UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE

ASSESSING SANITATION MANAGEMENT AND ITS IMPLICATIONS ON HEALTH IN THE BAWKU MUNICIPALITY, GHANA

HADIZATU ABAGREY SEIDU

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THESIS SUBMITTED TO THE DEPARTMENT OF PUBLIC HEALTH, SCHOOL OF ALLIED HEALTH SCIENCES, UNIVERSITY FOR DEVELOPMENT STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHILOSOPHY (M.Phil) DEGREE IN COMMUNITY HEALTH AND DEVELOPMENT

JANUARY, 2018

DECLARATION

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature: ……..... Date:……

Name:……

Supervisor

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University for Development Studies.

Supervisor's Signature: …… Date: ……

Name of Supervisor: ……

DEDICATION

I dedicate this thesis to my family and friends.

ABSTRACT

The sanitation situation in the Bawku municipality is not different from that of other parts of Ghana. Most houses in the high density areas lack toilet facilities and drains. This study was conducted to evaluate sanitation management and its implications on health in the Bawku Municipality, Ghana. The study employed an analytical cross sectional study design using questionnaire to collect data. The study applied multi-stage sampling techniques to select participating households and respondents. In all, 396 study participants were selected to take part in the study. Findings from the study showed that, only two communities (Daduri and SagaboGari) within the study setting, had households with the highest number of toilets facilities representing (42.8%). It was also showed that, 71.5% of the households in Mognori had drainage system while no house had a drainage system in Helbuko. Findings from the study showed that, majority of the study participants (73%) cited that children defecate around the houses while participants (89%) mentioned that, they disposed off their liquid waste in the open space. It was further revealed that, majority of the study participants representing 76.5% said they did not have toilets in their houses because they did not include it in their building plans. More so, from the results, there was a statistical association between respondents' occupational status and knowledge of the factors that accounted for the poor state of the sanitation issue ($p<0.001$). From the results, majority (56.5%) of the study participants cited diarrhoea as the commonest diseases children mostly experience whilst 25% cited cholera. The knowledge of respondents on poor sanitation was adequate. The study recommended more health education on the need to keep good sanitation at the study place to improve people health.

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

BMA	Bawku Municipal Assembly
CWSA	Community Water and Sanitation Agency
DESF	District Environmental Sanitation Fund
EPA	Environmental Protection Agency
GSS	Ghana Statistical Service
HBM	Health Belief Model
KMA	Kumasi Metropolitan Assembly
KVIPs	Kumasi Ventilated Improved Pits
MEST	Ministry of Environment, Science and Technology
MLGRD	Ministry of Local Government and Rural Development
NESPOCC	National Environmental Sanitation Policy Coordinating Council
NGOs	Nongovernmental Organizations
SDGs	Sustainable Development Goals
UNICEF	United Nation Emergency Fund
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Adequate sanitation, together with good hygiene and safe water, are fundamental to good health and to social and economic development (WHO, 2010). Traditionally, sanitation has been regarded as a centrally provided service with little role for the creativity or energy of business in developing countries (Adubofour et al. 2013).

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces (Al-Shaar, 2010). Sanitation also refers to the maintenance of hygienic conditions, through services such as garbage collection and waste water disposal (Crous et al. 2013; Fuentes, 2012)

Sanitation management is considered as the interplay among generation, storage, collection and safe disposal of waste in a proper manner (Fink, 2010; Mcfarlane et al. 2014). Safe disposal implies not only that people must excrete hygienically but also that their excreta must be contained or treated to avoid adversely affecting their health or that of other people (Joshi et al. 2011; Mantell, 2012).

Sanitation management comprises a number of complementary activities, including the provision and maintenance of sanitary facilities, the provision of services, public education, community and individual action, regulation and legislation supported by clearly mandated institutions, adequate funding and research and development (Mundia, 2013). Good environmental sanitation is aimed at developing and maintaining a clean, safe and pleasant physical and natural environment in all human settlements, to promote

the socio-cultural, economic and physical well-being of all sections of the population (Mensah, 2012; O'neill, 2015).

Inadequate sanitation is a major cause of disease world-wide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities (Tukahirwa, Mol and Oosterveer, 2013).

Globally, about 2.4 million deaths (4.2% of all deaths) could be prevented annually if everyone practiced appropriate hygiene and had good, reliable sanitation and drinking water (UNEP, 2010). These deaths are mostly of children in developing countries from diarrhea and subsequent malnutrition, and from other diseases attributable to poor sanitation (Owen et al. 2013; Taing et al. 2013)

According to a UNICEF and WHO joint monitoring team report (2015), there were about 2.4 billion people globally that lack access to basic sanitation services such as toilets and latrines including 946 million people defecating in the open and about 1.8 billion people globally, used a source of drinking water that is fecally contaminated. There were about 2.2 million annual deaths (mostly children under the age of 5 years) caused mainly by poor hygienic conditions and sanitation-related diseases such as cholera, hepatitis, typhoid and diarrhea.

Despite many decades of development planning and assistance much of the rural and urban populations in most developing countries have low sanitation coverage (Velleman and Pugh, 2013). One dimension of low sanitation coverage is low level of solid waste management. Solid waste has been a major issue in all nations especially in developing countries (Strauss et al. 2010). In many African cities, only 10 to 30 percent of urban

households solid wastes are collected and services are inevitably most deficient for all settlements (William, 2010; Yap, 2010).

In Ghana, 16 million people used unsanitary or shared latrines (Ali, 2010). About 4.8 million have no latrines at all and defecate in the open (Ahmed et al. 2012). Enormous amount of plastic waste is generated throughout the world and the most crucially posed question is how to manage this waste effectively and efficiently to save the environment and the continuous existence of mankind (Ahmed et al. 2012; Ali, 2010).

Unfortunately, the properties of plastic that make it so valuable also make its disposal problematic. In many cases plastics are thrown away after one use, especially packaging and sheeting, but because they are durable, they persist in the environment (Farthing, 2010; Fuentes, 2012). Over the years, waste disposal especially, plastic waste has become a major problem in Ghana (Boadi and Kuitunen, 2010).

This development has the potential to destroy the natural environment in which human and natural resources in the country inhabit. The status of the local natural environment is important in the development process, since poor and marginalised people lack the resources needed to reduce the negative effects of a degraded environment (Curringham and Saigo, 2010). A damaged natural environment as a result of waste will hit the most vulnerable groups of society the hardest such as those who make living from the market environment (Carlo, 2010; Chukwu, 2010b)

Problems with waste management are a concrete manifestation of the impacts of consumption patterns, and it has been suggested that seeking a solution for the waste problem could provide a key to breaking the impasse, as it forces society to think about its flow of materials (Cumming and Norwood, 2012; Dinesen, 2010).

The choice of waste management methods depends on several factors including the waste stream, equipment capacity and finance (Ahmed et al. 2012). Sustainable solid waste management is a crucial problem not only for developing countries but also for the developed countries (Joshi et al. 2011).

However, what differentiates their effectiveness in dealing with waste generated, perhaps, are the general attitude of individuals to waste, and the fact that developed countries have developed specific policies to deal with each waste stream (Boadi and Kuitunen, 2010; Chinyama et al. 2012)

The sanitation situation in the Bawku Municipality is not different from that of other parts of Ghana. Many houses in the high density areas lack toilet facilities and drains (BMA, 2014). Sanitation facilities are also located mainly in Bawku township and other large settlements such as Mognori. In the rural communities, disposal of human and solid waste is largely indiscriminate (BMA, 2014).

This situation has contributed to the burden of sanitation related diseases in the municipality. Diseases such as diarrhea diseases, typhoid were amongst the top ten causes of outpatient attendance (BMA, 2014). The effects of poor environmental sanitation in cities and communities such as the Bawku Municipality threaten the achievement of the Sustainable Development Goals (SDGs).

The Bawku Municipal Assembly has enacted Environmental Sanitation Bye-Laws, but the enforcement of these environmental by-laws to regulate the activities of the inhabitants has been largely unsuccessful. Hence, the Bawku Municipal area still faces the challenges of poor sanitation resulting from poor or unhygienic habits and practices. Thus, the deteriorating environmental quality in health conditions in Bawku calls for

solutions in order to reduce its impact on the health of the people and improve the standard of living of the people at large (BMA, 2014).

1.2 Problem statement

Sanitation is a human right and a key component of primary prevention to ensure better health (WHO, 2010). Globally, safe drinking water, sanitation and good hygiene are fundamental to health, survival and development of very person (WHO, 2010). Yet, 1.1 billion people in the world lack access to improve water supplies and 2.6 billion people lack adequate sanitation in their surroundings (UNICEF, 2015).

In Africa, lack of sanitation facilities forces people to defecate in the open, in rivers or near areas where children play or food is prepared (Anand and Apul, 2014). In Africa it has been observed that, most people die every hour from diseases linked to poor sanitation, poor hygiene and contaminated water (Ali, 2010). Examples of diseases transmitted through water contaminated by human waste include diarrhea, cholera, dysentery, typhoid, tropical diseases and hepatitis A (Anchett et al. 2011)

According to the report of WHO (2010), in the African Region, 45% of the population used shared or unimproved facilities and an estimated 25% practice open defecation. The majority of those practicing open defecation live in rural areas or urban informal settlements.

In the East Africa nation of Kenya, 48% of people lack access to adequate safe water supply and better sanitation. Only 29% of the populations have access to improved sanitation, 26% shared sanitation, 31% un-improved sanitation and 14% of the population still practice open defecation (Koola and Zwane, 2014).

Whereas there was progress in reducing open defecation in Tanzania, in the sanitation sector, there were still huge service gaps between urban areas, 31% access improved sanitation facilities, 17% shared, 19% un-improved with 33% defecating in the open (Lugalla, 2011).

In the rural areas 29% access improved sanitation, 19% shared, 15% un-improved and 37% open defecation (Lugalla, 2011). Waste reduction in Africa seems to be very difficult to achieve because it is much associated with changing people's knowledge level and attitude (Andersen and Madsen, 2010).

In Ghana, rapid urbanization, lack of funding and economic decline in the 1970s through to the 1980s was cited as possible reasons for the poor sanitation of most towns and cities (Devas and Korboe, 2010). However, the recent upsurge in waste disposal problems can be attributed to people's general attitudes and perceptions towards wastes in Ghana (Adubofour, Obiri-Danso and Quansah, 2013).

Open, unregulated dumps are still a predominant feature of waste disposal in most parts of Ghana. The organic component of solid waste that is generated may not be too much of a problem (depending on the disposal option) as it is biodegradable, but the inorganic components are quite problematic because they are non-biodegradable and therefore can remain in the environment for a considerable length of time causing severe problems (Boadi and Kuitunen, 2010). Inorganic wastes such as plastics are scattered here and there in many communities in Kumsai (Devas and Korboe, 2010)

In a joint Monitoring Programme for water and sanitation, conducted by United Nation International Children Education Fund (UNICEF) and World Health Organization (WHO), Ghana is said to have an encouraging water supply of 75% and worse sanitation

coverage of just 18% with less hope of improvement. It is estimated that about 2.6 billion people still do not have a safe means of disposing of their wastes exposing them to several diseases (WHO and UNICEF, 2014).

The lack of sanitation facilities is considered a big problem by the residents in Northern Ghana, but it is very difficult to improve the situation because of several related issues (Kendie, 2010). First, there is hardly any space for latrines; the compounds are built up to capacity and available empty spaces are becoming encroached. Secondly, latrines are considered the responsibility of the landlord in this area, and because the landlord usually does not live in the area, s/he is not interested in improving the latrine situation (Kendie, 2010).

According to a study conducted in Northern Ghana, by Kendie (2010), plastic waste accounted for 1-9% (of net weight) of the total amount of waste generated. Since then, there has been a tremendous increase in plastic waste due to increase urbanization and consumption pattern.

In the Bawku Municipal, the behavior and attitude of the inhabitants towards sanitation do not augment government effort to handle sanitation. People do not seem to care about good sanitation practices and constantly litter, defecate and dispose waste water indiscriminately without considering the effects of these sanitation practices on their health (BMA, 2014)

Poor sanitation is a serious health risk and an affront to human dignity. There are many threats of pollution at where there are no sanitation systems or where the sanitation systems do not work properly. Moreover, there is little literature on sanitation management in the Bawku Municipality.

Environmental management practices which are supposed to address environmental issues are inappropriately applied. In the Bawku municipality no much work has been done in this regards. This represents a tremendous challenge to population health efforts where success is determined primarily by adherence to sanitation campaigns.

Although extremely worrying, this indicate an incomplete picture. To ascertain the true extent of the sanitation situation in the study setting, data on sanitation management is urgently required.

A full picture of the magnitude of the problem is critical to developing effective policy support for efforts aimed at improving sanitation management at the study setting. Thus, the researcher deemed it important to conduct an epidemiological study aiming to contribute to knowledge concerning sanitation management and its health implications in the Bawku municipality.

1.3 Research questions

The main research question of the study is to address sanitation management and its health implication in the Bawku Municipality.

1.3.1 Research questions

2 What is the sanitation situation in the Bawku Municipality?

3 What are the factors that account for the sanitation situation?

4 What is the influence of the current sanitation on the health of the people?

5 Are there interventions and strategies to improve sanitation management?

1.4 Research objectives

1.4.1 Main objective

The general objective of the study was to assess sanitation management and its health implications in the Bawku Municipality.

1.4.2 Specific objectives

1. To examine the sanitation situation in the Bawku municipality
2. To identify the factors that account for the sanitation situation
3. To assess the influence of the current sanitation on the health of the people
4. To examine interventions and strategies to improve sanitation management

1.5 Justification for the study

The problem of sanitation is one of the most pressing concerns in the country. Ghana has been a place of filth and it has very serious public health problems. Poor sanitation poses serious threat to the health of people. It is clear that sanitation coverage lags far behind water coverage, thus compelling a more focused attention on sanitation.

The findings from this study would help the Municipal Finance Committee to take good decisions when allocating resources for waste management in the Municipal. The findings from the study would help decision makers and policy makers to find other avenues that can help rid the Municipality of filth. Moreso, it is an academic exercise and serves as a reference point for future researchers.

1.6 Conceptual framework

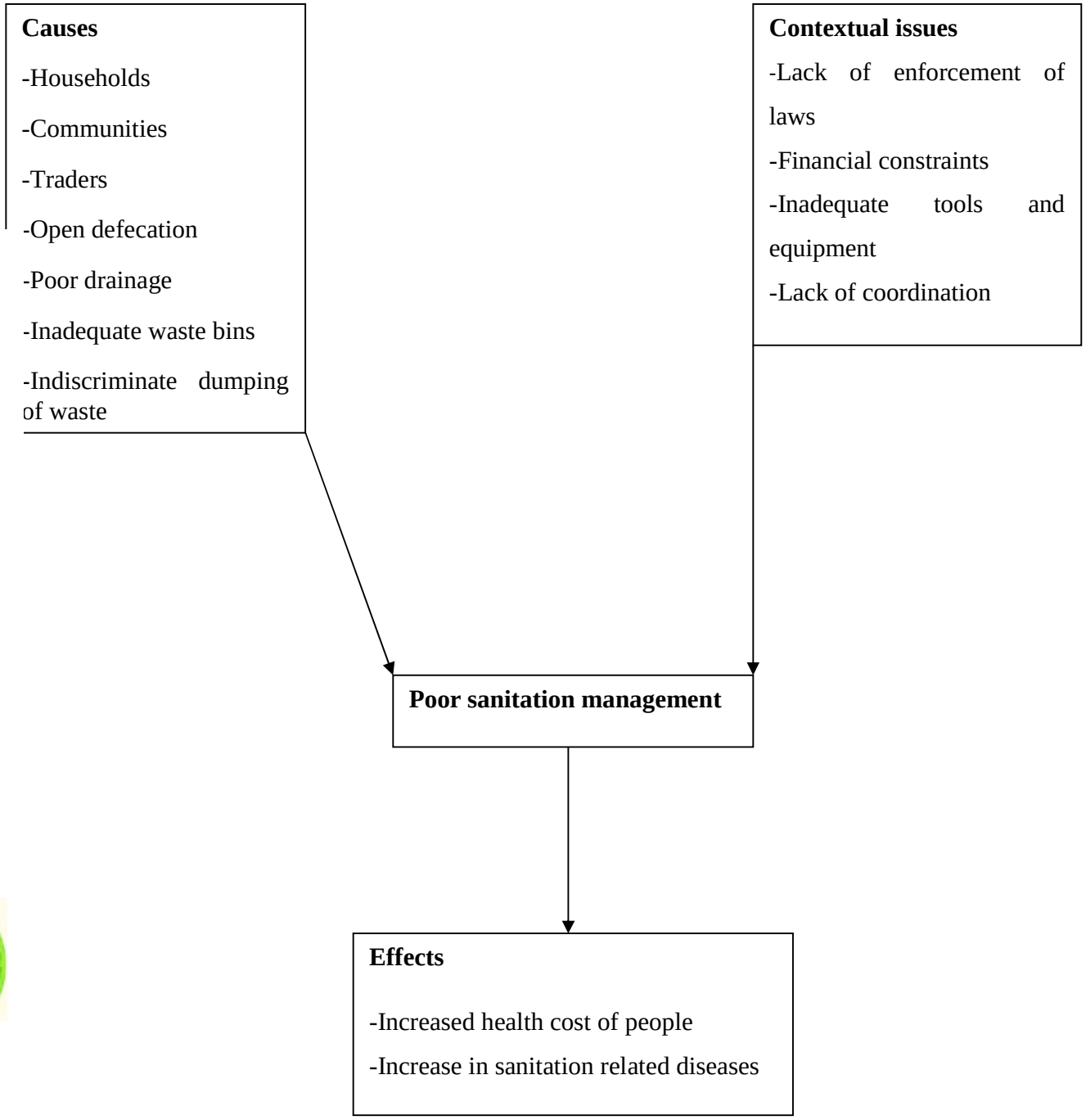

Figure 1.1: Conceptual framework

Source: Author's own construct, 2016

Figure 1.1 presents the conceptual framework on sanitation management situation and its health effects in the Bawku Municipality. The actors in sanitation management which generate waste comprises of households, community members and traders. From Figure 1.1 another issue that is contributory factor to the poor sanitation management issue in the study setting is contextual. These issues considered as causes of poor sanitation in the study setting are lack of enforcement of laws by key players, financial constraints, inadequate tools and equipment and lack of coordination among key institutions.

