weekly cleaning was the most common, the results suggest the need for improved regular maintenance to uphold hygiene standards and prevent sanitation-related illnesses. Jenkins and Scott (2007) emphasize the importance of regular maintenance and suggest that behavior change interventions can encourage households to adopt more consistent cleaning routines (Jenkins and Scott, 2007). The study's findings point to several opportunities for improving sanitation practices. Implementing structured cleaning schedules has been shown to enhance maintenance efforts, as demonstrated in studies by Simiyu *et al*. (2021) and Jenkins and Scott (2007). Additionally, collective discussions among compound members, the involvement of landlords in enforcing sanitation rules, and active monitoring have proven

effective in other contexts, such as Kisumu, Kenya (Simiyu *et al*., 2021; Jenkins & Scott, 2007). Behavior changes interventions guided by the Behavior Change Wheel (BCW) approach could further promote improved sanitation behaviors. Strategies such as incentivization, education, and community participation have been successful in Uganda and Bangladesh (Tidwell *et al*., 2019). Moreover, ensuring that landlords provide adequate sanitation resources, such as water and cleaning materials, can help sustain long-term improvements in sanitation conditions (Meili *et al*., 2022).

4.3.2 Examination of shared sanitation facility quality in low-income settlements

The results from Table 4.4 indicate that between 48% and 59% of sanitation facilities were classified as clean, while 27% and 28% were categorized as dirty. This aligns with findings from Tumwebaze *et al*. (2013), which highlight the variability in shared sanitation cleanliness due to inconsistent maintenance and usage patterns (Tumwebaze *et al*., 2013). The decline in facilities classified as "very clean" over the three days mirrors observations in Simiyu *et al*. (2017), who noted that shared sanitation facilities deteriorate quickly in the absence of structured cleaning routines and monitoring mechanisms.

The consistent percentage of unclean facilities (27-28%) suggests persistent challenges in sanitation management. Studies highlight that inadequate sanitation contributes to the spread of diseases, reinforcing the need for regular facility maintenance (Bloomfield *et al*., 2016, Aiello *et al*., 2008, Prüss-Üstün *et al*., 2016). The World Health Organization (WHO, 2019) stresses that a lack of sanitation infrastructure, combined with poor management, leads to environmental contamination and public health risks, particularly in low-income settings.

These findings also support the notion that community-led sanitation programs and regulatory interventions can enhance sanitation outcomes. For instance, Aiello *et al*. (2008) found that regular hygiene promotion and structured cleaning schedules improve sanitation practices. Similarly, Tidwell *et al*. (2019) suggest that incentive-based programs can help sustain cleaning efforts and ensure long-term facility maintenance.

4.3.3 Development and testing of the effectiveness of the reward scheme

Numerous studies have shown how effective reward systems are at enhancing the cleanliness of shared restrooms, which lends credence to the results of this investigation. The notable decrease in flies, odor, urine/saliva, visible fecal matter, and maggots in reward scheme facilities is consistent with earlier studies that highlight the importance of incentives in encouraging hygienic practices (Tidwell *et al*., 2019). These findings imply that offering incentives for keeping a clean environment can be a potent motivator, highlighting the significance of behavioral interventions in sanitation management. Studies on community-led sanitation interventions have shown improvements in cleanliness indicators over time, which is consistent with these findings.

Consider Simiyu *et al*. (2017), who emphasized that systematic sanitation programs incorporating both monetary and non-monetary rewards result in long-term enhancements in facility care. The reward scheme's significant decrease in odor and visible fecal matter by Day 3 is consistent with findings from sanitation behavior studies that found that positive reinforcement improved maintenance habits (Jenkins and Scott 2007). Additionally, the argument that regular cleaning and maintenance efforts disrupt disease vector breeding environments is supported by the notable decrease in the presence of flies and maggots in reward scheme facilities. This result is consistent with that of Bloomfield

et al. (2016), who emphasize that by reducing the conditions that encourage vector proliferation, good sanitation lowers the spread of pathogens. As stressed by Prüss-Üstün *et al*., the decrease in the presence of urine and saliva further emphasizes the significance of regular hygiene practices. (2016), who link improper sanitation to a higher risk of illness. This study shows that the reward system is effective in improving sanitation outcomes, but it also shows that facilities that were not part of the reward system continued to have poor maintenance. Research investigating the limitations of voluntary sanitation initiatives without enforcement mechanisms has reported similar findings (Tumwebaze *et al*., 2013). Without rewards, facility patrons might not be motivated to keep themselves clean, which could result in declining levels of cleanliness. This is consistent with research showing that to promote long-term behavior change, sustained interventions that combine community education and incentives are necessary (Aiello *et al*. 2008).

