

**AN ASSESSMENT OF HYGIENE KNOWLEDGE AND PRACTICES:  
A CASE STUDY OF CHOTO INFORMAL SETTLEMENT  
IN KATIMA MULILO**

**A THESIS SUBMITTED IN PARTIAL FULFILMENT  
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**BY**

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## **ABSTRACT**

About 2.4 billion people globally live under highly unsanitary conditions and practice such poor hygiene that the risks of their exposure to the spread of infection are enormous. The World Health Organization (WHO) has been at the forefront of environmental sanitation over the past years and has developed key materials for the edification of policy makers and technical people dealing with these issues. These materials include sanitation guidelines, “best practices” in hygiene documentation, and general health promotional materials (WHO, 2011).

There is no documented evidence which describes either the practice of hygiene by people in the Namibian informal settlement of Choto, in Katima Mulilo, or their knowledge of the subject. The purpose of this study was an exploration and description of the knowledge and the practice of hygiene among these residents.

An explorative, qualitative study was done. The research sample was comprised of residents of Choto, 18 years of age and older. Face-to-face interviews were conducted and the participants’ statements were recorded by the researcher. The following research ethics were observed during the study: informed consent, permission from authorities, confidentiality and voluntary participation. References from existing literature were also sought.

Forty (n=40) Choto residents participated in the study, with 21 females and 19 males interviewed as subjects. The following themes emerged during the analysis:

household hygiene and in the surroundings; disposal of human waste; household refuse removal; personal hygiene, including hand washing, water source knowledge and knowledge of hygiene-related diseases.

The researcher's conclusion is that, although the people in the Choto informal settlement have some general knowledge about hygiene, the extent of that knowledge is quite limited. The knowledge of hygiene is usually not carried out in practice by the residents for various reasons, which include poverty, insufficient water supply, insufficient knowledge and lack of access to sanitation facilities.

The following training is therefore recommended:

- home cleaning maintenance, including the proper disposal of domestic and human waste,
- the practice of proper storage and handling of water,
- proper hand-washing techniques,
- how these practices relate to the prevention of hygiene-related diseases.

The Katima Mulilo Town Council should be advised to formulate strategies that will address issues of water, sanitation and hygiene in the Choto informal settlement.

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**LIST OF ABBREVIATIONS**

<b>AIDS</b>	– Acquired Immune Deficiency Syndrome
<b>CCOHS</b>	– Canadian Centre for Occupational Health and Safety
<b>CDC</b>	– Centers for Disease Control and Prevention
<b>HIV</b>	– Human Immune Deficiency Virus
<b>MDGS</b>	– Millennium Development Goals
<b>MOHSS</b>	– Ministry of Health and Social Services
<b>NHS</b>	– National Health Service
<b>ORT</b>	– Oral Rehydration Therapy
<b>RNA</b>	– Ribonucleic Acid
<b>RTI</b>	– Reproductive Tract Infections
<b>TB</b>	- Tuberculosis
<b>UK</b>	– United Kingdom
<b>UNICEF</b>	– United Nations Children’s Education Fund
<b>WHO</b>	– World Health Organization

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## **DEDICATION**

I dedicate this achievement to all the people who supported me, especially my immediate family members for their encouragement and financial support. May Almighty God bless you abundantly.

## **DECLARATION**

I declare that the thesis “An Assessment of Hygiene Knowledge and Practices: A Case Study of Choto Informal Settlement in Katima Mulilo” is my own work and has not been written for me, in whole or in any part, by another person or persons. I also affirm that all quotations from the published or unpublished work of others have been duly acknowledged in this work, which I present for examination.

Signature:

Date:

Place:

## **CHAPTER 1: INTRODUCTION AND BACKGROUND INFORMATION**

### **1.1 Introduction**

This chapter outlines an introduction to and background for information on the subject of hygiene, in regards to both knowledge and practice, among the residents of Choto informal settlement in Katima Mulilo, Namibia. A problem statement, the initiative to conduct this study, operational definitions, and its objectives, are also outlined.

### **1.2 Background of the study**

According to the United Nations Children's Fund (2008a) access to improved water and sanitation facilities does not, of and by itself, necessarily result in improved health. There is evidence which indicates that hygienic behavior, in particular hand washing with soap at critical times, such as after defecating, and before eating and preparing food, is equally important. Hand washing with soap can significantly reduce the incidence of diarrhoea, the second leading cause of death amongst children under five years old worldwide. Good hand washing practices have also been shown to reduce the incidence of other diseases, notably pneumonia, trachoma, scabies, skin and eye infections, and diarrhea-related diseases such as cholera and dysentery. The promotion of hand washing with soap is also a key strategy for controlling the spread of avian influenza.

India Parenting (2010) stated that the health risks to which humans are exposed prove that good hygienic practice is essential. In fact, the spread of most new-world diseases, like bird flu and swine flu, has been attributed to a lack of hygiene. With this in mind it is clear that, if sound hygienic practices were more wide spread, all people would benefit, including future generations. Good hygiene is actually a group of habitual practices that need our attention and should be inculcated in children at an early age, indeed, as early as possible.