All these identified reasons lead to poor sanitation management at the study setting. The overall effects are that, it leads to increased health cost of people and increase in sanitation related diseases.

1.7 Scope of the study

This study focuses on the current sanitation situation in the Bawku Municipality and considered the factors that accounted for the current sanitation situation in the Bawku Municipality. In addition, the study assessed the influence of the current sanitation on the health of the people in the Bawku Municipality. Finally, the study examined sanitation management interventions and strategies to improve sanitation management in the Bawku Municipality.

1.8 Definition of key terms

- **Environmental sanitation:** Interventions to reduce people's exposure to diseases by providing a clean environment in which to live.

- **Environmental sanitation condition:** Concerned with domestic water, excreta disposal, waste disposal, personal and domestic hygiene facilities, services or practices.

1.9 Structure of the thesis

This thesis is organized into six chapters. Chapter one comprises the introduction and background to the study, the problem statement, the research questions, the study objectives, the significance of the study, scope of the study, conceptual framework and definition of terms. Chapter two examines the review of relevant literature in relation to the study.

The research methodology is presented in chapter three which contains the profile of the study setting, research design, research population, data collection tools, data collection procedures, sampling technique, sample size calculation, data analysis, ethical considerations and limitations of the study.

Chapter four contains the results whilst the discussion of the results is presented in chapter five. Chapter six contains the summary, conclusion and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents selected literature that has been carried out by various writers and researchers in the area of sanitation. It also reviewed studies on issues of sanitation and its effects on health status of people and contributions that had relevance to the study. The review of the literature was done based on thematic areas related to the study.

2.2 Concept of sanitation

Sanitation generally refers to the provision of facilities and services for the safe disposal of waste (Tissington, 2011; Schertenleib and Dionys, 2012).

Sanitation is a relatively broad concept involving among others the construction and use of sanitary facilities as a way of preventing diseases arising out of inappropriate hygiene habits such as poor disposal of plastic waste (Strauss et al. 2010).

Sanitation could also be described as the process where people demand, effect and sustain a hygienic and healthy environment for themselves and others by erecting barriers to prevent the transmission of disease agents in order to lay foundation for sustainable development (Oldfield and Parnell, 2014; Mundia, 2013). The current environmental sanitation status of Ghana leaves much to be desired as a result of the numerous hygiene related health problems it poses (Mantell, 2012).

Mensah (2012) viewed good sanitation as the condition of cleanliness of a place, community or people particularly relating to those aspects of human health including the

quality of life determined by physical, biological, social and psychological factors in the environment which prevent them from becoming ill.

This usually includes hygienic management of human and animal excreta, refuse and wastewater, the control of disease vectors and the provision of washing facilities for personal and domestic hygiene. It also deals with both behaviours and facilities which work together to form a hygienic environment (World Bank, 2015).

Wherever humans gather, their waste also accumulates. Progress in sanitation and improved hygiene has greatly improved health, but many people still have no adequate means of appropriately disposing of their waste. The improper management of the sanitary condition is creating some level of nuisance for many people in their respective communities, transmitting the risk of contracting infectious disease, especially to vulnerable groups such as the very young, the elderly and people suffering from diseases that lower their resistance (Mara, 2012)

2.2.1 Types of Sanitation

The various types of sanitation has been described and explained as follow:

2.2.1.1Community-led Total Sanitation

George and Frank (2012) proposed that, Community-Led Total Sanitation (CLTS) is an approach to achieve behavior changes in mainly communities characterized by poor sanitary conditions by a process of sensitizing the community members, leading to spontaneous and long-term abandonment of open defecation practices. CLTS is a move toward to community sanitation that works without hardware subsidies and that facilitates

communities to recognize the problem of open defecation and take collective action to clean up and become "open defecation free".

2.2.1.2 Ecological Sanitation

William (2010) revealed that, ecological sanitation deals with an approach, rather than a technology or a device which is characterized by a desire to "close the loop" (mainly for the nutrients and organic matter) between sanitation and agriculture in a safe manner. Ecological sanitation systems carefully recycle excreta materials (plant nutrients and organic matter) to crop production in such a way that the use of non-renewable resources is minimized".

As Carlo (2010) puts it, when properly designed and operated, ecosan systems provide a hygienically safe, economical, and closed-loop system to convert human excreta into nutrients to be returned to the soil, and water to be returned to the land. Ecosan is also called resource-oriented sanitation. Sanitation encompasses the control of environmental factors that are connected to disease transmission. Subsets of this category are solid waste management, water and waste water treatment, industrial waste treatment and noise and pollution control (Thrift, 2007).

2.2.1.3 On-site sanitation

On-site sanitation, referred to Tilley et al. (2014) as decentralized sanitation, is a system where the treatment of excreta or sewage takes place at the same location where it is generated. Examples are pit latrines, septic tank, and Imhoff tank. A septic tank and drained field combination is the oldest and most common type of on-site sewage facility

in the U.S., although newer aerobic and bio-filter units exist which represent scaled down versions of municipal sewage treatment plants.

2.2.1.4 Sustainable sanitation

Evans (2008) indicates that, sustainable sanitation considers the entire "sanitation value chain", from the experience of the user, excreta and waste water collection methods, transportation or conveyance of waste, treatment, and reuse or disposal. The term is widely used since about 2009. In 2007, the Sustainable Sanitation Alliance (SSA) had defined five sustainability criteria to compare the sustainability of sanitation systems (Prüss, Kay, Fewtrell, and Bartram, 2012). In order to be sustainable, a sanitation system has to be:

(i) Economically viable

(ii) Socially acceptable

(iii) Technically adoptable

(iv) Institutionally appropriate

(v) It should also protect the environment and the natural resources

2.3 Concept of health

There had been increasing recognition within the international community that improving the health of poor people across the world depended on adequate understanding of the socio-cultural and economic aspects of the context in which public health programmes were implemented (WHO, 2010). They agreed that health is a fundamental human right and the attainment of a highest possible level of health was crucial (Tona et al. 2014).

The health agencies support the view of the WHO (2010) that 'health' is a state of complete physical, mental and social well-being but not merely the absence of disease or infirmity.

Generally, people who have a duty to promote health saw it as resource for everyday life and not the object of living. It was a positive concept that emphasizes social and personal resources and physical capabilities (Yap, 2010; Tumwebaze et al., 2014).

In rural areas and small towns, there are often no vehicles for collection of waste, hence uncontrolled dumping occurs within the built up areas with all its attendant health hazards and negative environmental impact (Velleman and Pugh, 2013).

2.4 Concept of sanitation management

Sanitation management comprises a number of complementary activities, including the construction and maintenance of sanitary infrastructure, the provision of services, public education, community and individual action, regulation and legislation (Ali, 2010; Anand and Apul, 2014)

The United Nations Environmental Programme also defines sanitation management as the control of all human activities which have a significant impact on the environment (UNEP, 2010). Good hygienic waste disposal education helps people dispose of sanitary waste in a safe, sensitive and environmentally friendly manner, ensuring compliance with standard regulations (Okurut et al. 2014; Mensah, 2012).

To ensure that effective environmental sanitation education is well enforced among people, waste bins should be provided and placed at vantage points to enable people to

have access to store and dispose of both domestic and industrial waste which could provide an unbeatable control of odour (Otsuki et al. 2013; Salifu et al. 2011).

Good food hygiene handling, preparation and storage of food prevent food borne illnesses especially food borne illness. Proper handling of food prevents contamination of food with pathogens spreading from people, pets, and pests (Mcgranahan, 2015; Mara, et al. 2010)

2.5 Environmental sanitation management

Environmental sanitation management encompasses the process of allocating resources to ensure a hygienic environment through service and infrastructure provision and proper disposal of waste (Yap, 2010). Poor environmental sanitation or hygiene also has tremendous economic costs. The health impact of inadequate environmental sanitation leads to a number of financial and economic costs including direct medical costs associated with treating sanitation-related illnesses and lost income through reduced or lost productivity and the government costs of providing health services (Okurut et al. 2014).

Additionally, poor sanitation also leads to reduced income from tourism (due to high risk of contamination and disease) and clean up costs (Prüss et al. 2012). Poor environmental sanitation practices also affect the environment in diverse ways (Velleman and Pugh, 2013).

In regions where a large proportion of the population are not served with adequate water supply and sanitation, sewage flows directly into streams, rivers, lakes and wetlands,

affecting coastal and marine ecosystems, fouling the environment and exposing millions of children to disease (Velleman and Pugh, 2013).

Particularly in the context of urbanization, indiscriminate littering, domestic wastewater, sewage and solid waste improperly discharged presents a variety of concerns as these promote the breeding of communicable disease vectors as a result of air, water and soil pollution (Okurut et al. 2014).

Environmental sanitation management ensures that there is prudent allocation of limited resources tailored to the needs of the people to ensure economic sustainability (Mcgranahan, 2015). On the one hand, a healthy people produce more and miss fewer days and on the other hand, a healthy community is often a more lucrative market for goods, services and investment (Mensah, 2012).

Improved environmental sanitation management reduces environmental burdens, increases sustainability of environmental resources and allows for a healthier, more secure future for the population (Salifu et al. 2011)

2.5.1 Solid waste disposal

Disposal of solid waste is most commonly conducted in landfills, but incineration, recycling; composting and conversion to biofuels are also avenues. In the case of landfills, advanced countries typically have rigid protocols for daily covers with topsoil, where underdeveloped countries customarily rely upon less stringent protocols. The importance of daily cover lies in the reduction of vector contact and spreading of pathogens (UNEP 2010).

Menegat (2010) advised that, daily cover also minimizes odor emissions and reduces windblown litter. Likewise, developed countries typically have requirements for perimeter sealing of the landfill with clay-type soils to minimize migration of leaching of waste liquid that could contaminate groundwater (and hence jeopardize some drinking water supplies). For incineration options, the release of air pollutants, including certain toxic components is an attendant adverse outcome.

Recycling and biofuel conversion are the sustainable options that generally have superior lifecycle costs, particularly when total ecological consequences are considered (Menegat (2010). Composting value will ultimately be limited by the market demand for compost product (Andersen and Madsen, 2010).

2.5.2Sanitation situation in the Bawku municipality

The sanitation situation in the Bawku Municipality was examined based on the following thematic areas: availability of toilet facilities, availability of drains for liquid waste disposal and the availability of solid waste bins. The availability of household toilet facilities are rather common in urban and sub-urban communities where most of the residents were found to be practicing good sanitation practices which in their view represents the requirements for health status.

The contention that seems to exist is the fact that, there are always cases of lack of commitment on the part of the residents which tends to create some difficulties in the various communities. The problem is due to the fact that, most residents in the communities identified above desire open defecation; however, the elite in the affluent communities tend to be using the toilets in their respective household.

Another issue which was mostly observed was that, in most part of the Municipality there were insufficient waste containers and as a result most of the respondents revealed that their waste is usually left uncollected for several days and the stench which emanates from these uncollected solid wastes is unbearable.

It was however found out that, the rate of emptying of containers was on the regular basis in other parts of the Municipality. In low residential areas such as Gentiga, Bador, Helbuko, Zabugu, Asikiri and Gozesi the frequency of refuse collection was not regular. This may be due to the fact that residents in the more affluent and properly organized residential areas, residents are more committed and ready for the disposal of their waste.

2.6 Environmental sanitation policy and government institutions

Environmental sanitation management necessarily requires the assignment of responsibilities to specialised institutions involved in overseeing the use of natural resources. As such, a number of institutions have been established to guide and co-ordinate all activities involving the appropriation of natural resources. Boadi and Kuitunen (2010) argue that, the successful management of environmental resources in any country depends to a large extent on the effectiveness of the institutional arrangements put in place by government for their management.

These institutional arrangements refer to the types of organizational units involved, such as ministries, agencies, and committees, and to the responsibilities and authorities of these units, and the relationships between them.

2.6.1 Institutional structure

At the national level, there are five ministries involved in environment and sanitation. The Ministry in charge of Sanitation, the Ministry of Local Government and Rural Development (MLGRD) and the Ministry of Water Resources Works and Housing. The other two ministries involved in environmental sanitation are the Ministry of Environment, Science and Technology and the Ministry of Health, which handles health data, contributes to policy-making, setting standards, and hygiene education (MLGRD, 1999).

2.6.1.1 Ministry of Local Government and Rural Development (MLGRD)

MLGRD is one of the agencies in the sanitation sector. It is responsible for creating and coordinating sanitation policy, issuing guidelines on sanitation services and their management, and for supervising the National Environmental Sanitation Policy Coordinating Council (MLGRD, 1999).

In theory, institutional responsibilities for sanitation are clear, with the Ministry of Local Government and Rural Development (MLGRD) having overall responsibility for formulating environmental sanitation policies.

2.6.1.2 Ministry of Environment, Science and Technology (MEST)

The Ministry of Environment, Science and Technology exist to establish a strong national scientific and technological base for accelerated sustainable development of the country to enhance the quality of life for all. The overall objective of MEST is to ensure accelerated socio-economic development of the nation through the formulation of sound policies and a regulatory framework to promote the use of appropriate environmentally

friendly, scientific and technological practices and techniques and the intensification of the application of safe and sound environmental practices. Land and water are looked after by everyone in today's society, so that tomorrow's generations inherit a cleaner and healthier world.

The Environmental Protection Agency (EPA) seeks to ensure environmentally sound and efficient use of both renewable and non-renewable resources, to prevent, reduce, and as far as possible, eliminate pollution and actions that lower the quality of life; and to apply the legal processes in a fair, equitable manner to ensure responsible environmental behaviour in the country. The Environmental Protection Agency is very collaboration-oriented, which weakens its regulatory abilities. There is also, a need to update enforcement procedures for sanitation bye-laws.

2.6.1.3 Environmental Protection Agency (EPA)

The Environmental Protection Agency is the leading public body responsible for protecting and improving the environment in Ghana. Its job is to make sure that air, National Environmental Sanitation Policy Ghana’s National Environmental Sanitation Policy (ESP) was developed in 1999 in consultation with a variety of stakeholders and covers the broad spectrum of environmental sanitation including solid and liquid waste, industrial and hazardous waste, storm water drainage, environmental and hygiene education, vectors of disease, and disposal of the dead (Republic of Ghana, 1999).

The policy was developed by the Ministry of Local Government and Rural Development (MLGRD). It is a fairly concise document that sets out basic principles and objectives,

identifies roles and responsibilities and also covers environmental management and protection, legislation and funding among others.

The Environmental Sanitation Policy is aimed at developing and maintaining a clean, safe and pleasant physical environment in all human settlements, to promote the social, economic and physical well-being of all sections of the population. It comprises a number of complementary activities, including the construction and maintenance of sanitary infrastructure, the provision of services, public education, community and individual action, regulation and legislation (MLGRD, 1999).

The policy identifies many of the major problems and constraints in environmental sanitation, including the lack of assigned roles for governmental bodies, the lack of capacity and skilled professionals at all levels, and the problems associated with the transfer of responsibilities for environmental sanitation without the corresponding budget, personnel, and equipment transfers. The policy then lays out its strategy to deal with these problems. Key items in the strategy include:

a) Defining the roles and responsibilities related to environmental sanitation of institutions from the national ministries down to unit committees, community organizations, and the individual;

b) The privatization of environmental sanitation services;

c) The creation of a National Environmental Sanitation Policy Coordinating Council (NESPoCC) and a District Environmental Sanitation Fund (DESF); and

d) The phasing out of pan latrines (by 2010). Targets were set for 2020 (except for the phase-out of pan latrines, which was targeted for 2010).

This has allowed the government a lot of flexibility. Each of the above components is discussed below.

(a) Roles and responsibilities. The policy clearly states the role of actors at a variety of levels of government. Evaluations of Ghanaian sanitation policy and governance identified loopholes in the activities and coordination between some ministries and institutions and thus recommended an update to include the roles of the MWRWH and Community Water and Sanitation Agency (CWSA), and to clarify the roles of some other institutions and ministries (e.g. Ministry of Heath).

(b) The Policy also outlines the roles and responsibilities of the Community and Individuals. Ensuring good environmental sanitation is the responsibility of all citizens, communities, private sector, enterprises, Nongovernmental Organizations (NGOs) and government institutions. All these actors have an essential part to play in maintaining a high standard of environmental sanitation. The policy indicates that, every individual, establishment or institution shall be responsible for:

- Cleansing within and in the immediate environs of the property they occupy, including access ways and the drains and roads abutting the property;
- Temporary storage of wastes within the property and disposal thereof outside the property, as may be directed by the competent authority;
- Taking measures to prevent the breeding of disease vectors within and in the immediate environs of the property they occupy;
- Ensuring that the wider environment is not polluted or otherwise adversely affected by their activities;

- Hygienically disposing of all wastes they generate in public areas by use of an authorised public toilet or solid waste container as appropriate;
- Participating in all communal environmental sanitation exercises organised by the community or its representatives (MLGRD, 1999)

The policy also entrusts in the Assemblies the power to promulgate bye-laws and regulations to help in their environmental sanitation management process.

To complement these efforts, the Judiciary is expected to establish and empower Community Tribunals to prosecute offenders against environmental sanitation bye-laws and regulations (MLGRD, 1999). This is a clear opportunity for MMDAs to enact strict environmental sanitation bye-laws to make the city inhabitants responsible for environmental sanitation in Kumasi to ensure good environmental sanitation practices.

2.7 Significance of community participation in environmental sanitation management

From a normative perspective, a core argument is that more inclusive forms of (local) government constitute approaches to ensure broader participation in urban environment initiatives which in turn will lead to better results in implementation (Mara et al. 2010).

According to Lugalla (2011), the issues related to environmental degradation is not only technical or engineering ones, but more socio-economic. Thus, the understanding of such factors affecting the community's collective action is crucial to any efforts aimed at championing people's participation of such resources.

The UNEP (2000) recommends community participation in environmental sanitation problem-solving using the Participatory Hygiene and Sanitation Transformation

(PHAST) approach. The PHAST approach encourages local participation in defining problems and solutions related to water, sanitation and disease control. The community itself analyses its own beliefs and practices and then decides what needs to be changed. Outside experts, such as local health personnel, water and sanitation engineers and social scientists also participate and share information with the community.