4.3.4 Comparative analysis of the effectiveness of existing arrangements for cleaning and maintaining the facilities

A comparative analysis of existing arrangements for cleaning and maintaining shared sanitation facilities in low-income settlements highlights key disparities in privacy, accessibility, and safety. The study reveals that while a significant proportion of households (59%) reported satisfactory privacy provisions, 13% had minimal privacy features, indicating the need for targeted interventions (Hutton *et al*., 2016). Privacy is a critical factor influencing sanitation uptake, as inadequate privacy can discourage facility use, particularly among women and girls (Winter *et al*., 2019). Accessibility remains a pressing challenge, with 68% of respondents reporting unrestricted access to sanitation facilities, while 18% faced limitations. These findings align with Tumwebaze *et al*. (2012), who argue that restricted access to shared sanitation facilities often leads to unhygienic

alternatives such as open defecation. Ensuring equitable access requires infrastructural investments and policy enforcement to reduce barriers to facility use (Mara *et al*., 2010). Safety assessments further demonstrate structural concerns in shared sanitation facilities. While 53% of the facilities exhibited satisfactory structural integrity, 38% had minor issues such as cracks, and 8% showed significant safety risks, including roof damage. These findings are consistent with Fink *et al*. (2011), who highlight that poor facility conditions contribute to sanitation-related health risks and discourage consistent use. Regular maintenance and community involvement in sanitation governance are crucial for sustaining safe and functional facilities (Giné-Garriga *et al*., 2017).

These findings illustrate the complex sanitation challenges in low-income settings, reinforcing the need for comprehensive interventions that address privacy, accessibility, and safety concerns. Multi-stakeholder collaboration, involving local governments, landlords, and community members, can enhance facility management and improve sanitation outcomes (Evans *et al*., 2017). Future sanitation initiatives should integrate participatory approaches to ensure sustainability and user compliance, as recommended in global sanitation frameworks (WHO, 2019).

4.3.4 Insights from Key Personnel Interviews

The key informant interviews provided critical insights into the sanitation status and challenges across various municipalities. Respondents ranged from Principal Environmental Health Assistants with 11-12 years of experience to Chief Environmental Health Assistants with 17-26 years of experience, demonstrating a broad spectrum of expertise. The sanitation status was predominantly rated as "Fair." A significant majority (88%) reported that houses had toilets, while 12% did not. The open defecation rate was

generally low, around 1-2%, aligning with findings from similar studies emphasizing the need for adequate sanitation facilities to reduce open defecation (Jenkins *et al*., 2014). The number of sanitary prosecutions varied widely, from 3 to 11, highlighting inconsistencies in enforcement. None of the respondents had implemented the reward scheme approach due to resource constraints, yet they believed in its potential effectiveness. This aligns with evidence suggesting that incentives can enhance sanitation behaviors, though sustainability remains a concern (Whittington *et al*., 2012). Efforts to improve sanitation included frequent premises inspections, law enforcement, health education, and enforcement initiatives. The GAMA Project, in particular, was repeatedly cited as a successful initiative, providing over 2,000 households with subsidized toilet facilities, a strategy shown to significantly increase sanitation uptake (Hutton *et al*., 2015).

Challenges with shared toilet facilities were prevalent, including poor maintenance, lack of privacy, insanitary conditions, and discomfort. These issues underscore the need for ongoing maintenance and community engagement to improve sanitation infrastructure (Tumwebaze *et al*., 2013). Overall, these insights highlight both the progress made and the persistent challenges in achieving comprehensive sanitation improvements. The success of the GAMA Project illustrates the impact of targeted interventions, while the variability in prosecution and maintenance practices points to areas needing further attention.

4.4 Summary of the findings

The first objective examined the quality of shared sanitation facilities in low-income settlements. Findings revealed varying levels of cleanliness, with a significant proportion of facilities classified as clean or very clean. However, a decline in cleanliness over time highlighted the need for consistent upkeep and improved maintenance strategies. These

results align with existing literature emphasizing the role of regular cleaning and sanitation interventions in sustaining hygiene standards. The second objective focused on the development and testing of a reward scheme to improve sanitation facility maintenance. The findings demonstrated that reward-based interventions significantly enhanced cleanliness, with facilities under the reward scheme showing substantial reductions in fecal matter, flies, odor, urine/saliva, and maggots over time. These results support prior studies indicating that incentives play a crucial role in encouraging hygiene behavior and proper facility maintenance. The third objective involved a comparative analysis of existing arrangements for cleaning and maintaining shared sanitation facilities.

The study highlighted disparities in privacy, accessibility, and safety, with some facilities lacking essential features for proper sanitation. These findings align with previous research, emphasizing the importance of targeted interventions to address privacy concerns, improve infrastructure, and ensure equitable access to sanitation services in low-income communities. The fourth objective assessed the effectiveness of current sanitation management interventions and proposed strategies for improvement. The study found that while some initiatives, such as reward schemes, had a positive impact, persistent challenges like limited access to resources and inadequate enforcement hindered sustainability. Literature supports the need for integrated approaches combining behavioral change interventions, community engagement, and policy enforcement to achieve long-term sanitation improvements in low-income settlements.