According to World Health Organization (2011), it is important to make sure that information about health is accessible in public places. Such information should be made available in an eye-catching, uncomplicated and accurate fashion. Where appropriate, large posters, containing bright colors and well-chosen messages pertaining to health and hygiene, should be displayed in public places for the general education of the public. School children and college students could be involved in preparing educational posters and notices for display in public places. Poster messages should include the promotion of:

- Hand washing
- Use of refuse bins
- Care of toilet facilities
- Protection of water supplies.

WHO (2011) further stated that, about 2.4 billion people globally live under highly unsanitary conditions. Poor hygienic behavior, and exposure to the risks of infection are very serious issues. The WHO has been at the forefront of environmental sanitation and hygienic initiatives during recent years and has developed key materials directed at policy makers and technical people dealing with these issues. These materials include: guidelines; “best practice” documents and promotional materials on sanitation and hygiene. Around 1.1 billion people globally do not have access to adequate sources of water and about 2 million people die every year due to diarrheal diseases; most of them children under five years of age. The most affected people are those living in developing countries, those living under conditions of extreme poverty, and peri-urban dwellers. Providing access to sufficient supplies of safe water, the provision of facilities for the sanitary disposal of excreta and the introduction of sound hygienic behavior, are of the utmost importance in the reduction of disease caused by these risks.

Takanashi, Chonan, Quyen, Khan, Poude & Jimba (2009) conducted a cross-sectional study in Vietnam to investigate possible factors influencing hygienic practices among mothers regarding their handling of food and the prevalence of diarrhea among their children. The study was conducted in a Vietnamese hamlet. The researchers recruited mothers who had children between the ages of six months and five years. Laudable hygienic practices noted among these mothers included hand-washing, methods of washing utensils, separation of utensils for raw and cooked food, and well-selected locations for the preparation of food. The findings revealed

that the risk of diarrhea was significantly higher among children whose mothers prepared food on surfaces other than tables (typically on the ground) compared to children whose mothers prepared food on tables. The results of the study indicated that mothers in Vietnam who practiced good hygiene and did not prepare food on the ground, at least potentially prevented diarrhea among their children.

Adhikari, (2007) gave information about a study of adolescent girls in Nepal that was conducted to evaluate their knowledge and behavior regarding aspects of menstrual hygiene. Findings indicated that the girls observed in the study did not properly observe menstrual hygiene. Results of the study indicated that 40.6% of the girls had general knowledge of hygiene, while only 12.9% actually practiced good hygiene. Overall, the girls' knowledge *and* practice were both insufficient. The findings indicated that there was an obvious need to educate girls about the process and the significance of menstruation in terms of the proper use of sanitary pads or absorbents and their correct disposal. The goal of eliminating misconceptions among adolescent girls regarding menstrual hygiene could have been achieved through proper training and health education administered by teachers, family members, health educators and the media.

According to the Foundation for Water Research (2000) diarrhoea affects millions of people world-wide. The disease has the greatest impact on children, especially in developing countries. Waterborne diseases remain a cause of concern in both developing and developed countries. In developed areas, improvement in wastewater

disposal, protection of water sources and the treatment of water supplies, has greatly reduced the prevalence of waterborne diseases. Hygiene education comprises a broad range of activities aimed at changing attitudes and behavior to break the chain of disease transmission associated with inadequate water and sanitation. In the context of rural Africa, the provision of safe piped-in water for every household has not been achieved and the art of maintaining good hygiene assumes an added significance.

Approximately 18 million South Africans do not have access to adequate sanitation. This problem is not unique to South Africa; it is a challenge in many developing countries. Unhygienic practices affect the quality of life and in many cases can result in diseases, which for many families, can be an additional financial and health burden as well as pose potential exposure and increased risks related to personal safety. The impact of unhygienic practices on the health of the community is extremely serious. For example, many cases of diarrhoea in children under the age of five, and cholera outbreaks, are witnessed annually on the continent of Africa (Phaswana & Shukla, 2005).

Other health problems associated with unsafe hygienic practices include diarrhoeal diseases, intestinal infections, poliomyelitis, typhoid, bilharzia, malaria, worms, eye infections, skin diseases and increased risk for bacteria, infections and diseases in people with weakened immune systems due to the human immune deficiency virus (HIV) and/or the acquired immune deficiency syndrome (AIDS). Environmental problems associated with unsafe hygienic practices include dispersed and diffuse

pollution of water sources resulting in a water and fecal disease cycle for communities with untreated water supplies (Phaswana and Shukla, 2005).

In order to achieve the Millennium Development Goals (MDGs), Namibia aims to achieve a sanitation coverage of 62%. The lack of sanitation facilities, combined with a limited knowledge of basic hygiene and environmental sanitation, has led to increasingly high levels of diarrhoea-related mortality in the country. On 15 October 2008 Namibia celebrated the first ever global hand-washing day. The aim of this observance was to raise awareness about the benefits of hand washing with soap and of improved sanitation, respectively (United Nations Children's Fund, 2008b).

A community is comprised of individuals or groups of people who live in the same area and who may have similar interests or origins. For example, they may share similar concerns or understanding about what a healthy lifestyle entails. Personal hygiene is an individual's responsibility. It is the responsibility of everyone to maintain as high a standard of personal hygiene and to avoid behavior that may be detrimental to their health and well being (De Haan, Dennill and Vasuthevan, 2005).