This is based on the principles that; communities can and should determine their own priorities for disease prevention. When people understand why improved sanitation is to their advantage, they will act. Also all people, regardless of their educational backgrounds, are capable of understanding that poor environmental sanitation promotes diseases and can be harmful, and can learn to trace and describe the faecal-oral route of disease transmission in their own environment. Communities can identify appropriate barriers to block disease transmission.

Commitment from the local government to improve environment performance and establish policies for the purpose is very important. A strong commitment from the local government to be inclusive, develop political support, or show leadership will necessitate the involvement of the community. A prudent local government will involve the community in order to ensure broad commitment from all residents of the city (Evans, 2008)

This will also ensure acceptance and ownership of its policies and programmes with the community. The local government has to develop and implement the necessary measures to enable various urban stakeholders to perform their tasks and implement their programmes/projects on the environment. This is a departure from the usual position of a local government as a 'provider' of services to a 'facilitator' of action.

Community participation calls for people to participate in planning, implementing and managing their local environment. Community participation means a readiness on the part of both local governments and the citizens to accept equal responsibilities and activities in managing their surroundings (UNEP, 2010).

2.8 Sanitation situation

Sanitation management in most developing countries has been an issue of great concern (Farthing, 2010). Poorly controlled waste also means daily exposure to an unpleasant environment (Felix, 2010). Progress in sanitation and improved hygiene has greatly improved health, but many people still have no adequate means of appropriately disposing of their waste in Ghana and by extension in the Bawku municipality (Devas and Korboe, 2010).

The improper management of the sanitary condition in most urban and rural is creating some level of nuisance for many people in their respective communities (Cumming and Norwood, 2012; Dinesen, 2010).

In most studies, it has been estimated that, about 2.6 billion people lack access to improved sanitation, two-thirds of whom live in Asia and sub-Saharan Africa (Dinesen, 2010). About, 1.2 billion people, of whom more than half live in India, lack even an unimproved sanitation facility and must defecate in the open (Carlo, 2010). Similarly, in Ghana, regional disparities in sanitation coverage are huge (Bolaane and Ikgopoleng, 2011).

Whereas 99% of people living in industrialized countries have access to improved sanitation, in developing countries only 53% have such access (Centre for Environment

and Development, 2010). Within developing countries, urban sanitation coverage is 71% while rural coverage is 39%. Consequently, at present the majority of people lacking sanitation live in rural areas; this balance will shift rapidly as urbanization increases (Devas and Korboe, 2010).

Studies have showed the lack of toilets facilities in most rural and urban households' across African countries. This makes the sanitation situations in those places very poor (Fink, 2010). This would pose a lot of poor sanitation situation especially with regards to the safe disposal of human excreta (Crous et al. 2013).

According to Al-Shaar (2010) an estimated 24% of residents of informal settlements have access to household toilet facilities, 68% rely on shared facilities and 6% have no access to toilet facilities at all and often resort to 'flying toilets' which pose a serious health hazard to the people living in those places. In those places, it has been envisaged that, latrine emptying and sewerage removal are handled by small scale operators under unsanitary conditions (Al-Shaar, 2010). This makes the sanitation situation in these places very poor.

In uncontrolled urban growth as a result of the population growth leads to poor management of solid and liquid wastes produced by the residents in the cities. This leads to many problems associated with sanitation in the communities. The sanitation in these cities is generally dominated by self purification works. They often repress waste water that trickles down in living quarter streets emitting strong foul odors (Clasen et al. 2014)

In a survey carried out by Adubofour et al. (2013) to assess sanitation management of two urban slums of Muslim communities in the Kumasi metropolis, Ghana. The study used descriptive cross sectional survey to conduct the study. Finding showed that, most

of the households lacked access to households toilets facilities within their homes. The study concluded that, there was poor sanitation in the study place.

More so, the accelerated growth of population in West Africa has resulted in the production of unprecedented solid and liquid wastes in various households and industrial establishments (Felix, 2010). In Accra for instance urban waste waters (domestic, storm water, industrial) are discharged into the lagoons through sewers and channel existing storm water drainage without prior treatment.

This undoubtedly has created sanitation problems in the city for several decades. The end result is diseases manifestations such as malaria, diarrhea diseases and acute respiratory infections in most of the overcrowded settlements in the communities (Boadi and Kuitunen, 2010; Felix, 2010)

The proper disposal of children's stools is extremely important in sanitation management and in preventing the spread of disease. According to Mensah (2012), sixty-seven percent of children's stools were left uncontained, seven percent were put or rinsed into a drain or ditch, 11 percent were thrown into the garbage, and 49 percent were left in the open. Slightly more than one in five children's stools was disposed of hygienically.

Two percent of children under five use a toilet or latrine. Additionally, 17 percent of children's stools were disposed of in the toilet or latrine, and 2 percent were buried in the yard. Similarly in Northern part of Ghana, most elderly people do not consider faeces from a child as harmful (Salifu et al. 2011).

In Northern Ghana, a study by Kendie (2010) revealed that, waste were disposed off in the open space and were seen flying all over the place. The study concluded that more needed to be done to improve upon the sanitation situation of the place. A statistical

analysis performed by Kobel and Del Mistro (2015) indicated that they was a statistical relationship between educational status of study participants and the knowledge of sanitation issues ($\chi^2 = 2.610$; $p < 0.001$).

According to a report by Bartram and Cairncross (2010), children faeces were not considered as harmful and were left to be flying all over the places especially where it was dried. Children were left to defecate just in front of the house for the mother to take control over. Similarly, in a survey by Cairncross et al. (2010), findings showed that, majority of the people said children were not allowed to defecate around the house, but made to defecate in a controlled place where their mothers could collect the faeces and disposed it off. Another major issue that affects poor sanitation of a community is the drainage system. Poor drainage systems means poor flow of water leading to flooding (Dinesen, 2010)

In a study conducted by Anchett et al. (2011) to assess the drainage systems in rural communities in Bangladesh, the study employed descriptive cross sectional study design. Findings from the study showed that, majority of the study communities indicated that they were proper drainage systems which easily allowed for the flow of water. The study concluded that, drainage systems at the communities ensured proper sanitation management.

According to a study conducted by Schertenleib and Dionys (2012) to assess the attitude and perception of people towards sanitation management in Tanzania findings from the study showed that about 56% of people who were surveyed showed bad attitude towards community sanitation as most people were not participating in cleaning the community but were concerned with their own activities. The study concluded that study participants

did not see community cleanliness as part of their schedules. And entirely left that to the work of the sanitation institutions

In Ethiopia, studies conducted in seven communities in Mekelle Zone showed that 90% of people had good knowledge concerning poor environmental sanitation management but however had bad attitude towards environmental sanitation practices as most people throw rubbish anyhow on the street (Tissington, 2011). The study revealed that, most of the communities visited were filled with rubbish scattered all over the places.

In Limpopo Province, South Africa, a convenient sample size of 148 people were selected and used in a study and the results showed that 55% of the people had good knowledge of environmental sanitation management as the people indicated that their knowledge was informed by the media, seminars and workshops they had attended (Tukahirwa et al. 2013).

Studies concerning knowledge and attitude of people towards environmental sanitation discovered that 99.1% people had positive attitudes towards environmental sanitation management whiles 0.9% people had poor attitude towards environmental sanitation in Zambia (Velleman and Pugh, 2013). The study revealed that, based on this, most of the sanitation situation of settlements were in a very deplorable state.

In a related study on waste management among households in Nepal revealed that 58.1% of the respondents were highly knowledgeable, 12.9% did not practice the proper way of managing waste at the household level because they were dumping rubbish in front of their houses, 37.1% practiced waste management by burning their waste more often and 50% practiced waste management infrequently (Owusu-Sekyere et al. 2013). The study revealed that waste was not managed properly at the time of the study.

In Nigeria, a study to evaluate the attitude of people towards sanitation management found that people expressed the view to normally participate in cleaning the environment during community clean up exercise (Mcgranahan, 2015; Mantell, 2012). In Uganda, most people did not consider participating in cleaning the environment as important (Yap, 2010). The study showed that, during such campaigns people were seen busily doing their own things.

The need for more sanitation programmes is unavoidable. Sanitation programmes change long-held beliefs through mentioning the unmentionable; equally address the needs, preferences and behaviours of children, women and men. Adopt approaches which recognize and allow optimal use of valuable community attributes such as participatory approaches, focuses on behaviour and facilities together (Mcgranahan, 2015).

Sanitation programmes and hygiene awareness workshop should address cleanliness, collection of waste, safe disposal of faeces, food storage, disease prevention, sanitation facilities and erection of toilets (Scott et al. 2007).

2.9 Factors that account for the current sanitation situation.

The inadequacies of informal urban sanitation are most dire in Sub-Saharan Africa compared to other regions of the world. Sanitation coverage in African cities is below 50%, and 25% of the urban population practice open defecation (Strauss et al. 2010). Worse still, the urban poor have to pay 10 to 100 times more than the rich to access urban services such as sanitation (Owusu-Sekyere et al. 2013). Despite the efforts made, little or no progress has been made in improving the urban sanitation situation in Africa between 1990 and 2010 (Schertenleib and Dionys, 2012).

One of the causes of poor sanitation in developing areas is blamed on the incapacity of governments that lack the national policies and programmes necessary to transform the sanitation sector. The high urban population growth in developing areas adds further constraints to the proper management of urban sanitation infrastructure and services (Obirih–Opareh and Post, 2012).

Boadi and Kuitunen (2010) observed that, middle-income citizens were able to pay for waste collection services whiles residents in low-income households could not. They also identified major constraints facing the private companies involve in waste collection in the metropolis as financial, lack of workers as well as low morale among the staff.

These major problems have played significant roles in the unsatisfactory nature of waste management services in the city. The inability of the low income areas to pay for waste management services has further aggravated the sanitation situation in the city as they have resorted to indiscriminate dumping and burning of refuse which have their own health implications.

Frantzen and Post (2010) suggested that “political interference” is behind the failure of public partnership to provide waste management and sanitation services for the poor in Accra and Kumasi, but they went on to argue further that, “community control” of sanitation facilities is perhaps the only way of ensuring greater accountability of service providers to users.

Kendie (2010), examines the relationship between socio-cultural and changes in water use and sanitation behaviour on the part of rural population in the Upper West and Upper East regions of Ghana. The management of waste in these areas was found to be rudimentary. Garbage disposal methods were mainly household dumps, community

dumps and disposal on the farms. The study further examined the relationship between settlements and garbage disposal.

It was observed that dispersed settlements tended to have more garbage disposed on compound farms as compared to the nucleated settlement areas. Animal excreta, which were used as manure, were also dumped on nearby farms. Waste water management, was found to be appalling. Waste water was allowed to flow into pits which becomes stagnant and thus providing breeding grounds for disease vectors (Kendie, 2010).

These management practices were sources of concern as the habit of dumping waste on nearby farms is likely to cause an increase in health related diseases due to the proximity of these farms to the homes of farmers. Moreover, Obirih-Opareh and Post (2012) also concentrated on the partnership of solid waste collection by the public and private sectors. They emphasized the fact that, the privatization actually benefited the consumers in terms of solid waste collection services frequency and expansion of service areas in Accra. The researchers looked at the impact of solid waste collection on the environmental quality in Accra. They suggested that the government still lacks accountability in their public services and management

Devas and Korboe (2010) present a clear picture on sanitation management practices in Kumasi. They analyzed the relationship between city governance and poverty in the Kumasi metropolis. They noted that door-to-door collection of waste and other public services were predominantly concentrated in high-income areas with these services being ineffective in poor residential areas.

The study concluded that, sanitation and drainage was a major problem confronting the Kumasi Metropolitan Assembly (KMA) with only 30 percent of households having

satisfactory sanitation arrangements in their houses while 24 percent use the very unhygienic system of buckets and 40 percent of residents depending on public toilets, for which there are lengthy queues.

King et al. (2011) also indicated that, the type of solid waste that is generated in these two major cities in the country, the amount collected, the landfill sites available and measures taken by the Assemblies concern to manage these waste was a big problem affecting sanitation issues in Ghana. It was again estimated that, only 42 percent of the total waste generated daily in Kumasi is actually collected and around 33 percent gets to the landfill site.

With finance, it was mentioned in the study that the waste management department is wholly integrated into the KMA budget and less funds are allocated for the management of waste. In Accra, the study revealed that around 60 percent of total waste that was generated in the metropolis was actually collected before the privatization reforms began in 2009, and the rate has since improved to around 70 percent after privatization.

Providing adequate sanitation in urban settlements is further challenged by social, economic and institutional constraints such as: unemployment, fragile social structures, poor management, and the inappropriate terrain of most informal settlements (Owen et al. 2013; Farthing, 2010).

According to a study conducted by Post and Obirih-Opareh (2013) in Ghana to assess people knowledge on sanitation, findings showed that, majority of the study participants believed that, it was the responsibility of the state to take care of the sanitation situation. The study concluded that study participants said the sanitation issues were still held as the

preserve of the colonial administration and thus, Sanitary officers should be employed to take care of the environment.

Similarly, the existing system could not cope with the ever-increasing volume of solid waste being generated in Ghana. Therefore, the public disposed of rubbish indiscriminately especially in watercourses and drainage channels and often through burning contribute to the poor sanitation situation management (Fink, 2010; Curringham and Saigo, 2010). Huge piles of refuge at overflowing refuse containers are seen throughout the urban centres particularly near markets and squatter settlements (King et al. 2011; Chukwu, 2010b).

Another problem of improving sanitation was that people refused to talk about sanitation as responsibility for all. So what was seen as solely the responsibility of others when it was for all could not be improved upon unless that attitude was altered or changed (Chukwu, 2010a; Devas and Korboe, 2010; Fink, 2010)

At the household level, poor hygienic practices by individuals and communities are compounded by insufficient and ineffective hygiene education (Lugalla, 2011; Fink, 2010; Frantzen and Post, 2010). Also most households and individuals do not have dustbins for collecting their wastes (Malama and Kazimbaya-Senkwe, 2010; Frantzen and Post, 2010).

In a related development, most households that were sampled in a cross-sectional surveyed in Kano State, Nigeria, had no access to dustbins. Due to lack of adequate dustbins along the street compelled most people to throw rubbish in the street and into the gutters (Malama and Kazimbaya-Senkwe, 2010).

The open dumping areas could create health problem, as it led to multiplication of rodents and flies (Frantzen and Post, 2010). Open dumping might result in the generation of anaerobic gases, which led to creation of bad odour primarily resulting in a variety of diseases (Mann, 2003; Farthing, 2010). There were persistent complaints from people residing near open dumping areas. Health care establishment premises with poor solid waste management were prone to spreading diseases (Lugalla, 2011).

In a related survey carried out by Mcfarlane, Desai and Graham (2014) to assess people knowledge and attitude towards sanitation management. Findings showed that there was a statistical relationship between gender and sanitation ($p<0.001$). The results revealed that women were more careful with sanitation issues than their counterparts' men.

According to Yap (2010) study participants had rubbish bins but still did not put the wastes into the waste bins. In Ghana, management of waste has been a difficult one for all governments. Several trials have been made by the authorities and stakeholders. The sites where the wastes are being deposited are apparently too close to residential areas (Malama and Kazimbaya-Senkwe, 2010). This in effect created more problems for residents living in and around the dumping sites.

In South Africa, the poor delivery of basic sanitation infrastructure in dense urban informal settlements is partly attributed to the lack of a common interpretation of the sanitation policy (Salifu et al. 2011).

2.10 Influence of sanitation on health of people

Globally, about 3.4 million people die each year from illness associated with contaminated water supplies and inadequate waste removal (Felix, 2010; Cumming and

Norwood, 2012). The diseases associated with water contamination include malaria, cholera, dysentery, hepatitis A and schistosomiasis (WHO, 2010). While contaminated water is a major cause of infectious diseases, it also has an impact on health through the spread of organic and inorganic chemicals that are harmful to health (Cumming and Norwood, 2012).

These include chlorinated solvents (which cause cancer), trihalomethenes (which cause liver and kidney damage), heavy metals such as lead (which cause nerve and brain damage and birth defects) and polychlorinated biphenyls (PCBs) (which cause liver damage, and may also cause cancer) (WHO, 2010; Dinesen, 2010).

An economic study conducted in Kenya has shown that impacts resulting from poor sanitation and hygiene cost the economy of Kenya 27.4 Billion Kenyan Shillings (KSh) (US$ 324 million) per year, or the equivalent of 0.9% of annual Gross Domestic Product (GDP). These figures reflect the adverse health effects associated with poor sanitation and water supply, costs of treating these health problems, loss of productivity that results when individuals are sick and others have to care for them, and time spent to access service (Andersen and Madsen, 2010; Baptist and Bolnick, 2012)

Since the 1960s, it has been known that poor water and sanitation causes diarrhea, which consequently compromises child growth and leads to undernutrition. Ample evidence shows that poor water and sanitation causes diarrhea, but there is a growing body of knowledge discussing the magnitude of the impact of diarrhea on undernutrition (Tilley et al. 2014 B)

Indiscriminate defecation in drains, open space water courses and dump sites were common, giving rise to excreta-related diseases, and generally posing a health hazard to

the public. During storm events, liquid waste runoffs into areas of human settlements and water sources (Frantzen and Post, 2010; Crous, Haarhoff and Buckley, 2013).

At public toilets, holding septic tanks often overflowed during rainy seasons to compound the problem further. The other principal attribute to flooding was illegal settlements and construction of housing structures within flood plain (Joshi, Fawcett and Mannan, 2011).

A survey by Tukahirwa, Mol and Oosterveer (2013) shown that, diarrhoea was found to be the commonest diseases affecting children. The study showed that children that were leaving in poor sanitary conditions were worse affected by the menace. The study recommended that, people should be educated on how best to handle sanitation issues to avoid sanitation related diseases.

In a similar study by William (2010) showed that there appeared to have been no association between educational status of study participants and the number of times their children were fallen sick ($p<0.0112$). The study concluded that sanitation issues did not significantly affect only one group of people.

However, a survey was conducted by Yap (2010) to assess the knowledge of people on sanitation and health related diseases. The study employed a descriptive cross sectional study design using simple random sampling technique to sample the respondents. Findings showed that even where waste bins were available, people did not see the need to use them. This led to poor sanitation condition at the study place leading to sanitation related conditions. The study concluded that more health education was needed urgently so people could put rubbish into them.