4.4.1 Limitations of the Study

This study has several limitations. The relatively small sample size of 100 participants may limit the generalizability of the findings to the broader population. The study employed a

cross-sectional design, which captures data at a single point in time, thereby restricting the ability to establish causal relationships between variables. Additionally, reliance on self-reported data introduces the risk of response biases, including social desirability bias, where participants may provide answers they perceive as favorable rather than entirely accurate. The study was conducted exclusively in Ga Central (Anyaa and Ablekuma), which may limit the applicability of the findings to other regions with different socio-economic and environmental conditions. The absence of longitudinal data prevents an assessment of the long-term effects of sanitation interventions. Furthermore, resource constraints and limited access to some communities may have restricted the scope of data collection. Despite these limitations, the study provides valuable insights into shared sanitation practices and challenges. Future research should consider larger, more diverse samples, adopt longitudinal designs to track sanitation improvements over time, and explore additional factors influencing sanitation behaviors and facility maintenance.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The assessment of existing arrangements for cleaning and maintaining sanitation facilities revealed a reliance on pour-flush toilets and shared sanitation practices. However, challenges such as shared facility use and gendered cleaning responsibilities indicate the need for targeted interventions to ensure equitable and sustainable sanitation management. The examination of sanitation facility quality highlighted satisfactory cleanliness levels but revealed a decline over time. This underscores the importance of reinforcing hygiene promotion and maintenance programs to sustain sanitation improvements and prevent hygiene deterioration.

The development and testing of a reward scheme demonstrated its effectiveness in improving sanitation facility cleanliness. The study confirmed that incentives play a critical role in motivating consistent maintenance behaviors and supporting their integration into future sanitation interventions. The comparative analysis of sanitation arrangements identified disparities in privacy, accessibility, and safety. Sustainable solutions should integrate community participation, behavioral change strategies, and policy support for long-term impact.

5.2 Recommendations

Based on the findings of the study, it is recommended that:

Government

- The Ministry of Sanitation and Water Resources, in collaboration with local government authorities and hygiene-focused NGOs, should implement targeted awareness programs to educate households on proper maintenance practices for shared

sanitation facilities. These programs should emphasize regular cleaning schedules, efficient waste disposal, and basic repairs to ensure the longevity of sanitation infrastructure.

- The Greater Accra Metropolitan Area (GAMA) Project should expand its subsidized toilet provision in Ga Central municipalities. The initiative has successfully provided over 2,000 households with improved toilet facilities, but efforts should be made to reach underserved communities to enhance sanitation coverage.
- The Ministry of Gender, Children, and Social Protection should develop gender-sensitive sanitation interventions to address the unequal burden of sanitation tasks on women. This should include training programs and support mechanisms to encourage equitable participation and responsibility sharing among household members.
- Local government authorities, supported by community-based organizations (CBOs) and NGOs, should establish community-led sanitation monitoring and management systems. These participatory approaches can empower residents to take ownership of sanitation initiatives, mobilize resources, and ensure accountability for facility upkeep.

Housing

Households should take full responsibility for maintaining the cleanliness of their latrine facilities. To sustain this practice, households should prioritize setting aside cleaning materials and establish a routine for proper maintenance. Additionally, fostering a sense of ownership and responsibility within the community will encourage long-term commitment to sanitation and hygiene.

NGOs

The Ghana Health Service, in partnership with international development agencies and private sector stakeholders, should scale up reward schemes and incentive programs for shared sanitation users. Offering hygiene kits, essential cleaning supplies, or subsidized sanitation products can encourage adherence to hygiene practices and promote facility cleanliness.

5.3 Future Research Directions

To build upon the insights gained from this study and address remaining gaps in knowledge, future research endeavours could focus on the following areas:

1. Research should be conducted to undertake longitudinal studies aimed at evaluating the long-term effectiveness and sustainability of sanitation interventions. These studies should focus on monitoring behavioural changes, infrastructure maintenance, and hygiene practices over extended periods to comprehensively assess the enduring impact of intervention programs.
2. Future research endeavours should explore the integration of technological innovations, such as sensor-based monitoring systems, smart toilets, or mobile applications, for enhanced sanitation management. Investigations into the feasibility and effectiveness of these innovations in improving sanitation service delivery, fostering behavior change, and enhancing hygiene outcomes in low-income settlements are necessary to inform future interventions.
3. There is a need for research to analyze the policy and governance frameworks governing sanitation service delivery across different levels - local, national, and international. Such studies should aim to identify policy gaps, institutional barriers, and regulatory challenges that impede equitable access to sanitation facilities.

Moreover, recommendations for policy reforms and interventions to address these challenges effectively should be proposed based on the findings.

4. Future research should conduct comparative studies across diverse cultural contexts and geographical settings to explore the cultural determinants of sanitation practices. By comparing sanitation behaviours, preferences, and challenges across different socio-cultural contexts, these studies can provide valuable insights into the development of context-specific interventions tailored to local realities.

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