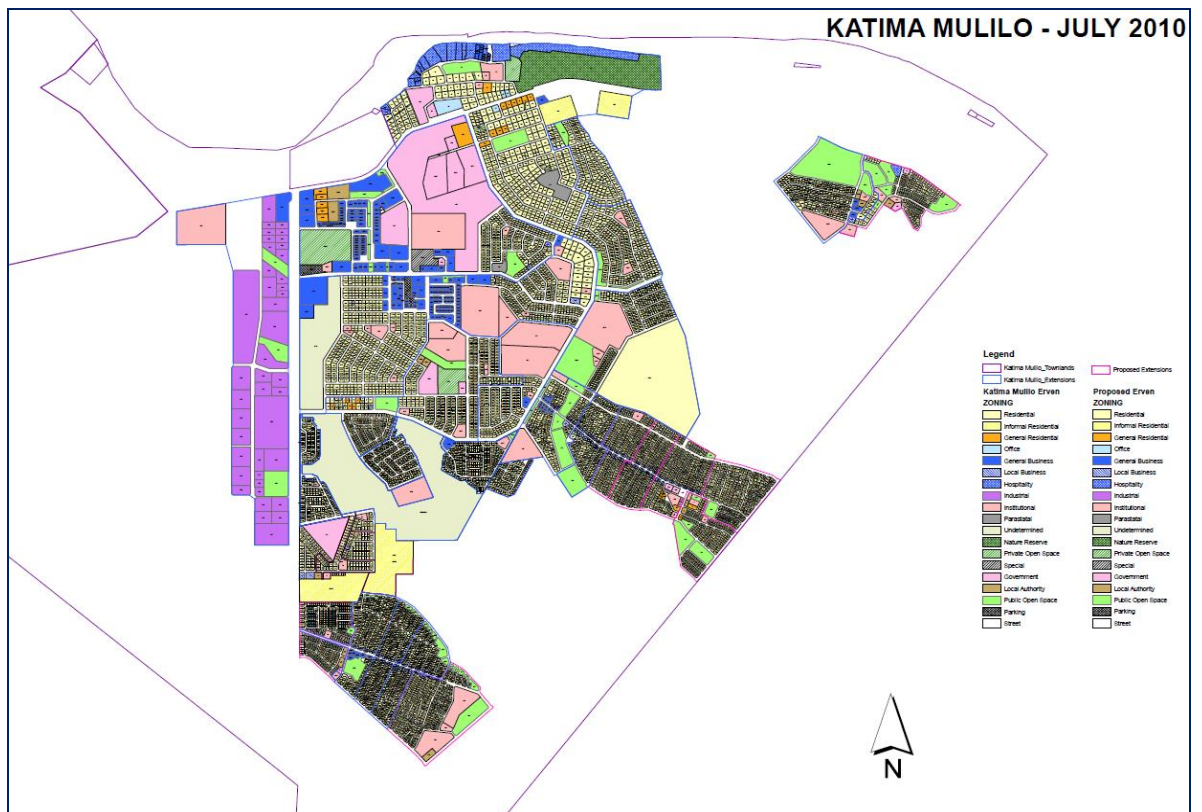
The 2001 Caprivi Census Report indicated that about 60% of the households in the Caprivi region in Namibia depend on public water reticulation systems and boreholes for their water. For public health purposes, water from pipes and boreholes are regarded as safe for drinking and cooking. For the region as a whole, slightly over 80% of the households have access to safe water. Safe drinking water is available to 98% of urban households and to 82% rural households, respectively. This implies

that approximately one out of five households in the rural areas rely on unsafe water for drinking and cooking, thereby putting them at greater risk of infection or parasitic diseases. Over 80% of the households in Caprivi region have no toilet facilities and residents must utilise open areas as a toilet. Over 40% of the households in the urban areas have no toilet facilities and use the bush to relieve themselves. This implies that only 60% of the households in the town have toilet facilities and these are mostly in the formal settlements. The most common means of disposing garbage in the Caprivi region is the use of rubbish pits, utilised by 44% of all households. In the urban areas only 23% of households have their garbage regularly collected (National Planning Commission, 2001).

The findings of the Namibia Demographic and Health Survey of 2006-07 indicated that dehydration, caused by severe diarrhoea, was a major cause of morbidity and mortality among children, despite the fact that the condition can be easily treated with oral rehydration therapy (ORT). Exposure to diarrhoeal-causing agents is frequently related to the use of contaminated water, unhygienic practices related to food preparation and the disposal of excreta (Ministry of Health and Social Services, 2008).

Children should be taught the importance of hygiene from a young age so that its practice becomes habitual, as they are the most susceptible population group to hygiene-related disorders like skin rashes, infections and wounds. They need to be taught from pre-school age about what kinds of behavior should be avoided. They need to know the importance of a few precautionary measures to prevent infections and diseases (India Parenting, 2010).