According to Tona et al (2014) the relative impact of sanitation related diseases was human suffering, diseases epidemic, poor sanitation health, stress, and disruption of commercial activities and normal activities. While many of the studies included in those reviews could not rigorously disaggregate the specific effects of sanitation from the overall effects of wider water, sanitation, and hygiene interventions, a longitudinal cohort study in Limpopo Province, South Africa, found that an increase in sewerage coverage from 26% to 80% of the target population resulted in a 22% reduction of diarrhoea prevalence in children under 3 years of age; in those areas where the baseline diarrhoea prevalence had been highest and safe sanitation coverage lowest, the prevalence rate fell by 43% (Geere and Hunter, 2010).

Similarly, a longitudinal study in Kwabre District, Kumasi, Ghana found that the major risk factors for diarrhoea in the first three years of life were low socioeconomic status, poor sanitation conditions, presence of intestinal parasites, and absence of prenatal examination. The study concluded that diarrhoeal disease rates could be substantially decreased by interventions designed to improve the sanitary and general living conditions of households (Fink, 2010)

Further, it is not just the provision and adult use of sanitation that is important. A meta-analysis of observational studies of infants' faeces disposal practices found that unsafe disposal increased the risk of diarrhoea by 23%, highlighting the importance of the safe management of both adults' and infants' faeces (Farthing, 2010; Dangour et al. 2013)

Thus, in communities where faeces of children were not taken to be harmful, it would have meant that poor sanitation in these communities were constantly affecting children

which would have increased their struggling with diarrhoeal infections from dirty water (Schertenleib and Dionys, 2012)

2.11 Interventions and strategies to improve sanitation management

According to Van-Vuuren (2014) enforcement of sanitation laws could help to solve the problem of the poor waste system. This would necessarily compelled people to abide by all rules and regulations. Implying that people would be made to take the sanitation issues of their place very serious and also contribute to the reduction of sanitation related diseases.

Community-Led Total Sanitation (CLTS) is another innovative methodology in sanitation provision in under-served areas as it is used to mobilise local communities to completely eliminate open defecation (OD) (Lundin, 2013; Lebel, 2012). Communities are facilitated to conduct their own appraisal and analysis of OD in their areas, and to take their own action to become OD free (ODF) (Kendie, 2010).

Consequently, the main objective of CLTS is to trigger communities to collectively change their situation, thus empowering people to take action. In this way, CLTS encourages bottom-up innovation, mutual support and localized solutions and sustainability (Kim, 2013). Others studies have also suggested strategies that could be used to improve the sanitation of a place.

The most important of these strategies is political leadership, which is manifested by establishing clear institutional responsibility and specific budget lines for sanitation, and by ensuring that public sector agencies working in health, in water resources, and in utility services work together better (UNEP, 2010).

In addition, the biennial global reports on sanitation and drinking water published by the World Health Organization and UNICEF (2015) contribute towards political leadership and aid effectiveness by publicizing the sanitation work of both developing country governments and support agencies (Chukwu, 2010a; Bracken, 2010). The second strategy is the shift from centralised supply-led infrastructure provision to decentralised, people-centred demand creation coupled with support to service providers to meet that demand (Curringham and Saigo, 2010)

This strategy is transforming sanitation from a minor grant-based development sector into a major area of human economic activity and inherently addresses the problem of affordability, since people install whatever sanitation systems they can afford and subsequently upgrade them as economic circumstances permit (Tilley et al. 2014)

Another strategy to improve sanitation of place could involve the full participation of the health sector. The health sector has a powerful motivation for improving sanitation, and much strength to contribute to achieving this goal (Dangour et al. 2013; Dinesen, 2010). The Declaration of Alma Ata in 1978 emphasised the importance of primary health care and included ‘‘an adequate supply of safe water and basic sanitation’’ as one of its eight key elements (Taing et al. 2013).

Many years have passed since this Declaration, and the body of evidence about sanitation has increased substantially. The health sector now needs to reassert its commitment and leadership to help achieve a world in which everybody has access to adequate sanitation (Taing et al. 2013; Dinesen, 2010)

Also, Prüss, Kay, Fewtrell and Bartram (2012) revealed that, more public education could assist people to get better understanding of sanitation issues at the study place. Using

public education such as community engagements, media discussions could assist people to become conscious of the need to be more sensitive to sanitation issues in the study place.

Strict monitoring and enforcement remains a key strategy in managing sanitation properly in community level (Mcfarlane, Desai and Graham, 2014). There are examples, such as in Uganda, the enforcement of sanitation practices through other means, including the penalisation for non-compliance with sanitation standards through fines or prison sentences, but there were concerns that such approaches may be less effective in generating behaviour change that translates into health gains (Mundia, 2013; Oldfield, and Parnell, 2014).

In a related study on how people could manage waste at the community level, a survey conducted by Mantell (2012) revealed that most people identified burning of rubbish as the preferred way of managing waste at the community level.

2.12 The Health Belief Model (HBM)

According to Carlo (2010) it is assumed that people will take the preventive action only if the expected benefits outweigh the expected costs. The role of demographic and social variables (called mediating factors) can indirectly affect behaviour by influencing an individual's perceptions of susceptibility, severity, benefits and costs. This can apply to the Bawku Municipality where people fit into the four aforementioned expectations.

A systematic review of studies regarding people's behaviour and environmental sanitation had used the Health Belief Model among adults into the late 1980s and found it

to be consistent in predictive power for much behaviour, sometimes due to its limits of scope to predisposing factors (Crous et al. 2013; Dinesen, 2010).

Fuentes (2012), however argue that, the Health Belief Model continued to be the most appropriate and frequently used model in published descriptions of programmes and studies in health education and health behaviour in the early 1990s and this was supported by (Kobel and Del Mistro, 2015). According to Lopes et al. (2012) the health belief model, highlights 'perceived' or 'expected' benefits and costs to predisposing factors. The person receives a 'cue to action' or a precipitating force that makes the person feels the need to take action (Koola and Zwane, 2014).

Efforts to model several health-related actions have multiplied and increasingly had become complex. On account of these circumstances, the person believes that benefits accruing from the recommended behaviour outweigh the costs and inconvenience.

2.13 Theoretical foundation of the study

This study adopted the Health Belief Model (HBM) to support the variables that were assessed in the study. Initially the model was developed in the 1950s by a group of social psychologists in an effort to explain the widespread failure of people to participate in programs to prevent and detect disease (Becker, 1979).

The model states that individuals engage in preventive health behaviour based on three main factors. These factors are perceived vulnerability, perceived severity and perceived benefits. This means that a person would have to believe that he or she is susceptible or vulnerable to a disease in order to take any action. The value of compliance is therefore based on the probability that in the client's view, compliance would reduce the perceived threat and not be too costly in money, time and emotional energy (Becker, 1979).

For the purpose of this study, only four out of the six major Health Belief Model Constructs were used in the study.

(i) Perceived susceptibility

This refers to how much individuals believe that they are vulnerable to or at risk for some illnesses (Ajzen and Fishbein, 1980). In relation to this study, if people in Bawku Municipal believe that the poor way of managing waste generated poses a risk and that they are at risk to such health hazards then their attitude will change.

They will thereby adopt good sanitation practices based on the knowledge that they are vulnerable. For instance making them aware that plastic waste which does not degenerate easily tends to block culverts, leaving in its wake stagnant water that can cause floods and also serve as a breeding place for mosquitoes, that lead to the high incidence of malaria cases, typhoid, cholera and other contagious diseases will make them to adopt practices aimed at avoiding these negative outcomes.

(ii) Perceived severity

This refers to how serious the individual believes the consequences of being ill are. The study bears on the presupposition that if the people know that the risk associated with poor sanitation can be fatal, they will change their attitude and engage in practices that improve sanitation in the area. For example, if the people know that dirty surroundings breed flies which settle on food items and make them unwholesome and cause a deadly disease like cholera, they will change their attitude.

(iii) Perceived effectiveness

This refers to the expected benefits if one engages in the protective behaviour. Fitting this into the study, if people in Bawku Municipality realize that by disposing of waste,

especially plastic waste in the dumpsite will actually reduce the risk of contracting sanitation related diseases they are more likely to engage in proper sanitation practices. To this end, the community members will be healthy and go about their daily activities without hindrance.

(iv) Perceived cost

This refers to the barriers or losses that interfere with health behaviour change (Ajzen and Fishbein, 1980). Referring to the barriers and losses that can impede the practice of proper waste management, especially plastic waste, allusion is to the perceived time waste, financial burden and inadequate information on the expected gain associated with improved sanitation practices.

For instance, when people in Bawku Municipal think that practicing proper waste management is relatively time consuming, drawing on their finances or that the practice would not yield any tangible benefits, they are not likely to be motivated to change their attitude and practices despite their awareness of proper waste management.

The Health Belief Model, in this case helped to explain certain health related behaviours and guided the search to explain why study participants at Bawku Municipality put up with poor sanitary conditions and dispose of their waste especially, plastic waste indiscriminately. It also helped the researcher to relate knowledge to behaviour changes that play crucial role in making informed choices and this can motivate and stimulate the participants' readiness to act in a concrete and an observable practice.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This part of the study provides information about the methodology that was employed to conduct the study. The chapter contains the profile of the study setting, research design, the study population, sample size determination, data collection instrument, data collection procedure, data analysis, ethical consideration and limitations of the study.

3.2 Profile of the study setting

The research was conducted in the Bawku Municipality. Bawku Municipality is located in the Upper East region of Ghana. It has its administrative capital at Bawku. It is one of the thirteen districts and municipalities in the Upper East region of Ghana. It shares boundaries with Pusiga district to the north, Binduri district to the south, Garu-Tempane to the east and Bawku west to the west. The Municipality has a total land area of

247.23720 (sq.km) and it's located approximately between latitudes 11.11^0 and 10.40^0 north and longitude 0.180 and 0.60 in the north eastern corner of the region.

3.2.1 Population

The total population in the Municipality is 217,791(GSS, 2010). Out of the municipal population, 52.0% were females and 48.0%, males. The age cohort with the highest proportion of the population was the 5-9 age groups (14.1%), followed by the age cohort 0-4 (13.5%). It also showed that the age 0-24 (youth) years constituted 59.8% of the total population. The Municipality has a population of 97,221 (BMA, 2014).

3.2.2 Physical features

The physical features of Bawku Municipality is located within the warm climatic zone, and like most of Northern Ghana, it is characterized by two distinct seasons: a raining season spanning May to October, and a dry season from late November to early April (GSS, 2010). Generally, the climatic conditions render the Municipality susceptible to bush fires and soil degradation during the dry season.

The Municipality is well drained by the White Volta and its tributaries as well as by other rivers. The vegetation is mainly of the Sahel Savannah type, consisting of open Savannah, with fire swept grassland separating deciduous trees with a few broad-leaved and fire-leached tree species (GSS, 2010). The entire Volta Basin as well as parts of the forest (including Morago West and Kuka) is protected under Local Authority and Municipal Assembly instruments (BMA, 2014).

3.2.3 Economic Characteristics

Bawku Municipality's economy is based on three major activities: agriculture, small-scale industries, and commerce (BMA, 2014). Agriculture is the major economic activity in the study area along side pretty trading. The sector comprises mainly subsistence crop production livestock and poultry farming. The main crops grown include millet, sorghum, maize, rice, groundnuts, watermelon and onions. The main livestock include cattle, sheep, goats and donkeys (BMA, 2014)

Commerce is the second important economic activity in Bawku Municipality, which is generally regarded as the commercial nerve of the Upper East Region. However, its bustling commercial role transcends both the municipal and regional boundaries. The Municipality has a three-day market cycle during which local agricultural produce (such as foodstuffs, livestock, and poultry) as well as manufactured goods are traded (BMA, 2014)

Traders from other parts of Ghana buy livestock and foodstuffs and load onto southbound trucks for redistribution in the major southern cities like Kumasi, Accra, Tema, and Cape Coast (BMA, 2014). In return, traders from Bawku deal in manufactured goods brought from Techiman, Kumasi, Tamale, Accra, Takoradi and Tema. Importantly too, Bawku strategic location at Ghana's border with Eastern Burkina Faso and Northern Togo as well as the easy crossing it provides into Mali and Niger has made it an important commercial node in the regional trade (GSS, 2010).

The third important economic activity includes individual and family-run businesses. These are characterized by diverse small-scale industries; namely Shea butter extraction, groundnut oil extraction, pito brewing, millet grinding, sorghum and maize processing for

domestic use, dawadawa processing, weaving and dress making, and pottery (BMA, 2014)

3.2.4 Sanitation

The state of environmental sanitation in the Municipality is improving, however, a lot more needs to be done (BMA, 2014). Meanwhile, most houses in the high density areas lack toilet facilities and drains (BMA, 2014). There are plastic litter bins at some vantage points in the township. The Bawku Municipality also has a number of waste disposal facilities including four tractors, 24 truck containers, 11 containers at site, 13 metal dust bins, 40 plastic bins and 2 waste disposal sites (BMA, 2014).

The Municipality also has the following liquid waste disposal facilities, 27 septic tank latrines, 14 Kumasi ventilated improved pits (KVIPs), 936 Ventilated improved pits (VIPs), 246 water closets, 1 environ-loo and 58 pan latrines. However, these facilities are located mainly in Bawku Township and other large settlements such as Mognori. In the rural communities, disposal of human and solid waste is largely indiscriminate (BMA, 2014).

3.3 Research design

The study employed an analytical cross-sectional study design using both quantitative and qualitative data collection techniques. Analytical cross-sectional study design is suitable not only because it enabled the researcher to collect data on both the independent variables and outcome variables simultaneously, it is comparatively quicker and cheaper to carry out (Mann, 2003).

The researcher used the mixed approach of data collection to have a broader overview of the sanitation management and its health implication in the study area. The qualitative research offered respondents the opportunity to speak about their own experiences with regards to sanitation issues at the study setting. This provided in-depth explanation of sanitation management and its health implication in the Bawku Municipality.

3.4 Study population

The study population comprised household heads especially those who were in charge of directing the daily collection, handling and transporting of waste to the refuse dumps in the Bawku Municipality. The researcher gave priority to females considered as household heads because at the study area, the cleanliness of the house is done at all times by the women.

The study population also involved heads of key institutions directly involved in sanitation management at the Bawku Municipality. These institutions involved were the Community water and Sanitation Unit, the Environmental Sanitation Unit and Care takers of Public Sanitation facilities within the study setting. These institutions were considered because of the role each of them plays towards sanitation management and its implication with the health status of the people within the study setting. The total study population involved was 396.

Table 3.1: Sampled population

Community	Number
Daduri	35
Zongo	35
SagaboGari	35

Yirongo	35
Sabonga	35
North Natinga	35
Mognori	35
Gentiga	20
Bado	20
Helbuko	20
Zabugu	30
Asikiri	20
Gozesi	20
Deega	21
Total	**396**

Source: Field data, 2016

3.5 Sample size determination

The study population was determined using the single population proportion formula, N= (Z21−α/2)P(1−P)/ d^2 because the outcome variables were categorical (Aday and Cornelius, 2006).

From the formula,

N is the sample size,

P is the estimated proportion of households, which was set at a value of 50.0%,

d is the acceptable margin of error at 5% (Z1−α/2) at 95% confidence interval (1.96).

Therefore, the required sample size was; N =1.96×1.96× (0.50) (1-0.50)/0.05×0.05 = 384.

Adjusting for a 10% non-response rate, a total of 423 households were selected to participate in the study. But at the end, only 396 study participants were used.

3.6 Sampling techniques

Multi-stage sampling techniques were used to select participating households and respondents. Two communities (fourteen communities in total) were randomly selected through lottery method to participate in the study. The sub-municipalities are: Kuka east, Kuka west, BaribariBado, Mognori, Urban east, Urban west and Kolori sub-municipalities. The total sample size required for the study were allocated proportionally to the number of communities based on population of households in the community to get the number of households required in each participating community.

Systematic random sampling were used to select the participating households by dividing the total number of households in a participating community by the number of households required in that community to get a sampling interval (n). A household was selected randomly within the sampling interval as the starting point. The subsequent households were selected by adding the nth term to any selected household. Study participants who formed the Focus Group Discussions and the Key Informants interviews were purposively sampled.

3.7 Data collection instruments

The study employed a structured questionnaire made up of close and open-ended questions (Appendix I), a semi structured interview guide for the key informants (See Appendix II) and a Focus Group Discussion Guide (See Appendix III) to collect data from respondents. The questions were carved out of the study objectives.

3.8 Data collection methods

3.8.1 Structured questions

The researchers used the structured questionnaire to collect the data. The questionnaire collected the data on socio-demographic characteristics of respondents, the current sanitation situation at the study setting, factors that accounted for the current sanitation situation, and strategies adopted to control the sanitation situation. Research assistants were employed to assist in the data collection process. The data was collected in English and the local languages. Training of data collectors was undertaken by the researcher to equip the data collectors with in-depth understanding of the questions and interview process. In the event that a respondent did not understand English, the questionnaire was administered in the local language.

3.8.2 Focus Group Discussion (FGD) Guide

The researchers used the FGDs to collect data from the study participants. The participants were homogenous in nature and consented to participate in the study. The researcher collected the data from the participants at a systematic manner and at the same time. Sitting arrangement was circular to enable participants see and hear one another and maintain eye contact. Each discussion lasted between 60-90 minutes and before a discussion starts, the moderator and note taker were introduced and allowed participants the opportunity to do same. This enabled building of rapport before the discussion.

The discussions were tape recorded to ensure that the views of participants have been fully captured. In addition to the audio recordings, detailed field notes were taken during every discussion to help capture responses and non-verbal actions during the discussion

processes. The consistent use of detailed field notes contributed immensely to ensuring consistency in views and opinions held by respondents during the analysis of the qualitative data.

The researcher addressed threats to validity using data collected during the research process itself. This was achieved by collecting rich data; all audio recordings were transcribed verbatim and compared with the detailed notes taken during the discussions to ensure consistency. Also, the researcher solicited feedback from participants by sharing the detailed notes recorded with them after each discussion to ensure that participants agree with the notes as a true interpretation of the opinions. The FGDs helped the researcher to collect data from participants that were not captured on the structured questionnaire.

3.8.3 Semi structured interview guide

The researcher used the semi structured interview guide to collect data from the key institutions heads at the study settings.