Poor hygiene is an issue that certainly affects most informal settlements in Namibia. People have little or no access to sanitation facilities and the absence of hygienic practices in these communities contributes enormously to the occurrence of hygiene-related diseases. In view of this vulnerability the area that was chosen for this study was the Choto informal settlement. It is located approximately 300 meters west of a tract of houses built by the National Housing Enterprise and 20 meters south west of Greenwell Matongo location in Katima Mulilo (see Figure 1).



**Figure 1:** Map of Katima Mulilo

### **1.3 Statement of the problem**

The dwellings in the Choto informal settlement are constructed of mud with roofing of corrugated iron sheets. Lacking toilets, the residents use the open bush to relieve themselves. The residents use prepaid communal taps for water (Shack Dwellers Federation of Namibia, 2009). The open areas around Choto and other informal settlements in the area of Katima Mulilo are dirty and hygiene-related diseases have also been experienced (see Table 1).

During the commemoration of World Health Day on 7 April 2010 in Windhoek, the Minister of Health and Social Services (MoHSS), Dr Richard Kamwi, stated, “Informal settlements come with their own problems, one being poor sanitation. This situation is a concern to the government. Poor supplies of clean water and unhygienic environments lead to hygiene-related problems such as diarrhoea, cholera and other diseases” (Kakujaha, 2010, p.1). This statement underscores the relevance of this study in the face of ongoing hygiene challenges. Some of the hygiene-related diseases recorded at Mavuluma Clinic in Choto location are listed in Table 1.

**Table 1:** Hygiene-related diseases

DISEASE	JANUARY 09 TO SEPTEMBER 09, 2009		TOTAL
	UNDER FIVE (5) YEARS (NUMBER OF PATIENTS)	ABOVE FIVE (5) YEARS (NUMBER OF PATIENTS)	
1. Diarrhoea	432	546	978
2. Skin disease	221	401	622
3. Scabies	38	56	94
4. Conjunctivitis	137	120	257
5. Eye disease	36	38	74
6. Common cold	369	315	684
<b>TOTAL</b>	<b>1233</b>	<b>1476</b>	<b>2709</b>

Source: Kwenani (2009, p.1).

There is no published documentation which records either the hygienic practices of the people in Choto or their knowledge of the subject. Provisions for sanitation and water supply are inadequate in Choto. The residents use communal taps as a source of water and there are no toilet facilities. Investigating these conditions, the researcher was interested in answering the following questions.

- What hygienic practices are observed by Choto residents?
- What knowledge do the residents in Choto have regarding hygiene-related diseases?

#### **1.4 Purpose of the study**

The purpose of this study is to explore and describe the knowledge of hygiene that the residents of Choto possess and to document their observable hygienic practices in the environment of their informal settlement in Katima Mulilo.

#### **1.5 Objectives of the study**

There are two objectives, namely:

- To explore the hygienic practices of people living in Choto informal settlement.
- To assess the knowledge of the people with regard to hygiene-related diseases.

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

The significance of the study is to produce documented information about the hygienic knowledge and practices of people living in Choto informal settlement of Katima Mulilo. The findings of this study should provide both the residents of the Choto community and the entire Caprivi region with helpful information regarding the possible consequences of poor hygienic practices and inadequate sanitation facilities. Appropriate recommendations could generate or stimulate action for the improvement of the hygienic circumstances of people in the entire region.

### **1.7 Operational definitions of concepts**

*Hygiene* is more than just being clean. It is defined as the combined practices that help people to stay healthy (Advameg, Inc, 2009).

*Good hygienic practice* includes actions people take to stay healthy, like washing hands thoroughly and often, taking a shower every day, wearing clean cloths and keeping homes clean (Auger, Colinders, Bihn, Gravani & Embrey, 2005).

*Personal hygiene* may be described as the practice of maintaining cleanliness and grooming of the physical body. In common vernacular it is described by the phrase “looking after your self” (Hygiene Expert (UK), 2000-2009).

*Health* is a state of general physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO, 2010).

*Hygienic practice* means that a person frequently engages in activities or behaviour that serve to promote or preserve health (Answers.Com, 2010).

*Sanitation* is the process of preventing human, animal and insect contact with excreta to avoid the spread of disease (Global Education, 2010).

*Good sanitation* is defined by safe, private and hygienic defecation and the maintenance of adequate, accessible facilities for this purpose (Fawcett, 2011).

*Environmental sanitation* is a package of measures that eliminate factors that encourage the proliferation of flies and the spread of disease. Some of these interventions include the provision of safe water, toilets and health education

programmes to improve the personal and environmental hygienic practices of a population (Rabiu, Alhassan, Ejere & Evan, 2012).

### **1.8 Conceptual framework for data analysis**

For the purposes of this study the researcher used the Health Belief Model (HBM) to assess the hygienic knowledge and practices of people living in Choto informal settlement. The HBM is a psychological model that attempts to explain and predict healthy behaviour. Predictions are made by focusing on attitudes and beliefs of individuals (University of Twente Report, 2012). The HBM is based on the theory that a person's willingness to change health-related behaviour is primarily due to perceived susceptibility, perceived severity, and perceived benefits, as described below:

- *Perceived susceptibility* describes the attitude that people will not change their behavior unless they believe they are at risk. A person will only use soap to wash his /her hands if he/she believes that a negative condition like diarrhoea can be avoided.
- *Perceived severity* refers to the probability that a person will change his/her health-related behavior to avoid the consequences of a behaviour which depends on how serious that person considers this consequence to be. For example, if a person expects, as recommended, that using soap when washing hands will prevent diarrhoea, then such a person will react to such recommendation positively and adopt its practice.