3.8.4 Pilot study

The data collection tools were pretested in a neighboring district, the Garu-Tempane district. The pretesting tested the appropriateness of the data collection tools in gathering the desired data. It tested clarity and flow of questions. Ambiguous questions were revised. Data gathered from the pretesting process was excluded in the study results.

3.9 Data analysis

The data was coded and entered using Statistical Package for Social Sciences (SPSS) windows version 21.0 and Microsoft word excels 2013. Inferential and descriptive statistics were used to describe the information contained in the questionnaire. The results were presented in the form of tables and charts. The analysis was guided by the specific objectives of the study.

The researcher read the focus group discussion transcripts several times to have an understanding of the content of the data. Ideas and patterns relevant to the study objectives identified during the reading process were written down. Thematic analysis was done with the qualitative data. All statistical tests were performed using two-sided tests at the 0.05 level of significance. P values less than 0.05 was considered significant.

3.10 Ethical consideration

The researcher obtained permission from the relevant authorities before carrying out the study. Honesty and integrity was highly maintained throughout the study. Informed consent was obtained from all the study participants. Participation in this study was voluntary and the study subjects were allowed to withdraw from the study without any penalty.

The participants right to confidentiality was protected as names of the participants were not written on the questionnaire. The researcher assured the respondents the confidentiality of the data obtained. As required by every scientific research, names, addresses and other vital particulars of the respondents were not connected with particular answers without the explicit permission of the respondents.

This made it impossible to connect any answer or behaviour with a specific individual. In certain situations, the researcher ensured that information obtained from the field was treated with the utmost confidentially that it deserves.

3.11 Study limitations

Some respondents were not willing to give all the information required by the researchers because of the fear of being penalized. Efforts were however made to reduce this problem by assuring them of the confidentiality of all information provided. It is assumed therefore that all responses were made in honesty. Time and resources were the limitation since the researcher did not seek funding from external source, but used personal resources.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter contains the results of the data collected from the respondents. It is presented based on the specific objectives of the study.

4.2 Demographic data of respondents

The study collected bio data of the study participants on sex, age in years, marital status, educational level and occupational status. Knowing the demographic data assisted the researcher to know the caliber of people who formed the study participants since that could enhance the reliability and validity of the data collected. The results of the demographic data of respondents are showed in Table 4.1.

From Table 4.1, the demographic data collected showed that, majority of the study participants (78.5%) were aged above 40 years while 15.9% of the study participants were aged between 31-40 years. These results showed that, majority of the respondents were in their early thirties and late forties. These therefore, showed that, study participants were matured and their responses could be valid in terms of the variables assessed.

Majority of the study participants (61.6%) said they were females while the rest were males. This showed the readiness of both sex to participate in the study even though the findings was more of females because they have much knowledge on how waste are generated and disposed in their houses.

The results also showed that, majority of the study participants (55.8%) indicated they had tertiary education while the results had other forms of educational training except

(10.1%) of the study participants who had no form of formal education (See Table 4.1). This finding showed that, study participants had good knowledge of the variables that were assessed since their educational level was good. Thus, their response to sanitation issues within the study area might have been informed by their educational level and exposure to the reality of the sanitation situation.

Less than half, (45.7%) of the study participants were petty traders while 20.5% were unemployed. From this results based on the occupational status of study participants, it meant that, majority of the study participants might have been confronted with the reality of the sanitation situation in the market especially as they went about their businesses of buying and selling. See Table 4.1 for the detailed results of the demographic data of study participants.

Table 4.1: Demographic data of respondents

Variable	Frequency (n=396)	Percent (%)
Age (years)		
18-30	22	5.6
31-40	63	15.9
40+	311	78.5
Sex		
Male	152	38.4
Female	244	61.6
Marital status		
Single	52	13.1
Married	344	86.9
Educational level		
No formal education	40	10.1
Primary	80	20.2
Secondary	55	13.9
Tertiary	221	55.8
Occupational status		
Unemployed	81	20.5
Traders	181	45.7
Farmers	101	25.5
Salaried workers	33	8.3

Source: Field data, 2017

4.3 Current sanitation situation

The study tried to assess the sanitation situation in the various communities. The findings showed significant portions of study participants highlighting the effects of the bad sanitation practices which undoubtedly resulted in major difficulties and constraints in environmental sanitation management. The results showed that, the current situation of the study setting was not the best because of several reasons.

Table 4.2 showed the results of availability of household toilet facilities in communities that were visited within the study setting. As part of assessing the current sanitation situation at the study setting, a total of 14 communities were visited to assess the availability of toilets at the households and at the community level where people within those communities could use them.

From the results in Table 4.2, the highest number representing (42.8%) was recorded in two communities (Daduri and SagaboGari), which had availability of toilets for people to use. This could explain the reasons that these two communities are just within the Bawku Municipality and perhaps may not want a bad ordour to emanate from the communities.

However, from the results, three communities had not got any public or households toilets in their communities within the study settings. While a good number of them had 3 toilets facilities representing 8.6%. These showed that, the current sanitation situation at the study place was not the best.

Table 4.2: Availability of household toilet facilities in communities

Community	Availability of toilet n (%)	Not available n (%)
Daduri	15 (42.8)	20 (57.2)
Zongo	12 (34.3)	23 (65.7)
SagaboGari	15 (42.8)	20 (57.2)
Sabonga	8 (21.6)	27 (71.4)
Yirongo	10 (28.5)	25 (71.5)
North Natinga	9 (25.7)	26 (74.3)
Mognori	3 (8.6)	32 (91.4)
Gentiga	1 (5.0)	5 (19.0)
Bador	2 (10.0)	18 (90.0)
Helbuko	0 (0.0)	20 (100.0)
Zabugu	3 (8.6)	27 (90.0)
Asikiri	3 (8.6)	17 (85.0)
Gozesi	0 (0.0)	20 (100.0)
Deega	2 (10.0)	18 (90.0)

Source: Field data, 2017

The drainage system of a place is a strong determinant of sanitation of the place. Households and communities that have good drainage systems are marked high on the sanitation ladder whilst households and communities with poor drainage systems are marked low. From Table 4.3, the study assessed the drainage system in the communities visited.

From the results, 71.5% of the households in Mognori had drainage system while no house had a drainage system in Helbuko. This would definitely affect the sanitation situation at these places. Based on the results in Table 4.3, 35.9% of households have drains/gutters to grey water disposal whilst the remaining 64.1% did not have drains/gutters and resorted to other means to dispose waste water from the kitchen and bath.

Table 4.3: Availability of drains in the households

Community	Availability of drains n (%)	No drains n (%)
Daduri	22 (62.9%)	13 (37.4%)
Zongo	24 (68.5%)	11 (31.4%)
SagaboGari	19 (54.2%)	16 (45.7%)
Sabonga	12 (34.3%)	23 (65.7%)
Yirongo	13 (37.1%)	22 (62.8%)
North Natinga	10 (28.5%)	25 (71.5%)
Mognori	25 (71.5%)	10 (28.6%)
Gentiga	5 (25.0%)	15 (75.0%)
Bador	1 (5.0%)	19 (95.0%)
Helbuko	0 (0.0%)	20 (100.0%)
Zabugu	6 (20.0%)	24 (80.0%)
Asikiri	2 (10.0%)	18 (90.0%)
Gozesi	1 (5.0%)	19 (95.0%)
Deega	2 (9.5%)	19 (90.5%)
Total	83	313

Source: Field data, 2016

From Figure 4.1, majority of the study participants (76%) cited that the type of toilet they have at home was the KVIP while 13% said they had locally constructed toilet facilities within their homes. It is a common thing to see or experience in most houses including self containers houses built without toilets. This practice has persisted for some time now

because they have not been much discourse in this direction and landlords have not found it befitting to add toilet facilities to their houses. See Figure 4.1 for details.

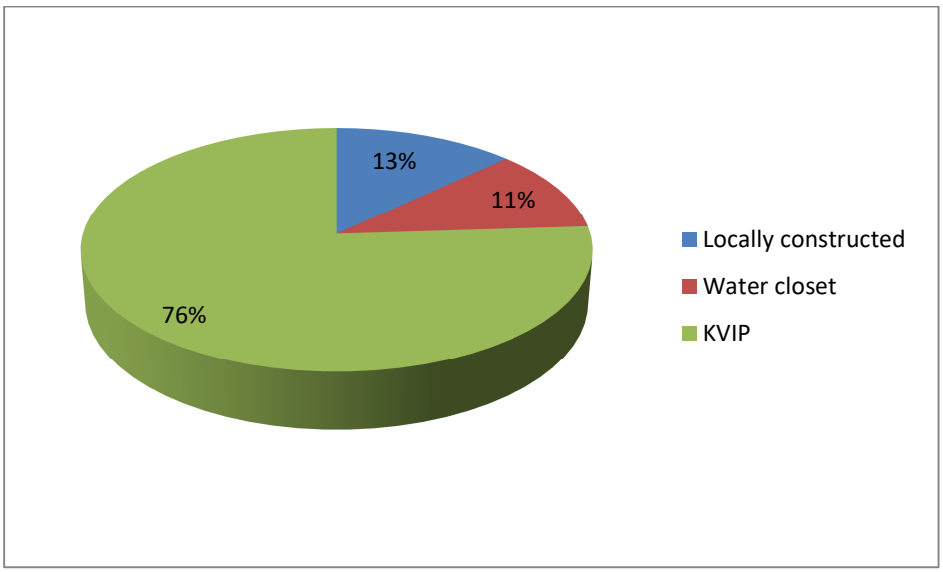

Figure 4.1: Type of toilet facility

The study assessed how children defecate in the study setting since that could also contribute to the immediate sanitation situation. From the results showed in Figure 4.2, the findings showed that, majority of the study participants (73%) cited that children defecate around their houses. Based on this, it would not be out of place to suggest that, children faeces might just be left around the houses which could posed a health threat. The results also showed that, 11% of the study participants cited that, children defecated in the gutters (See Figure 4.2).

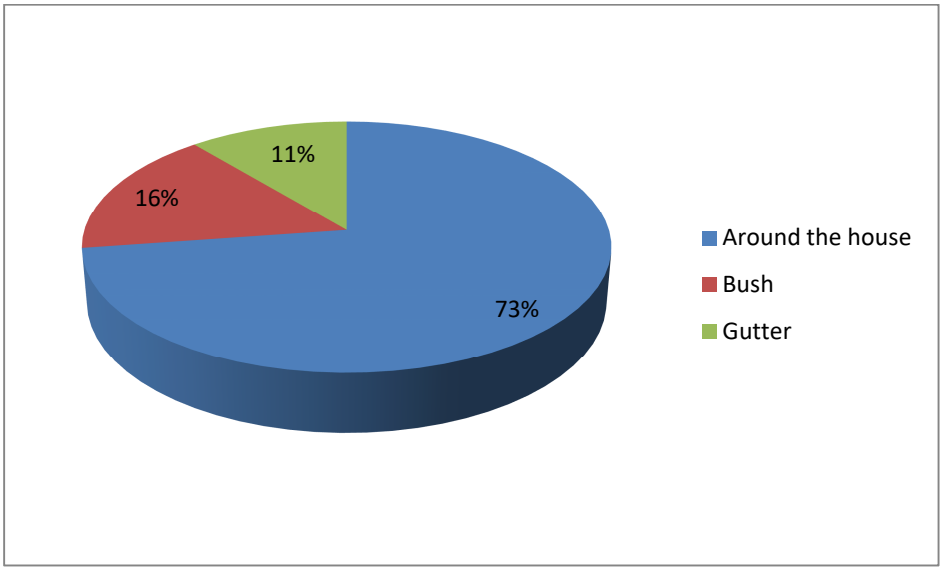

Figure 4.2: Mode of defecation for children

Another essential component of sanitation is the proper disposal of garbage also referred to as solid waste. From Figure 4.3, majority of the study participants (89%) mentioned that, they disposed off their liquid waste in the open space. This could just be within the immediate surroundings. However, from the results, see Figure 4.3, only a smaller number representing 3% indicated that they disposed off their liquid waste in a pit.

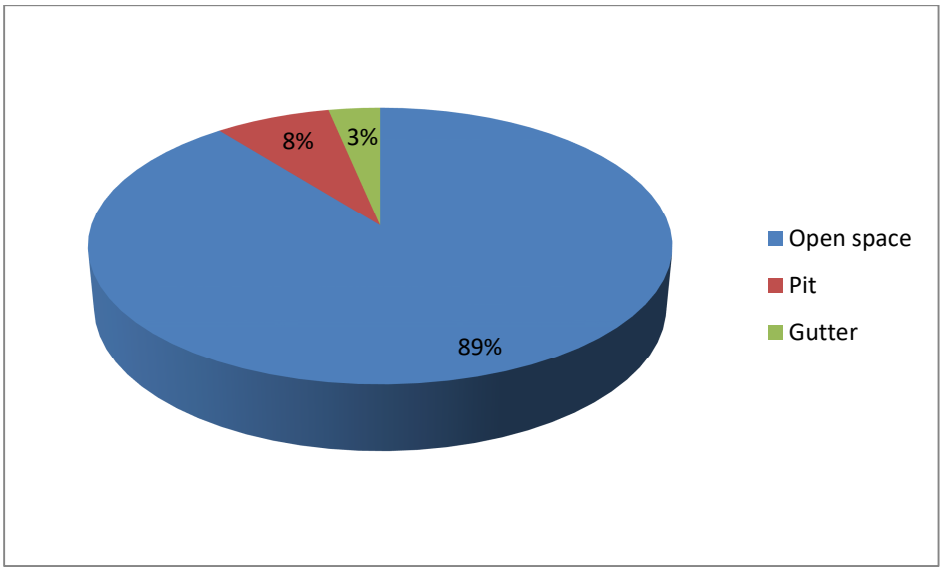

Figure 4.3: Mode of disposal for liquid waste

From Figure 4.4, most of the study participants (37%) cited that, they mode of disposing their solid waste was burning in the open space while 14% indicated that they put them in a pit. It is important to state that, most solid wastes in the communities where the study was undertaken were mainly disposed through burning. This mode of disposal of waste was found to be common to those disposing solid waste. See Figure 4.4 for details results of how study participant's disposed their solid waste.

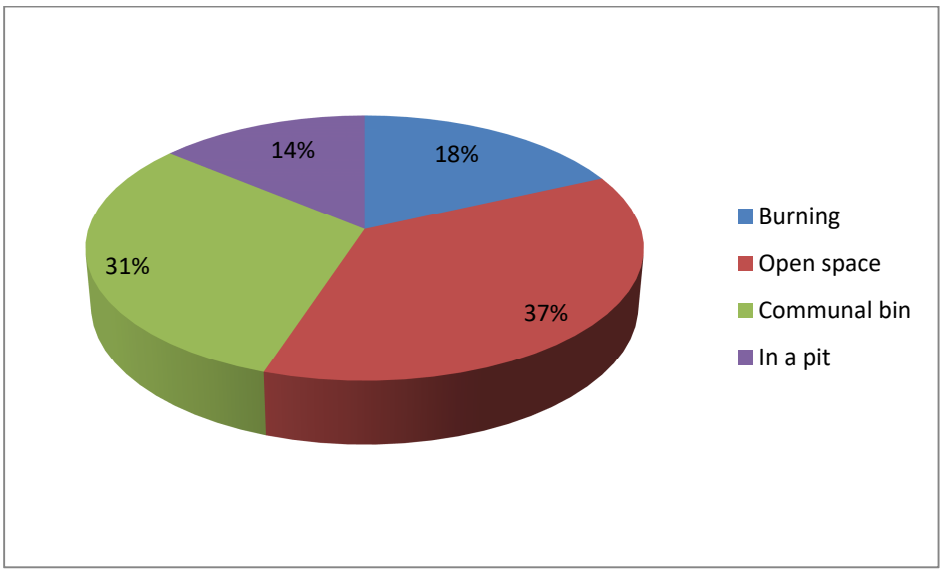

Figure 4.4: Mode of disposal for solid waste

From Table 4.4, there was a statistical relationship between respondents educational status and knowledge of the current sanitation situation at the study setting ($\chi^2 = 2.610$; df = 3; P = 0.011). This could probably be due to the fact that, both the educated and non educated all knew the current sanitation situation of the study setting since the issue of sanitation is not hidden.

Table 4.4: Education and sanitation situation

Variable	Very good	Good	Bad	Very bad	χ^2	Df	p-value
Primary	11.1%	8.2%	18.5%	62.2%	2.610	3	0.011
Secondary	21.0%	8.7%	37.1	33.2%			
Tertiary	8.8%	11.3%	34.7%	45.2%			

Source: Field data, 2016

Study participants were asked to assess the sanitation situation at the study setting. From Figure 4.5, majority of them representing 53.5% indicated that, the sanitation situation at the time of the research was very bad while a relatively smaller number representing 3.2% said it was very good. Based on these two findings, the sanitation situation at the study place was not the best. See Figure 4.5 for details.

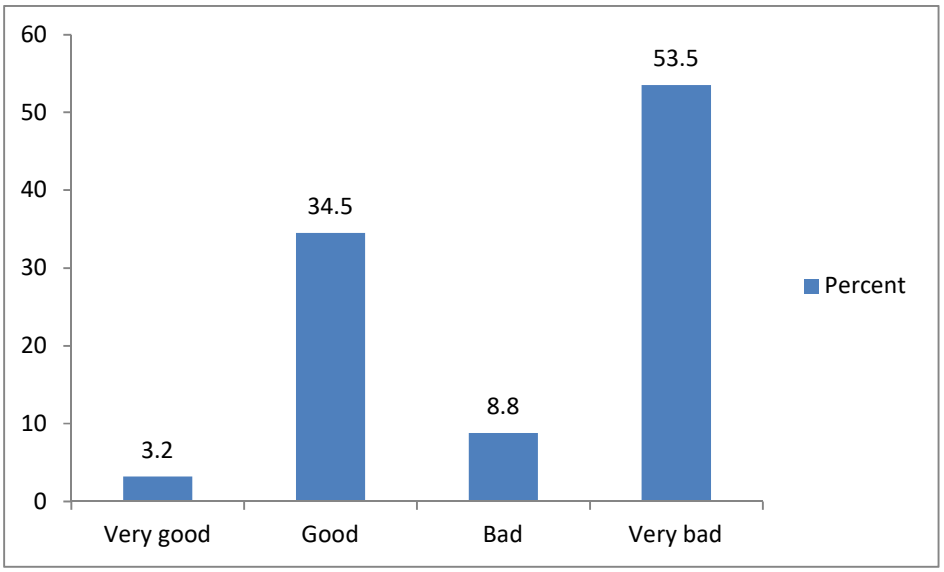

Figure 4.5: Assessment of the sanitation situation in their community

4.4 Factors that account for the current sanitation situation

The factors which contribute to poor sanitation management present or absent from the household plot or community levels are complex and diverse. The study assessed the factors that accounted for the sanitation situation at the study setting.

The study examined the availability of toilets in households in the study area. From the results showed in Figure 4.6, majority of the study participants representing 76.5% said they did not have toilets in their houses because they did not include it in their building plans. This therefore, means that, these houses would have to resort to open defecation especially at places where availability of public toilets is not in existence. This obviously was a factor contributing to the poor state of the sanitation management at the study setting.

From the results in Figure 4.6, 2.7% also cited that, there was no need for construction of a toilet in their houses. This could be a worrying situation since this number would not make any conscious efforts to construct a toilet but perhaps may resort to open defecation leading to the poor sanitation situation with its health implication associated with poor sanitation diseases.

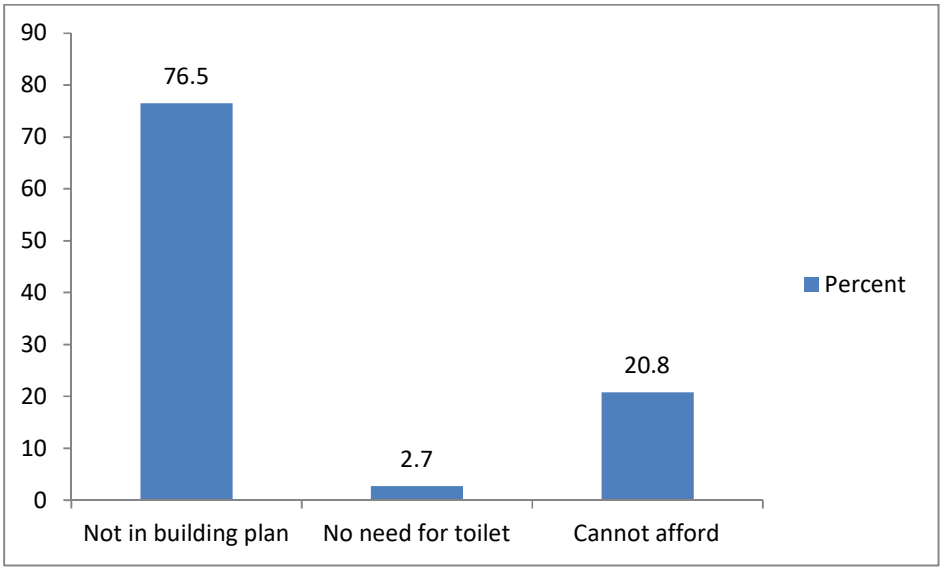

Figure 4.6: Lack of toilets in households

The study assessed the factors that contributed to the poor sanitation management at the study setting in terms of waste bins in this figure. From the results in figure 4.7, most (49%) of the study participants said they could not afford to buy the waste bins for storing rubbish while 14% of the study participants said they did not know that waste bins services were available in the study setting where people could make request for. From this result, it meant that majority of the households did not have the waste bins and therefore, might have been dumping their waste around their houses or just littering them around. This would obviously affect the sanitation management situation in the study area.

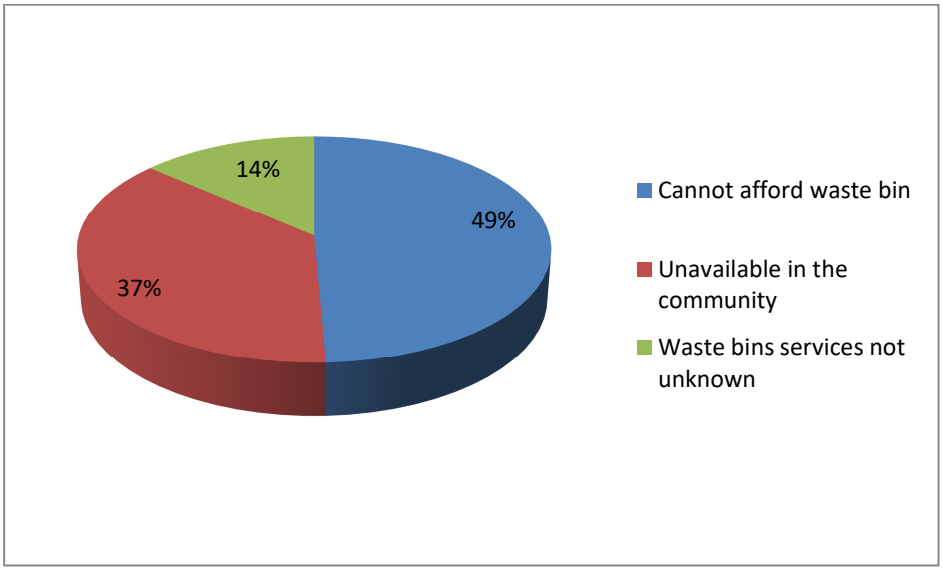

Figure 4.7: Lack of waste bins

From Table 4.5, paired samples test of respondents' demographic data such as age, occupation and education and knowledge of the factors that accounted for the current sanitation situation was analysed. From the results, there was a statistical association between respondents' occupational status and knowledge of the factors that accounted for the poor state of the sanitation issue with a standard deviation of 1.218 ($p < 0.001$). There was no statistical relationship between respondents' educational status and knowledge of factors that accounted for the current sanitation situation ($p > 0.011$) and ($p < 0.001$). See Table 4.5

Table 4.5: Paired sampled t test of demographic data and sanitation

		Paired differences					t	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval			
					Lower	Upper		
Pair 1	Age – causes	.000	1.228	.147	-.293	.293	.000	.000
Pair 2	Occupation – causes	-1.229	1.218	.146	-1.519	-.938	-8.440	.000
Pair 3	Education – causes	-.157	1.163	.139	-.434	.1201	-1.131	0.011
Pair 4	Sex-causes	-.197	1.111	.115	-.134	.1001	-1.121	.000

- *As for this community, you will not see dustbins for collecting waste. So we lack communal bins which are a cause of the poor sanitation in Daduri community.* **A female participant,**
- *This community (Zabugu) has poor drainage system. Sometimes when it rains, it very difficult for the water to pass leading to the poor sanitation situation.* **A male participant**
- *As for this community (Asikiri) we just donot have both household toilets and public toilets for people to use. So people do defecate around leading to the poor sanitary condition. This situation is even more terrible for women.* **A male participant**
- *In our houses too, we do not have soak away pits. This makes people to discharge waste in their immediate surroundings.* **A female participant in Deega**

- *As for this community (Deega), we defecate in the open space.* **A male participant**
- *We sometimes use the community (Mognori) toilet or ride into the bush or rocks to defecate*. **A male participant**
- *In our area, I think why people do not have toilets facilities at their homes is because they cannot afford to buy the equipment and materials needed for construction. So you will see a very big compound house but with no toilet for people to use*. **A male participant in Bado**
- *At the community level, public toilets are not being handled well by the care takers. It is not siphoned regularly even if it is siphoned; the sludge is deposited in the community.* **A female participant in Bado**
- *We in this area deposit our waste around our immediate environment. The wind comes to blow them around leading to the poor state of the sanitation situation*. **A female participant in Bado**
- *"The urban councils which are subset of the municipal assembly are not functioning well due largely to inadequate staffing and inadequate logistics"*. **A key informant**

4.5 Influence of the sanitation on the health of the people

In the context of urbanization especially observed in the study setting, indiscriminate littering, domestic wastewater, sewage and solid waste improperly discharged presents a variety of concerns as these promote the breeding of mosquitoes. This poses a health threat to the people. The study assessed the influence of the current sanitation on the health of the people.

From table 4.6, study participants were asked to mention the most common diseases children were experiencing two week before the survey especially related to poor sanitary conditions. From the results (see Table 4.6), majority of the participants cited diarrhoea as the commonest disease children mostly experience while 25.0% cited cholera. However, 16.6% of the study participants indicated that their children never had any disease related to poor sanitary condition at the study setting (Table 4.6). This could be due to the fact that, children might have presented symptoms or signs parents or caregivers thought were not in any way connected with the variables that were discussed in this study under this objective or perhaps, that these children never experience the diseases. See table 4.6 for details.

Table 4.6: Sanitation related diseases that affected children

Variable	Frequency	Percent (%)
Diarrhoea	224	56.5
Cholera	99	25.0
Malaria	3	0.9
Typhoid	4	1.0
No disease	66	16.6

Total	**396**	**100**

Source: Field data, 2016

From table 4.7, there was a statistical relationship between study participants educational status and number of times children have fallen ill at the time of the study (χ^2=1.468; P=0.002). This could be due to the reason that educated persons might have had knowledge on how to prevent poor sanitary conditions especially breeding grounds for mosquito.

Table 4.7: Education and disease experience crosstabulation

Variable	Diarrhea	Malaria	Cholera	Typhoid
No education	51.4%	48.6%	0.0%	0.0%
Primary	14.5%	51.1%	23.4%	10.9%
Middle/JHS	8.6%	17.2%	66.7%	7.5%
SHS	25.9%	17.1%	25.0%	32.0%)
Tertiary	14.5%	31.1%	33.3%	21.1%

Source: Field data, 2016

- *We easily experience these diseases especially among children "Malaria, diarrhea, typhoid",* "Six *participants said children under five years have had diarrhea in their households two weeks preceding the study"*
- *Malaria is the commonest disease among adults in the community. The disease is mainly from the drainage system. There are no household soak a-ways and waste water is chocked with solid waste and this serves as a breeding place for mosquitoes that is why malaria incidence is high.* ***K*****ey informant**
- *Open defecation is very common and when there is a rainfall, fecal matter is carried into the hand dug wells around because they are not covered and other water bodies. When this water is consumed, diseases are acquired. Also our children defecate around the house and that is the same place they play that is why most children have diarrhea.* **Key informant**

4.6 Interventions and strategies to improve sanitation management

The study assessed the possible strategies that could be employed to aid in improving the sanitation situation at the study place. The results are presented below.

From table 4.8, study participants suggested ways by which they could improve upon the state of sanitation situation at the study place. From the results, all participants stated that, they normally clean their houses daily while 40.5% of the study participants said they also usually participate in National Sanitation Day.

From the results, nearly all of the study participants (92.9%) cited that, enforcement of bye-laws at the study setting could serve as a mean to let people take the cleanliness of their own surrounding serious which would go a long way to improve upon the

sanitation. Since persons would be fined for being negligence on the sanitation issues. See Table 4.8 for details.

- *We have realized that children are the once responsible for disposing household refuse so we have constructed steps and attached them to the communal bins so that the children can climb to dispose the waste because most of them dispose the waste on the floor because the cannot reach the communal bin.* **A Key informant**
- *To improve sanitation in the rural communities, households should be supported to construct toilet facilities since the response to Community Led Total Sanitation (CLTS) is not favorable.* **Key informant**
- *The vehicles used to carry waste should be maintained regularly to work in their full capacity. The urban councils should be empowered and strictly supervised to work efficiently to improve sanitation management.* **Key informant**
- *More environmental health workers should be employed because since 2011 we have not received new environmental health workers. More laborers should be employed to clean the public facilities and sweep around the township. Most drains in the township are chocked due to the parking of large trucks on the road.* **Key informant**
- *The municipality should use the national sanitation bye laws. The by-laws are currently not enforced. They are to be reviewed and strictly enforced at the end of the year.* **Key informant**
- *We have a radio program where we educate the inhabitants of the municipality on the need to ensure good sanitation and the health implication of poor sanitation and the need for attitude change. The information van goes round the*

municipality regularly to educate the people and also notify them on the national sanitation day. **Key informant**

- *We can ensure good sanitation in our household by, cleaning the entire households weekly and the entire community monthly that is during the national sanitation day.* **Key informant**
- *I think there should be a strict enforcement of bye laws on sanitation in this area if we want to solve the problem of poor sanitation.* **A female participant**
- *The municipal assembly should sponsor the construction of the community toilets and jobs should be created to empower individuals to construct their own toilet facilities. This would help improve sanitation in their community and the Municipality at large.* **Male participant in Bado**
- *There should be adequate staff to clear the city of solid waste. The municipal assembly should collaborate with "zoomlion" to make the municipality clean.* **A male participant in Bado**

Table 4.8: Strategies aimed at improving on the sanitation

Variable	Frequency (396)	Percent (%)
Interventions		
Cleaning the house daily	396	100.0
Cleaning the house weekly	268	67.7
Participating in the National sanitation day	160	40.5
Strategies to improve sanitation		

Public education	345	87.1
Provision of households toilet	396	100.0
Provision of communal toilets	298	75.3
Provision of waste bins	368	92.9
Enforcement of bye-laws	368	92.9

Multiple responses

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter of the report closely looks at the main findings of the study and relates them to available literature where appropriate.

5.2 Sanitation management

Sanitation is a complex topic, with links to health and to social and economic development. It affects many but is championed by few. From the analysis, findings showed that, out of the 14 communities sampled within the Bawku municipality to assess the availability of household toilet facilities, it was showed that 10 communities visited had no households toilet facilities. This therefore, means that, safe water at those places would have been compromised.

Safe water and sanitation and knowledge of hygienic behavior among people are the greatest of all public health breaks through (Jacobsen, Webster and Vairavamoorthy, 2012). Every human being should be encouraged by health authorities through health education to take keen interest in having the priority of drinking good and safe water and must also observed good sanitation practices as it would lead to development in developing countries. Studies on water handling during collection, storage and use have shown that there is progressive contamination from source to the point of consumption due to poor sanitation and inadequate/inappropriate hygiene among people especially at the rural area (Peal and Evans, 2011). A rural water and sanitation study showed that only 9% of 57 household surveyed were consuming acceptable quality of water (Spears, 2013). As evident in this study, it was revealed that, only few communities within the study place only had access to good drinking water.

It was showed that, only 4 communities had houses with households toilets above 10 in number. This finding from the study is similar to the study done by Adubofour et al. (2013) where urban slum Muslim communities in the Kumasi metropolis, Ghana lacked access to households toilets. Given the size of the municipality couple with how fast

trading was taking place in the study setting, it was evident that, the current toilets that could be used by people in the houses were very inadequate.

Given the volatile nature of the study setting, one wonders what would be done in houses where there were no toilets and people would like to ease themselves in the night especially during curfew hours. It would be left with no option but to resort to the use of the black polythene for storing and disposing of human excreta especially among urban communities. This assessment of the toilet situation points to the fact that, the sanitation situation at the time of the study was not the best of shape.

Providing adequate sanitation will have profound implications for human health and poverty alleviation. The global community has set ambitious targets for improving access to sanitation. Achieving these goals will have a dramatic impact on the lives of hundreds of millions of the world's poorest people and will open the door to further economic development for tens of thousands of communities. Access to adequate sanitation literally signifies crossing the most critical barrier to a life of dignity and fulfilment of basic needs (Schmoll et al. 2006)

Again from the results, 7 communities had no proper drainage systems. These communities had no drainage systems up to 10 in number. Given the intensity of rains sometimes in the raining seasons, one wonders how waste was likely to be transported. This finding from the study is at variance with the study done by Anchett et al. (2011) where they were enough drainage systems in Rural Bangladesh.

The study also assessed how children defecate in the study area. From the results, 73% of the study participants cited that, children defecate around the houses. This finding from

the results was not surprising as children faeces were not considered by people as dangerous in the study setting. This could pose health risk to the children and even the older person themselves. This finding from the study is similar to the study done by Bartram and Cairncross (2010) where children were said to be defecating just in front of the houses.

Across the world, billions of people still lack back sanitation unless it is controlled and safely disposed off. Human excreta pose a major treat to health, particularly infectious disease (Colin, 2011). But basic sanitation such as latrines can protect health, waste can also be a useful resource, for example human excreta and waste water are used and recycled in many countries for example in Agricultural and aquaculture and this can be done safely (Annet et al. 2008)

The finding is however at variance with the study done by Cairncross et al. (2010) where children were told to defecate in the bush. It is important to state that, over the past two decades, provision of improved sanitation has barely kept pace with increasing populations while most other social services, including water supply, have outpaced population growth.

From the results, majority of the study participants representing 89% indicated that they disposed off their waste in the open space. This finding from the study agrees with the findings presented by Kendie (2010) where waste were disposed off in the open space in Northern Ghana.

The study showed that there was statistical relationship between the educational status of study participants and how well they were able to assess the sanitation situation at the study place as reported (χ^2 = 2.610; df = 3; P= 0.011). This finding from the study

disagrees with the study done by Kobel and Del Mistro (2015) where education appeared to have been more associated with the knowledge of sanitation by people. Based on that, the study participants rated their understanding of the current sanitation situation of the study place not to be good.

The problem is amplified by inadequate land use planning and control in unplanned slum communities, which often have the most severe sanitation problems, and inadequate drainage systems, often choked with uncollected solid waste. Adequate drainage and solid waste management is therefore an essential complement to excreta management services (Bryant, 1998).

In many developing countries, enabling environments are weak, characterized by a lack of effective policy and regulation at the city level, inadequate capacity for sanitation planning and stakeholder consultation, and insufficient harmonization with established municipal capacities, systems, and budgeting processes. Effectively implementing these frameworks depends on the political drivers for policymaking, resource allocation, and operational decision making and technical focus of the frameworks may lead to these factors being overlooked. In particular, poor communities often lack political influence to affect municipal decisions, so sanitary conditions in these communities may not be political priorities for decision-makers (Carr and Strauss, 2001)

Delivery of effective sanitation to all urban dwellers requires the whole chain of services, supported by a combination of domestic, decentralized, or fully networked infrastructure. This, in turn, requires an appropriate enabling environment that can engage the many stakeholders involved, from communities to national governments, to drive change and secure sustainable financing for services provided through both the market and the public

sector, reinforced by clearly defined accountability mechanisms (Esrey, 1994; Kyomukama, 1999).