- *Perceived benefits* relates to the difficulty of convincing a person to change behavior when they perceive no personal advantage in changing. If people believe that they can use soap comfortably and with confidence, they will have no problem doing that, provided that they can afford to buy the soap.

### **1.9 Summary of the chapter**

Good hygienic practices play a major role in curbing hygiene-related diseases like diarrhoea and scabies. Millions of people, mainly children under the age of five years, die annually from hygiene-related diseases. Hygiene, as both knowledge and practice, seems to pose a challenge not only in Choto informal settlements, but also in other Namibian rural environments. This view motivated a study to assess the knowledge and practices of hygiene in informal settlements in order to make relevant recommendations to improve the health status of residents in these areas.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

For this study a literature review serves to make a critical analysis and to compare information on hygiene from other geographical areas and to source published views of scientists regarding hygiene issues. Findings made in similar studies help identify gaps in the body of knowledge in the context of the aim and objectives of the current study. The literature review was also carried out to shed light on the following pertinent issues: personal hygiene, environmental sanitation and the knowledge and practices relevant to hygiene.

### **2.2 Importance of good hygiene**

Hygiene is the maintenance of healthy practices which is commonly regarded as a reference to 'cleanliness'. Outward signs of good hygiene include the absence of visible dirt, dust and stains on clothing, or bad smells. Since the development of the germ theory of disease, hygiene has come to mean any practice leading to the absence of harmful levels of germs. Good hygiene promotes health, beauty, comfort and social interaction. Good hygiene directly helps to prevent and isolate disease. This means that if you are healthy to begin with, good hygiene will help you to prevent illness. If you are sick, good hygiene can reduce your contagiousness to others (WordIQ.com, 2010).

Hygiene is an important issue in personal department, i.e. in taking care of oneself both physically and emotionally. People often have infections because they do not take good care of themselves physically, such condition that can produce emotional difficulties as well. Good hygiene includes the practice of regularly and thoroughly washing one's hands and body, brushing one's hair, flossing the teeth and caring for gums. These grooming habits will reduce vulnerability to harmful bacteria that reside on the body. While some bacteria are harmless and even beneficial to the body, the accumulation of bacteria can endanger a person's health (Money Instructor (2005).

Most people are afraid of contracting infection with life-threatening diseases like AIDS, cancer and tuberculosis (TB). Notwithstanding such fear, one should question whether people exercise basic measures in their daily routine to prevent disease that may be caused by the lack of simple hygiene. Not many people ensure the water they drink is from a glass which is clean. There is a common tendency of people to overlook simple things that are important for the prevention of serious problems. It must be remembered that basic hygiene can have an important effect for ensuring a healthy and morbidity free life (Health Jockey, 2011).

Ustun, Kay, Fewtrell and Bartram (2004) stated that the burden on health caused by unsafe water, poor sanitation and hygienic practice, has been estimated on a global level taking into account various outcomes of disease, mainly diarrhoeal diseases. Identification of levels of risk takes into account many factors, such as the ingestion

of unsafe water and the lack of water associated with: inadequate hygiene, poor personal and domestic hygiene, contact with unsafe water, and the inadequate development and management of water resources or water systems. In order to estimate the burden of infectious diarrhoea, exposure scenarios are established according to water supply and sanitation infrastructure, the level of fecal-oral pathogens in the environment and populations assigned to these scenarios. The health burden from schistosomiasis, trachoma, ascariasis, trichuriasis and hookworm disease are all wholly attributable to unsafe water, sanitation and hygiene. Unsafe water, sanitation and hygiene are important determinants in a number of other diseases, such as malaria, yellow fever, filariasis, dengue, hepatitis A, hepatitis E, typhoid fever, arsenicosis, fluorosis and legionellosis. A high global disease burden is attributed to some of these diseases.

Water, sanitation and health are closely interconnected. Viewed worldwide, the lack of sanitary waste disposal and clean water for drinking, cooking and washing is to blame for over 12 million deaths. In the majority of cases, diarrhoeal deaths occur worldwide due to inadequate hand washing and just being able to wash one's hands with soap and water can reduce the incidence of diarrhoea by 35% (Environmental Learning, 2003).

It is also worth noting that, given the range of health risks to which people are exposed, it has become vital to maintain as high a standard of hygiene as possible. In

fact, most new-world diseases, like bird flu and swine flu, have been attributed to poor hygiene. If the present generation were to make concerted efforts to improve hygiene, it would have beneficial effects on future generations (India Parenting, 2010).

Health and sanitation are serious concerns in most cities, especially in poor neighborhoods. Living conditions in poor neighborhoods are especially bad because of inadequate government investment in informal settlements, where services such as basic water or sanitation, education or health services, are lacking. Informal settlements are commonly marked by overcrowding. This condition facilitates the rapid spread of disease which, in turn, contributes to the suffering of children due to poor health. These problems are often based on inadequate nutrition and the lack of access to clean water and sanitation (Kenya Community Sports Foundation, 2012).