Good sanitation and improved hygiene means of disposing their waste. This is a growing nuisance for heavily populated areas, carrying the risk of infectious diseases, particularly from diseases that lower their resistance. Poorly controlled waste also means daily exposure to unpleasant environment. The buildup of faucal contamination in rivers and waters is not the best of shape in most observed cases (Hunter, 1997)

5.3 Factors that account for the current sanitation situation

Factors identified to be causing poor sanitation among residents are multifaceted. While individual factors could play key contributions to the poor waste management systems, community waste are equally contributing to the poor waste management.

From the study findings it was showed that, 49% of the study participants indicated that they could not afford to buy a waste bin at the time of the study. This possibly could explain why majority of them had their waste openly displayed at the open space within the study place. This was evident in one of the responses as stated below.

- *As for this community, you will not see dustbins for collecting waste. So we lack communal bins which were a cause of the poor sanitation in the community.* **A female participant**

This finding from the study disagrees with the study done by Yap (2010) where study participants had rubbish bins but still did not put the wastes into the waste bins.

From the study results, findings showed that, 76.5% of the study participants indicated that, they were not having toilet facilities because it was not included in the building plan

of their houses. This could possible mean that study participants among others were practicing open defecation. This was even evident in this response;

- *As for this community, we defecate in the open space.* **A male participant**
- *We sometimes use the community toilet or ride into the bush or rocks to defecate*. **A male participant**

In many developing countries, enabling environments for the provision of basic toilets facilities are weak, characterized by a lack of effective policy and regulation at the city level, inadequate capacity for sanitation planning and stakeholder consultation, and insufficient harmonization with established municipal capacities, systems, and budgeting processes (Verspyck and Guene, 2012)

Effectively implementing these frameworks depends on the political drivers for policy making, resource allocation, and operational decision making and technical focus of the frameworks may lead to these factors being overlooked. In particular, poor communities often lack political influence to affect municipal decisions, so sanitary conditions in these communities may not be political priorities for decision-makers (Koné, Strauss and Saywell, 2007)

Reducing open defecation cannot be considered as “mission accomplished.”The key issue is to prevent exposure to fecal matter (human and animal) in order to hinder initiation of tropical/environmental enteropathy. Building toilets and providing reliable sources of water supply, therefore, will not yield much unless the quality of water and sanitation facilities is improved and hygiene practices are promoted to reduce fecal-oral contamination.

The provision of safe water and sanitation facilities in communities is a first step towards a healthy physical learning environment benefiting both learning and health. However, the mere provision of facilities does not make them sustainable or produce the desired impact (Jacobsen, Webster and Vairavamoorthy, 2012). It is the use of technical facilities and the related appropriate hygiene behaviours of people that provide health benefits. In communities, hygiene education aims to promote those practices that will help prevent water and sanitation-related diseases as well as promoting healthy behaviour in the future generation of adults (Koné, Strauss and Saywell, 2007)

Women were significantly more likely than men to be concerned with environmental problems. Females have been consistently shown to have higher environmentally conscious attitudes and practices than men. The common reason advanced for gender differences is the different socialization patterns between boys and girls. More often than not, girls are made to carry out most of all the sweeping and cleaning activities; they are called upon more than their male counterparts to perform maintenance tasks at home or in market centres. Sanitation issues at the community level should therefore, be seen by all.

The provision of sanitation is a key development intervention without it, ill-health dominates a life without dignity. Simply having access to sanitation increases health, well-being and economic productivity. Inadequate sanitation impacts individuals, households, communities and countries. Despite its importance, achieving real gains in sanitation coverage has been slow (Jacobsen, Webster and Vairavamoorthy, 2012)

In densely settled slums, the scramble for living space means that houses are sometimes built directly over open drains, exacerbating drainage and flooding problems. Improving sanitation in such environments can be even harder than introducing new infrastructure in

communities where there is a complete lack of infrastructure and services. It may take decades to achieve safe management and disposal of excreta and wastewater citywide, supported by consumer awareness, sustainable financing, and effective decision-making and service delivery systems (Colin, 2011)

Improving access to sanitation and changing hygiene behaviours provide large benefits to all members of society that justify the preferential use of financial resources by individuals, households, communities, governments and external agencies to fund sanitation and hygiene interventions. For countries with poor coverage, the focus should be on increasing access (Carr and Strauss, 2001)

This can be leveraged by steering public funding towards stimulating demand for sanitation and promoting hygienic practices in schools as well as at the household level; financing public and school sanitation services; and delivering targeted subsidies where these can be demonstrated to be effective in increasing access. Although external support agencies can help with funding, governments will still need to contribute most of the resources to accelerate implementation of sanitation and hygiene programmes. Governments have a responsibility to spend scarce resources in the most cost-effective way, that is, to select programmes or technologies that provide maximum health benefits to the greatest number of people at the lowest cost (Kyomukama, 1999).

The increased interest in water, sanitation and hygiene in communities could contribute to a safe and healthy learning environment which is a positive development. Special steps must be taken to accelerate and coordinate progress on water, sanitation and hygiene programmes in all communities by major stakeholders.

The removal and transport of waste from communities should be done in coordinated manner as steps are typically achieved in one of two ways. Sewerage washes the fecal matter through a pipe system using water and, frequently, pumping stations. Alternatively, fecal sludge is accumulated on-site in a pit or septic tank, emptied periodically, and taken by road to treatment. Either way, the absence or weakness of any link in the sanitation service chain will cause fecal pollution and negatively impact public health (Mathur, 2002)

5.4 Influence of sanitation on the health of the people

The world today is faced with an acceleration of environmental, economic and social changes that have become a cause for concern. These accelerated changes have resulted in global problems, which manifest themselves as a conglomerate of problems, calling for sophisticated solutions and extensive problem-solving processes.

The consequences of inadequate sanitation are severe. People living in poorly serviced areas are at a higher risk of getting infections such as cholera, diarrhoea and other deadly diseases, which jeopardise education, productivity, and the quality of life, in the event that they do not result in death. Where demand for sanitation exists, people are often willing to commit their own scarce financial and other resources to building sanitation facilities. Providing the right types of incentives, such as matching funds or gifts in-kind (for example, transportation of materials, supplying prefabricated sanitary platforms) may stimulate households or communities to build their own facilities.

Well-designed education programmes to demonstrate the link between sanitation, hygiene, health and economic development can contribute to increasing demand for

improved sanitation. Hygiene promotion campaigns are most effective among younger populations, and community members can be targeted both as beneficiaries and as agents of behavioural change within their families and their communities. Hygiene education should be included in school curricula, together with the provision and maintenance of sanitation facilities at school premises (Carr and Strauss, 2001)

From the results, a little over half of the study participants (56.5%) indicated that the commonest diseases their children normally get was diarrhoea. This finding from the study is similar to the study done by Tukahirwa et al. (2013) where diarrhea was found to be the commonest disease affecting children. Diarrheal is premised upon fecal-oral contamination. Diarrhea is a clinical condition and results in loss of appetite and nutrients. It is characterized by physiological and anatomical changes to the structure of the small intestine that affect a child's ability to both absorb and utilize nutrients.

Improving access to sanitation is therefore not just as a way to improve quality of life but also a life-saving strategy. Being a public good, the consequences of poor sanitation are not just limited to un-serviced areas; there are spill-over effects such as health risks, which affect even affluent households that have their own proper sanitation. From the results, 25% of the study participants also showed that, their children had ever experienced cholera possible due to the poor sanitation conditions in the study place. This finding from the study is similar to the study done by the WHO (2010).

A lack of sanitation is an issue that disproportionately affects women. The global sanitation crisis means that 2.5 billion people lack access to a toilet and this disproportionately affects women. they need the privacy of a toilet during menstruation,

they are at increased risk of violence if they do not have one and have to go outside, often late at night (Verspyck and Guene, 2012)

More than one third of the world's population lacks access to sanitation and with population growth snowballing the sanitation crisis will only deepen. The recognition of World Toilet Day by the UN this year sends an important message that sanitation should firmly be on all our agendas. But in order to help improve the lives of the 2.5 billion people without access to sanitation, stronger partnerships will need to be built. The success of these depends on greater support from across the private sector, governments and civil society, the strong leadership of all parties involved, a clear purpose, shared goals and a willingness to pool resource.

Reported cases of dirahhoea were indicated by respondents. This might not be seen by people in other parts of the countries. These disparities highlight a pressing need to address the urban sanitation challenge comprehensively, with emphasis on including slum dwellers and poor communities that have typically been neglected. Without concerted intervention, the prospects of cholera, diarrhea, and worm infections will increase, jeopardizing education, productivity, and the quality of life for all urban dwellers.

In many developing countries, there are major disparities in access to sanitation in urban areas between rich and poor. Global monitoring systems have not yet captured the full scale of the sanitation challenge in urban areas, but disaggregated data show differences in access to sanitation between the richest and poorest quintiles to be more than 80 percentage points in some countries. In Sub Saharan Africa, the lowest wealth quintile

had only 42 percent access to improved sanitation, compared to 91 percent for the richest quintile between 2004 and 2009.

From the results, there was a statistical relationship between educational status of respondents and the number of times children has fallen ill (χ^2=1.468; P < 0.002). This finding from the study disagrees with the study done by William (2010) where educational status of study participants did not play any significant role with the number of times their children were fallen sick. When people understand why improved sanitation is to their advantage, they will act. Also all people, regardless of their educational backgrounds, are capable of understanding that poor environmental sanitation promote diseases and can be harmful.

The long term benefits of education especially for women are well understood. Educated mothers are more likely to adopt healthy hygiene and sanitation behaviours and consequently have lower infant mortality rates in their households (Verspyck and Guene, 2012).

5.5 Interventions and strategies to improve sanitation management

One of the crucial, unsolved, or even unresolved problems for those concerned with the quality of life in the world, especially the developing world is that of adequate, accessible and acceptable basic sanitation. Enormous amount of plastic waste is generated throughout the world and the most crucially posed question is how to manage this waste

effectively and efficiently to save the environment and the continuous existence of mankind.

Complex societal problems, like inadequate sanitation in informal settlements, require innovative solutions. This is because informal urban contexts lack the institutional and infrastructural frameworks that would support a purely technocratic approach to innovation.

Additionally, a purely social approach to innovation is inadequate because informal settlements are materially deprived and require urgent technological interventions, hence the need to develop a more integrative socio-technological approach to solutions for informal urban contexts.

In most cultures, women have the primary responsibility for water, sanitation and hygiene at the household level. Women play a crucial role in influencing the hygiene behaviours of young children. The effective use of sanitation facilities will therefore depend on the involvement of both women and men in selecting the location and technology of such facilities. It is also essential that facilities are designed to accommodate the special needs of children.

The availability of water and sanitary facilities in communities can reduce the likelihood of poor sanitation related diseases. The design of the latrine and the location of water points and toilet facilities close to the home can increase women's health and dignity and ultimately reduce violence against them. All too often, however, decisions about the design and location of water and sanitary facilities are made without the involvement of users especially female users.

From the results, nearly all the study participants (92.9%) cited that enforcement of bye laws could help to solve the problem of the poor sanitation situation at the study place. This was even more explained as;

- *I think there should be a strict enforcement of bye laws on sanitation in this area if we want to solve the problem of poor sanitation.* **A female participant**

This finding from the study is similar to the study done by Van-Vuuren (2014) where study participants suggested that enforcement of sanitation laws could help to solve the problem of the poor waste system.

This behavior and attitude of the people especially in the developing countries towards sanitation do not suggest any progress towards a good fight at all. In most African countries, people do not seem to care about good sanitation practices and constantly litter, defecate and dispose waste water indiscriminately without considering the effects of these sanitation practices on their health.

Sanitation reduces or prevents human faecal pollution of the environment thereby reducing or eliminating transmission of diseases from the source. Effective sanitation isolates excreta and inactivates the pathogens or within faeces. High technology solutions are not necessarily the best.

Some simple latrines can be very effective while untreated sewage distributes pathogens in the environment and can be a source of diseases. Interventions that work in rural areas may not be very different from those in urban areas. The majority of the people living in developing countries are suffering from diseases, hunger and ignorance.

In most cases problems are interlinked. Due to lack of knowledge the people are exposed to hunger while having enormous resources around them. Over half of the population

suffers from diseases caused by poor sanitation when simple sanitary measure can make a big difference. Poor sanitation, hygiene and inadequate water supply are also related to the spread of other diseases, including tropical diseases such as schistosomiasis (sometime called Bilharzias) rank second in terms of socio-economic and public health importance in tropical and subtropical areas.

The diseases are endemic in 74 developing countries Uganda inclusive, infecting more than 200 million people of these, 20 million suffer severe consequences from the disease. 40% of the world population still have no basic sanitation; many people do no realize the health benefit to individuals, community and to the society from improving sanitation. The high cost of improving sanitation is often cited as a barrier to implementing sanitation projects.

From the results also, findings showed that, 87.1% of the study participants stated that more public education should be done to improve sanitation issues at the study place. This finding from the study agrees with the study done by Prüss et al. (2012) where study participants stated that more public education on sanitation management could help to reduce the menace of sanitation.

The improvement in sanitation is known to have significant beneficial impact on health both in households and across communities and even in the niche of the working environment. Progress towards sanitation target within which plastic waste was removed from the risk of human contact encompassed segregation and selling waste to earn some income. To the researcher, this idea will help to reduce the alarming sanitation challenges that currently confront Ghana.

It is a commonly held view, that developing countries would follow the development path forged by industrialised countries, aided by these 'more developed' countries. Urban sanitary practices of industrialised countries have helped contribute to the dignity, health and wealth of people in those countries, and thus have great bearing on the practices and the aspirations of developing countries. Many municipalities, cities and towns continue to grapple with the problem of Solid Waste Management, especially plastic waste and the Municipality of Bawku, Ghana is no exception.

The problem is amplified by inadequate land use planning and control in unplanned slum communities, which often have the most severe sanitation problems, and inadequate drainage systems, often choked with uncollected solid waste. Adequate drainage and solid waste management is therefore an essential complement to excreta management services. Cost of better targeting and the cost of subsidizing those who do not need such assistance. It is important to strike the right balance between interventions that directly benefit the poor and those that create viable services for the city as a whole, within a realistic timeframe for bringing services to all urban dwellers.

Traditionally, "water supply" and "sanitation" appear together as an inseparable concept in public statements; sometimes "hygiene" is also included. Sanitation and hygiene usually disappear, however, when it comes to policy-making, planning, budgeting and implementation. Since the health and environmental benefits of improved sanitation and hygiene are enjoyed by the community at large, there should be genuine public interest in expanding access to sanitation. Yet many feel powerless to act on an issue that is still shrouded in cultural taboos or stigma.

5.6 Health Belief Model (HBM)

Banana et al. (2015) described Health Belief Model (HBM) as a theory that explains why people do or do not engage in preventive health measures, such as getting tested for a disease, eating healthy food and exercising, or keeping their environment clean. It is one of the models which adopted theories from other disciplines and one of such is the behavioural science to study health problems.

The presupposition is that people who feared diseases are influenced by the type of health activities they do. This is seen in the degree of fear (perceived threat) and the expected fear reduction actions so far as that supposed reduction seemed to outweigh practical and psychological barriers to taking action (net benefits) (Chinyama et al. 2012).

The researcher thinks that the fear of diseases is not enough for people to engage in activities that will prevent them, but the awareness that certain preventive activities can help reduce the threat is important in the study area. Hence should the people at Bawku Municipality be equipped with knowledge about activities that can prevent waste related diseases, they will engage in them to prevent diseases.

When people in Bawku municipality are given a recommended behaviour, it is assumed that they will derive benefits from it. Such recommended behaviour includes the avoidance of indiscriminate littering, covering waste bins as well as sorting waste and disposing waste properly and regularly.

Good information on sanitation and hygiene is essential for making the right decisions. Getting the most useful information to flow from those who produce it to the people who use it is the challenge. There are several types of relevant information: there is technical information for practitioners/professionals, there is right to know/public participation

information (that includes the rights and responsibilities of citizens under legislation and regulations) and there is user data collected for monitoring purposes.

The Internet and e-mail are rapidly increasing access to information throughout the world, even in many poor or remote communities. To complement these new electronic methods for disseminating information, broadcast media and printed materials are still needed to reach the most inaccessible audiences. Traditional approaches to informing people, such as drama competitions and songs, have been used in many settings and have been shown to be effective.

Addressing the sanitation and hygiene crisis requires a global strategy that builds partnerships between national governments, external support agencies, NGOs, and households and the private sector. Increased sharing of information resources between agencies and organisations through partnerships will help to reduce duplicative efforts, to learn from past mistakes and to consolidate effective approaches. Partnerships are vital for leveraging scarce resources.

Increasing access to sanitation and improving hygienic behaviours are key to reducing this enormous disease burden in developing countries. Devoting resources to sanitation issues including advocacy could be the best way to change people behavior towards sanitaion, such changes would increase school attendance among children who would be healthy all the time, especially for girls, and help school children to learn better.

They could also have a major effect on the economies of many countries – both rich and poor – and on the empowerment of women. Most of these benefits would accrue in developing nations.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter contains the summary, conclusion and recommendations of the study.

6.2 Summary of the findings

Effective sanitation and hygiene programmes need to combine interventions to change behaviour with the selection of the right technology. Changing behaviour requires culturally sensitive and appropriate health education. People need to understand, in terms meaningful to their lifestyles and existing belief systems, why better health depends on the adoption of hygiene practices such as hand-washing (after defecation, after handling babies' faeces, and before cooking), on the use of latrines for safe disposal of faeces, and on safe storage and handling of drinking-water and food.

Raising awareness of why sanitation and hygiene are important will often increase motivation to change harmful behaviours. Selecting the right sanitation technology is about having effective alternatives and making the right choice for the specific circumstances. Making the right choice of technology requires an assessment of the costs (both for building the facility and for operations and maintenance) and its effectiveness in a specific setting. For example, it is inappropriate to introduce piped sewage if there is no capacity to adequately treat the effluents. The use of conventional sewerage systems in extremely water-short regions may also be unsustainable.

The demographic data of the respondents showed that, majority of them were aged above 40 years representing 78.5% whilst 5.6% were aged between 18-30 years. In terms of gender distribution, the results showed that, more than half of the study participants representing 61.6% were females.

Half of the study participants representing 55.8% had tertiary education while 10.1% had no formal education at the time of the study. The results on the demographic data of the study participants showed that, most (45.7%) of the study participants were engaged in petty trading.