The benefits of sustainable, effective hygiene education in informal settlements are numerous. Such benefits include reduced infant mortality from diarrhoea, reduced environmental pollution, reduced health-care costs, improved conditions of living and the reduced operation and maintenance of facilities. Sanitation facilities will only achieve a parallel reduction in diarrhoeal disease if developed in tandem with hygiene programmes. Hygiene education programmes are among the most cost-effective ways of lowering health-related costs, especially in high-density settlements where residents are exposed to higher risks through poor sanitation and hygiene-related diseases. Hygiene education programmes are not limited to hand washing or

hygiene-related topics. Such programmes can also provide a platform to address risks associated with improper use of sanitation facilities and the linkage between good sanitation and a healthy environment (Naidoo, Chidley & McNamara, 2008).

Nearly half of humanity lacks access to adequate sanitation. Every year, between two and three million people die of sanitation-related diseases caused by poor hygiene, contact with germs, dirty hands and contaminated food, utensils and water. The main cause for this shocking statistic is not related to technology or even to a lack of knowledge, but is due to the fact that insufficient financial resources are allocated to toilets and the water necessary to operate them (Environmental Learning, 2003).

According to Van Wyk (2007), rapid urbanisation is a serious challenge for those responsible to provide services to urban areas in developing countries. Unable to keep pace with rapid population growth, many urban areas experience a substantial increase in the numbers of people living below the poverty line in the categories of informal or unplanned settlements. Most informal settlements have no access to adequate and affordable basic services such as water supply and sanitation. The promotion of hygiene, sanitation and health is a key aspect of sanitation service provision in urban poverty stricken areas and densely populated informal settlements. The aim of introducing sanitation systems is to ensure measurable health benefits.

### **2.3 Knowledge of good hygiene**

To implement daily hygienic practices and avoid hygiene-related diseases, people need to possess knowledge of, and appreciation for, the importance of good hygiene. It is the only way people can make informed decisions regarding hygienic practices.

Water Aid America (2011) stated that good hygienic practices, such as hand washing and the safe disposal of feces, are essential for maximising the health benefits of safe water and sanitation facilities. Evidence shows that when hygiene education accompanies the provision of water and sanitation, the number of deaths caused by diarrhoeal diseases is reduced by an average of 65 percent. Hygiene education and promotion encourages people to replace their unsafe practices with simple, safe alternatives. Most people are only too happy to use clean water and safe sanitation facilities once they are readily available, but without knowledge of good hygienic practices, the health benefits will be greatly reduced.

Universal access to water and sanitation has been seen for decades as the essential step in reducing the preventable infectious disease burden in the developing world. However, it is now clear that this goal is best achieved through programmes that integrate hygiene promotion with improvements in the quality of available water and sanitation. Neglect of hygiene goes a long way to explain why water and sanitation

programmes have often not brought the expected benefits. The current focus in developing countries is on investment in community water supplies and sanitation in order to meet the Millennium Development Goals (MDGs) but, if the health benefits from achieving these goals are to be realised, sector professionals must look beyond the provision of water supply hardware and toilet facilities (Bloomfield, Martin, Fara, Nath, Scott & Van der Voorden, 2009).

According to Skelton (2007) women's hygienic practices are particularly important since they are care-givers who prepare food for others, clean for others and implement personal hygiene for children. Women run the greatest risk of spreading germs and disease to others. For them hand washing is vital, particularly for mothers. Women need to wash their hands many times during the day; good habits should be established to maintain personal and family hygiene, as well as caring for one's hands. According to eHow.com (2011) a person's personal hygiene can affect other people. People who do not wash their hands can spread infections and viruses to others. Personal hygiene entails bathing regularly, keeping hair clean, trimming fingernails and toenails, brushing teeth and using deodorant. Personal hygiene can enhance a person's self-confidence and improve the chances of success in many areas of life. People who do not bathe regularly are more susceptible to fungus infections, such as jock itch, athlete's foot or fungal toenail infections. A lack of oral hygiene can cause fungus infections such as oral thrush. Those who fail to wash their hands regularly are more prone to contracting viral or bacterial infections from

others. Bed bugs are a common problem when good hygiene and regular cleaning are lacking.

Menstruation and menstrual practices are still often shrouded in taboos and socio-cultural restrictions with the result that adolescent girls remain ignorant of important health-related information and information on hygiene, which sometimes can cause adverse health outcomes. The onset of menstruation is one of the most important health-related changes occurring in adolescent girls. Reactions to and management of menstruation depends on awareness and knowledge about the subject. Hygiene-related practices of women during menstruation are of considerable importance, since a woman's period increases her vulnerability to reproductive tract infections (RTI). The relationship of socio-economic status, menstrual hygiene practices and RTI are obvious. Today millions of women are sufferers of RTI and its complications and often infections are transmitted to a mother's offspring during pregnancy. Women having better knowledge regarding menstrual hygiene and safe practices are less vulnerable to RTI and its consequences. Therefore, increased knowledge about menstruation, beginning in childhood, may help promote safe practices and mitigate the suffering of millions of women (Indian Journal of Community Medicine, 2012).