Concerning the current sanitation situation at the study setting, most of the 14 communities visited majority of them such as Helbuko and Gozesi communities did not have toilets facilities while Deega (10%), Mognori (8.6%), Gentiga (5%), Asikiri (8.6%) and Bador (10%) communities had less than four toilet facilities within the communities. This presented the sanitation situation at the time of the study.

From the findings majority of the study participants (73%) said that children defecated around the houses. Majority of them representing 53.5% indicated that, the sanitation situation at the time of the research was very bad. Concerning the factors that accounted for the current sanitation situation at the study place, findings showed that, majority of the study participants representing 76.5% said they did not have toilets in their houses because they did not include it in their building plans and most (49%) of the study participants said they could not afford to buy the waste bins containers.

Drawing from the reviewed literature, one gram of faeces can contain ten million virus, one million bacteria, one thousand parasite cysts and a hundred warm eggs, that is what makes the safe disposal of faeces the most important of all public health priorities. Still today, the majority of illnesses in the world is caused by the fact that faecal matter enters the human body because of lack of safe sanitation and lack of hygiene.

To prevent this huge burden of illness, safe water and sanitation are only half of the answer. The other half is getting people to use them wisely and well. Millions of people have still not been adequately informed about the link between faeces and diseases.

Results on the influence of the current sanitation on the health of the people at the study setting showed that, poor sanitary condition diseases such as cholera (25%) and diarrhea (56.5%) were very common among others. The study identified daily cleaning of the immediate environment, public education, provision of waste bins among others as strategies to improve current sanitation situation at the study setting.

Health and environmental programmes in developing countries frequently lack sufficient expertise in the sanitation area. More capacity is needed to reach ambitious international targets; current levels of effort are barely sufficient to maintain the status quo in some communities. Building capacity means bringing together more resources have stronger institutions, better trained people and improving skills. Unless capacity grows, nothing much will change, some communities will continue to make slow progress and others will see coverage drop in terms of good sanitation practices.

Human well-being requires a healthy environment. Inadequate sanitation practices negatively impact the environment. For poor families living in congested urban slums and in villages, the lack of any sanitation facility means that waste lies on the streets, clogs the drains and creates an immediate local hazard as well as creating optimum conditions for the growth of disease vectors.

Waterborne sewage uses scarce freshwater resources and may contaminate surface waters when it is discharged into the environment without adequate treatment – thus endangering downstream users and aquatic resources. Finding technologies that

safeguard the environment and maximise the potential of waste products to be reused at the local level will have a major impact on the long-term sustainability of sanitation systems and processes.

Ecologically sustainable technologies have been widely promoted within the development community. The benefits of these systems are that they use little water, they treat the wastes and they facilitate the beneficial use of scarce resources. The carefully managed use of wastewater in agriculture and in other applications also has environmental and health benefits.

6.3 Conclusion

Sanitation management and its health implication in the Bawku Municipality is very significant, however the negative effects of waste management is creating serious challenges for the overall sanitation management in the Municipality. The main wastes generated in the Bawku Municipality were identified as liquid and solid wastes generated on daily basis. These wastes were poorly managed at the study area making the sanitation situation a serious health concern. The implication of this is that, most people were more likely to be affected with diseases in the event of an outbreak.

The study revealed three main types of toilets facilities in the study setting. These were identified as water closet (WC), the Kumasi Ventilated Improved Pit (KVIP) and the Swiss Latrine. But poor sanitation practices have left them in very deplorable state making them unattractive especially among the public toilets. The public toilets in almost all the communities are in a bad state which causes discomfort due to the stench emanating from the toilets in the communities.

In almost all the communities in the Municipality, toilet facilities were woefully inadequate to say the least leading to the poor storage and disposal of human excreta a difficult task.

Sanitation and hygiene are challenges that will not go away overnight. Over time, new ideas and approaches will emerge and old ideas will be improved. Gradually, the balance will shift until good hygiene and access to sanitation become the accepted norm all over the study area.

For this to happen, it will be important to keep track of what is happening, monitor progress, explore how new ideas are impacting on access and evaluate whether things are really improving for households. While global estimates of coverage will remain important, local capacity to generate and use information will be a vital part of the monitoring effort.

Generally speaking, there is fair availability of sanitation facilities especially in the urban communities as compared to the rural communities. However, there is inadequate availability of related sanitation facilities such as households toilets and particularly for the poor households both in rural and urban communities.

The average results of the different sanitation facilities and materials as given in the tables of this study revealed fair availability of pit latrines in the sampled communities while the availability of flush toilets is very low. According to the results, the sanitation facilities are also relatively inadequate and therefore inadequate to effectively serve the population in the sampled communities.

The health implication of poor sanitation situation was the result of diseases such as diarrhea, malaria and cholera. Thus, it would have to take very innovative ways to improve upon the attitude of people towards sanitation issues at the study place.

The attitude of the people towards sanitation is so bad that, voluntary compliance may not be used to ensure good sanitation behavior among people in the municipality. Thus, the major stakeholders in the sanitation sector need to address the attitude of people towards sanitation at the study setting to enhance good sanitation management.

6.4 Recommendations

- The study recommends that the Bawku Municipal Assembly, in collaboration with Zoom Lion and other Private Organizations in the sanitation sector within the municipality should supply waste bins to community members. The Bawku Municipal Assembly could provide waste collection vehicles as a way of managing domestic waste in the municipality
- The Bawku Municipal Assembly and other interested organizations could assist landlords to build toilet facilities so as to encourage the regularly use of toilets in defecation so as to reduce the incidence of sanitation related diseases in the Municipality
- The Bawku Health Management Team should organize periodic sanitation health education at social gatherings and at community durbars on the need to live in a healthy environment and proper methods of waste disposal.
- The media located within the Bawku Municipality could use sanitation as advocacy on the need for people to keep the sanitation clean

- The role of the sanitary inspectors should be improved upon in order to ensure that, the environment is cleared of the various forms of human excreta spread all over the immediate environment
- The Bawku Municipal Assembly should introduce an award scheme for the neatest community to encourage others communities to try to keep their communities clean.

6.5 Implication of the study to policy

The implication of the results showed that, more need to be done on how best nurses, teachers and sanitary officers within the study setting could assist the fight for improve sanitation management at the study setting. Therefore, sanitation authorities could use the findings to develop more ways of improving good behavior of people especially in relation to handling waste in the communities within the Bawku Municipal.

The findings of this study would also make important contributions to policy, planning and implementation issues of sanitation management because interested organizations in the study setting may use the study findings as a reference in the implementation of environmental health campaigns and the media could also use the findings of the study to sensitize community members about good sanitation practices within the Bawku Municipal.

Ending the global sanitation crisis is one of the most urgent developmental challenges of the 21st century. By the end of 2011 there were 2.5 billion people, over one third of the world's population, living without safe, adequate sanitation and hygiene. The lack of

access to this essential service holds back social and economic development through its negative impacts on health, education and livelihoods.

It is the principal cause of diarrhoea, the second biggest killer of children worldwide, and it contributes significantly to malnutrition, stunting and the overall global burden of disease. Birley (1995) noted that, the existence of inadequate sanitary systems affects the level of sanitation and that inadequacy systems affect the level of sanitation and that inadequacy of the system is due to the increasing population.

He observes that domestic water supplies are often installed before attention is given to provide adequate measure for sewerage water disposal. He points out that single bucket from distant stand pipes can be disposed off on to soil but as the water increases specific methods of disposal must be panned to prevent pooling and contamination with sewage.

In order to achieve good sanitation practice in the world, the proportion of people without access to sanitation must be reduced. The world cannot afford to ignore the sanitation crisis. Addressing it requires action from government at all levels, business, civil society as well as from households. It also requires a significant increase and better targeting of financial resources. The recognition of sanitation by the UN General Assembly in 2010 provides a strong impetus for more action.

It is essential now that the international community keeps its promises on sanitation, and accelerates progress in as the milestone year of 2015 approaches it becomes increasingly clear that the international community is not doing enough to remaining time to he eradication of poor sanitation practices to end the sanitation crisis. Although almost 1.9 billion people have gained access to improved sanitation since 1990, huge inequalities exist between countries and regions.

The world remains off track for the target to halve the proportion of people living without proper sanitation. On current trends 2.4 billion people will still lack access to improved sanitation facilities and the target would be missed by half a billion people. The study, being of an exploratory and interpretive nature, raises a number of opportunities for future research, both in terms of theory development and concept validation. More research will in fact be necessary to refine and further elaborate the novel findings.

First, while the researcher has generated a number of new and it is believe useful conceptual categories, given the in-depth sampling strategy focused on exploring the work of key informants, very little can be said of the nature of information work of the larger population of residents in Bawku Municipality. The study could thus be extended in search of statistical, rather than analytical, generalisability, as I have sought here.

Second, the study offers the opportunity to refine and validate the concepts and constructs that emerged from the inductive analysis. For example, the idea of a personal knowledgeability about proper sanitation of residents will need further refinement and elaboration, in terms of both its component elements and its internal dynamics. One could also ask whether and to what extent it is possible to identify different ideal types of knowledgeable in terms of sanitation issues among the residents, so that a typology of sanitation forms of knowledgeability can be constructed.

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APPENDIX I

Study questionnaire

University for Development Studies

Informed consent

Hello, my name is Hadizatu Abagrey Seidu. I am a student of the University for Development Studies offering a master degree program in community health and development. I am conducting a study on evaluating sanitation management and its health implication in the Bawku municipality. I would be very much appreciate your participation in this study. This information will help stakeholders in the district to device ways of averting the situation.

This interview will last between 10-15 minutes. Whatever information you provide will be strictly confidential and will not be shown to any other person other than the university, the district health directorate and the environmental sanitation unit of the municipal assembly. Participation in the study is voluntary and if we should come to any

question you don't want to answer just let me know and I will go to the next question, or you will stop the interview at any time.

However, I hope that you will participate in the study since your views are important.

At this time do you want to ask me anything about the study? May I begin now?

Signature of interviewer…… Date ……

Respondents agree (A) Yes (B) No Record times

Name of house 3 Sex: M □ F

No	Question	Code
1	Name of community	Q1 Community
2	Age of respondent (in completed years)……(confirm from any valid ID)	Q1 Age
3	Sex of respondent Male……..….1 Female ……...……2	
4	Marital status	Q2

	Single……..…..1 Married…….……...2 living with partner …….....3 Divorce/separated……....4 Widow…….....5 Circle (only one)	Marital Status
5	Household size	Q3household size
6	Respondent's occupation Unemployed……..……..……1 Farmer……..……...2 Trader/Business……..…….3 Government employee……...4 Private sector employee……..…5 Others (specify)..…… (circle only one)	Q4 occupation
7	Educational level (highest level attained) No education……..……1 Primary ……2 Middle/JHS……3 SHS……4 Tertiary and above……..…….5 (CIRCLE ONLY ONE)	

8	Ethnicity Bisa……..……1 Kusasi……2 Mamprusi……..……...3 Mossi ……4 Sissala……5 Others (Specify)……..…… (circle only one)	Q 6 Ethnicity

Sanitation situation and the factors that account for the sanitation situation in the Bawku municipality

9	Do you have toilet facility in your house? Yes No (circle only one)	Q 7 availabilityof toilet fac.
10	If yes, how many toilets do you have in the house	Q 8 no of toilets
11	Which type of toilet is it? WC ……..……..1 KVIP……..……2 other (please specify)_____	Q 9. Type of toilet
12	Who is responsible for cleaning it?	Q 10

	Men……1 women ……..……2 children……..……3	cleaning of toilet
13	How do you dispose the waste from the toilet? a. burning……..……..1 b. throwing it in the dust bin…….……2 c. throwing in a pit…….……3 Others please specify……	Q 11. TWD
14	How do you dispose the waste from the toilet? a. burning……..1 b. throwing it in the dust bin……2 c. throwing in a pit……3 Others please specify……	Q 12. Mode of defecation
15	Where do members of your household go to toilet? Public toilet ……..……..1 in the bush……...2 in the gutter……3 Others specify …….…….	
16	Where do children defecate Around the house…….……..1 In the bush…….……2 In the gutter…….……..3	

	Others (specify) …….	
17	What is the distance from your house to the nearest toilet facility? Less than100 meters ……..1 between 100 & 250 meters ……..……2 between 250 & 400 meters ……..……..3 more than 400 meters…….……...…….4 (choose one only) ……	Q 13 dist. To near facility
18	Do you pay for the service? Yes……...……..1 No……..2 (choose only)	Q 14 pay for services
19	If yes, how much do you pay for each visit?	Q 15.Cost of services
20	What is your assessment of the condition of the facility? Very clean…….……..1 Clean ……2 Dirty ……...…….3 Very dirty …….4 (CHOOSE ONLY ONE)	Q 16. Assessment of facility
21	Do you have waste water drains/ gutter from your house? Yes ……1 No……..……2 (choose only one)	Q 17 Drains in the house

22	If no, why	Q 18 why no drains
23	How do you dispose waste water from your kitchen and bathroom? In the open space……..……..……..……..1 in a pit…….……..2 others ……..…….3	Q 19. Dispersal of waste water
24	Who is responsible for cleaning the pavement in front of your house and the gutter? Women…….…….1 Men…….……..2 Children…….……3	Q 20. Cleaning of drains
25	Do you have a solid waste bin in your house? Yes……...…….1 No ……...…….2 If yes move to 25	Q 21 Solid waste bins
26	If no why?	Q22. Why no bins
27	How do you dispose your waste/refuse? Burning …….……1 in a pit……...2 in an open space…….3 communal waste disposal site……...……4	Q 23 mode of refuse dis

	other (please specify) _____	
28	Who is responsible for disposing off household waste or refuse? Children……..……...……1 Women……..2 Men……3	Q 24. Resp. for dis. ref
29	If answer to 22 is yes, how much do you pay for waste disposal/collection?	Q 25. Amt paid for disp.
30	How often do you pay for the waste collection? Weekly……..1 Monthly……2 Yearly……..……3 other (please specify) …… (CHOOSE ONLY ONE)	Q 26. Dur. Of pay.
31	Are you willing to pay for house-to-house waste collection if you do not have one? Yes ……1 No……..2	Q 27 willingness to pay for h to h
32	What is your assessment of the solid waste management condition in your neighborhood? Very good ……..……1 good ……..2 bad ……...……3 very bad ……...…….4	Q 28 assessment of waste. Management .

	(CHOOSE ONLY ONE)	

Health implication of the sanitation situations

33	what are the common diseases that affect household members Malaria……1 Cholera……2 Typhoid……..……3 Others (please specify)	Q 29diseases
34	Which group of people fall sick the most Children ……..……1 Women……...2 Men ……..……..3	Q 30group sick

Sanitation interventions and strategies to improve sanitation management

35	What do you do to ensure good sanitation in your household	Q 31. How to ensure Good sanitation management.
36	Are you aware that it is an offence to leave waste or litter in front of, and or around your house Yes ……..……1 No……..……..2	Q 32 offences

37	Do you think that BMA should strictly enforce the bye-laws to make every individual responsible for sanitation? Yes……1 No……2	Q. 33enforcement of laws
38.	Whatstrategies can you adopt to ensure good sanitation in your household and the community?	

APPENDIX II

FOCUS GROUP DISCUSSION

Guide for Moderator

Welcome participants and introduce yourself and note taker. Ask group participants to introduce themselves. Explain that the note taker is available to record detailed notes of the discussion process.

Explain that the study is for academic purposes and the aim is to gain an in-depth understanding of sanitation management in their community especially issues relating to sanitation and health. You hope that their responses to the questions will be important in understanding the situation and the knowledge gained will be shared with the environmental health unit and the District Health Team to help to improve sanitation and health in their area. The discussion will last about 60-90 minutes and because of the exhaustive nature of the discussion, you will ask their permission to record the discussion

to be sure that you have captured their views fully. Explain that you will like to assure them of confidentially and to this end you will assign to them pseudonyms (show cut card boards with numbers) which they will use throughout the discussion as their names. Also explain that whatever that will be discussed should not be shared with anyone outside the group. Ask if anyone has a question to ask about the information sheet given or the study before you can proceed. Ensure informed consent forms have been signed or thumb printed by participants. Ask permission to turn on the recorder.

Breaking the ice

First, I would like to ask you some questions about your community:

1. What are the major sanitation management problems of this community?

2. What are some of the health problems that affect the community? (Probe)

APPENDIX III

FOCUS GROUP DISCUSSION GUIDE

1. How will you describe the sanitation situation in your community?
2. Do you have toilet facilities in your houses?
3. If no why don't you have and where do you go to toilet
4. Are the public toilets in your community and are the public toilets adequate
5. What is the condition of the public toilet?
6. What do you think are the factors that account of the condition of the public toilet?
7. Where do you dispose household solid waste?
8. Are there communal bins in your community?
9. How often is the waste in the communal bin disposed?
10. Do you have drains for waste water from houses?
11. Implication of sanitation management on health
12. Can u explain the health implication of sanitation management in your community

Sanitation interventions and strategies to improve sanitation management

13. What have you done to improve sanitation management in your households and the community in general.
14. What has the municipal assembly done to improve sanitation in your community?
15. What strategies can be adopted to improve sanitation in your community?

APPENDIX IV

INTERVIEW GUIDE

We are going to discuss sanitation management and its health implication in municipality

Sanitation situation and factors that account for it

1. What is the nature and number of sanitation facilities in the municipality with special reference to?

 Toilet facilities

 Solid waste management facilities

 Waste water management facilities

 Staff strength of the environmental health department

2. Are the facilities and personnel are adequate?
3. What are the factors that account for the issues mentioned above?
5. Sanitation interventions and strategies to improve sanitation management.

   One of the sanitation interventions in Ghana is the existence of by laws in MMDA. Does BMA have such laws?
6. Who is in charge of enforcement of the bye-laws?
7. Who monitors the enforcement of the bye-laws?
8. Are there any sanctions for non-compliance of sanitation bye-laws?
9. Are there incentives for compliance with sanitation bye-laws?
10. How much of the Assembly's annual budget goes into:

(a) Management of public toilet facilities

(b) Solid waste or refuse management

(c) Management of waste water

11. What other interventions have u put in place to ensure good sanitation management in the municipality?

12. What strategies can be adopted to improve sanitation management in the Bawku municipality?