## **2.4 Hygiene attitudes, behaviors and practices**

Good hygienic behavior and practices can improve a person's general state of health and prevent the occurrence of hygiene-related diseases. According to Huuhtanen & Laukkanen (2006) hygienic behavior lowers the risk of infections. Poor hygienic behavior can be detected most distinctively in excreta-related diseases and diarrhoeal infections. Proper hygienic behavior, on the other hand, can decrease the spread of many diseases, including skin disease, contracted from agents on the ground and from insects. Adequate sanitation is the frontline method of preventing the spread of excreta-related diseases and spreading of pathogens in residential environments. The second most important method is hand washing, which prevents pathogen transmission to food, water, and people.

Important practices and facilities that improve hygiene are:

- Adequate sanitation facilities (such as flush toilets, latrines or improved ventilated pit latrines).
- Adequate storage and use of food.
- Proper storage of water to prevent contamination
- Proper handling and disposal of solid excrement and urine.
- Washing hands after defecation (also children's hands)
- Washing hands before touching food or containers of water
- Using clean water

Controlling vectors (Huuhtanen & Laukkanen, 2006). “When people follow good personal hygiene, they do not only help themselves but also others. By keeping clean, one does not spread germs to others and one does not make them sick” (MediTrends, 2000). Many diseases can be linked to the neglect of personal hygiene that fuels the occurrence and spread of hygiene-related diseases.

Canadian Centre for Occupational Health and Safety (2010) stated that the most important way to reduce the spread of infections is hand washing. Hands should always be washed regularly with soap and water. It is also important for people to be vaccinated against infections and viruses for which vaccines are available. In 2009 Kamate, Agrawal, Chaudhary, Singh, Mishra & Asawa (2009, p.1) conducted a survey in India of 791 individuals (57 % male, 43 % female). Results of this survey indicated that knowledge differed significantly according to gender, age group, educational and working status. They noted that females had better attitudes concerning hygiene than males. Despite sufficient knowledge and conducive attitudes, however, participants’ behavioral responses to Influenza A were poor. Thus, escalated effort on the part of government was recommended to establish factors that could be associated with adaptive behavior changes among the general public in order to improve the standard of their hygienic practices.

According to Denoble (2010), a company that claims to be the world’s largest distributor of paper and hygiene products, published the results of a global hygiene

attitudes study. The stated goal of the study was to discover how the flu pandemic of 2009 might have changed global attitudes towards hygiene. The findings of the study suggest that a larger number of people in China practice good hygiene now than was the case before the flu pandemic. Increased in awareness of hygiene in the wake of the global flu pandemic of 2009 has led to increased hand washing and home cleaning in China. The study revealed that nine out of ten people in China wash their hands more frequently and seven out of ten Chinese people cleaned their homes more often, since the flu pandemic of 2009.

Individuals observe their own standards of hygiene, and these were either actively taught by, or learned through observation of, others. Personal hygiene, if practiced conscientiously, helps to prevent the spread of disease, the outbreak of epidemics or even pandemics. Observing very basic practices may help prevent coughs and colds from spreading from one person to another (Hygiene Expert (UK), 2000-2009). The key to spreading the practice of hand washing with soap resides in promoting behavioral change through motivation, information and education. There are a variety of ways of accomplishing this, for example, through high-profile national media campaigns, through peer-to-peer education techniques, by way of hygiene lessons for children in schools, and subsequent encouragement of those children to demonstrate good hygiene to their families and communities (United Nations Children's Fund, 2008a).

De Haan, Dennill and Vasuthevan (2005) maintain that personal cleanliness is an important factor in the maintenance of hygiene. Conversely, poor standards in personal hygiene are associated with many unhealthy conditions, such as lice infestation, scabies, trachoma, yaws and skin infections. Individuals with poor standards of personal hygiene not only endanger their own health but also the health of others. The spread of infectious diseases may often be traced to poor hygienic habits of people who handle food or care for children, and people who fail to practice oral hygiene.

According to WHO (2011), it is believed in many African cultures that children's feces are harmless and do not cause disease. This is patently not true; the feces of children contain as many germs as that of adults. It is very important to collect and dispose of children's feces quickly and safely. Water Aid America (2011) stated that a starting point for a hygiene education project is initiating a discussion with communities about what they know, do and want in relation to hygiene. Actively involving communities in decision-making ensures that projects will enjoy sustainability because of alignment with culturally based belief systems. Water Aid America and its partners recognise that people are not motivated to adopt good hygienic practices solely because they understand the health benefits, but also because they experience improvements in privacy, convenience, environmental cleanliness, self-esteem and social status which help to motivate the necessary behavioral changes.

## **2.5 Environmental sanitation**

Today's public is generally more aware of the environment and its effect on the health and comfort of human beings. In that context, hygiene may best be described as those practices that are conducive to providing a healthy environment. This description incorporates three areas of concern: safety, environmental comfort and stimuli, and infection control. Maintaining cleanliness not only provides comfort and positive stimuli, it also impacts on infection control (Integrated Publishing, 2010).

Almost fifty percent of the developing world's population (approximately 2.5 billion people) lack adequate sanitation facilities and more than 884 million people still use unsafe drinking water. Inadequate access to safe water and sanitation services, coupled with poor hygiene practices, kills or causes sickness in thousands of children every day and leads to impoverishment and diminished opportunities for thousands more. Poor sanitation, unsafe water and low standards of hygiene have many other serious repercussions. Children, particularly girls, are denied their right to education because schools lack private and decent sanitation facilities. Because of their social status, women are obliged to spend a large amount of their time fetching water. Poor farmers and wage earners are less productive due to illness; health systems are overwhelmed and national economies suffer. Without water, sanitation and hygiene, sustainable development is impossible (United Nations Children's Fund, 2010).

Sibeene (2008) echoed Namibian President Hifikepunye Pohamba's observation that sanitation remains a great concern in the country's informal settlements as many inhabitants resort to "flying toilets" in their moment of need. These so-called "toilets" are plastic bags that slum dwellers use to relieve themselves, after which are discarded on streets, alleys, ditches or roof tops. In other words, assuming that out of sight, is out of mind. It could be argued that such "toilets" rarely remain out of sight. The WHO (2011) stated that when a large number of people use an area to relieve themselves, such as a bus station or school, especially when food can be obtained in the same area, there is a greater risk of the spread of diseases such as cholera, hepatitis A, typhoid and other diarrhoeal diseases. The nature of these places varies according to several factors: the number of people using them, the amount of time people spend there and the type of activities that occur there. Regardless, all public places need to have adequate sanitation and hygiene facilities. Responsibility for the provision of sanitation facilities in public places is not always obvious, especially when they are informal gathering places. It is vital however that an appointed agency monitors sanitation facilities in public places on behalf of the users. Ideally, this service should be included in the role of a country's ministry of health or its equivalent. Special attention should be paid to the adequacy of facilities, their availability to the public and the conditions of their operation. The WHO (2011) described several basic rules for sanitation in public places:

- There should be sufficient toilet facilities for the maximum number of people using the area during the day. Nominally, this means there should be one

toilet compartment for every 25 users. The toilet facilities should be arranged in separate blocks for men and women. The men's toilet block should have urinals and toilet compartments, the women's block, toilet compartments only. The total number of urinals plus compartments in the men's block should equal the total number of compartments in the women's block.

- Toilet facilities should not be connected with kitchens. Separation ensures a reduced number of flies that have close access to the kitchen and the absence of odors reaching the kitchen. It is important that people using a toilet facility do not pass directly through a kitchen.
- There must be a hand-washing basin with clean water and soap close to the toilet facilities. There should be separate, similar facilities near kitchens or any place where food is handled.
- There must be a clean and reliable water supply for hand washing, personal hygiene and flushing of toilet facilities. The water supply should meet quality standards and should be regularly tested to ensure that any contamination is discovered quickly so that the appropriate remedial action can be taken.
- Refuse must be disposed of properly and not allowed to accumulate, as it will attract flies and vermin.
- Responsibility for cleaning and maintaining sanitation facilities should be very clearly defined. Dirty facilities are conducive to poor or irresponsible use or avoidance altogether. Clean facilities attract and set a good example for users.

Sanitation and hygiene are critical to health, survival and development. A significant number of diseases could be prevented through better access to adequate sanitation facilities and better hygienic practices. Improved sanitation facilities, meaning toilets and latrines, allow people to dispose of their waste products safely, which helps break the infection cycle of many diseases. Hygienic acts, such as frequent hand washing, face washing and bathing with soap and clean water, lead to good health and cleanliness. However, one should be aware that practicing personal hygiene in many parts of the world can be very challenging due to the lack of clean water and soap. Providing access to safe water and sanitation facilities and promoting proper hygienic behavior are important aspects in reducing the health burden from poor sanitation and hygiene-related diseases (Centers for Disease Control and Prevention, 2010a).

Generally, the quality of water available to most households in Namibia is good, meaning safe; about 90% of households do not treat the water they consume. Water treatment differs between urban and rural areas of residence. Rural households are more likely than urban households to treat their drinking water (16% and 6%, respectively). Overall, drinking water is available on the premises in 81% of households in urban areas and 32% in rural areas. In households for which drinking water must be fetched from external locations, it is usually collected by adult females (25%). The amount of time spent by households to obtain water varies: 39% of households in rural areas take less than 30 minutes to obtain water compared with 17% in urban areas (Ministry of Health and Social Services, 2008, p.1). Maintaining

hygienic surroundings ensures that such areas are not turned into breeding grounds for bacteria and viruses. People need only to follow simple rules in order to ensure that areas surrounding water collection points remain hygienic, namely:

- *Dispose of waste in an appropriate manner.* Waste material, inappropriately disposed of, can cause outbreaks of deadly diseases. Most epidemics in history have been caused due to improper waste disposal.
- *Maintain a clean home environment.*
- *Acquire and use garbage cans or rubbish bins.*
- *Refrain from spitting and urinating in public places.* Such behaviour is not only antisocial but also causes the entire surrounding area to smell badly.
- *Consider the promotion of hygiene in your area as a civic duty.* People should stay in touch with appropriate local administration agencies to ensure that offices and residential areas are kept clean (India Parenting, 2010).

Three areas of surveillance need attention in order for environmental sanitation to be effective. These are water supply, sanitation, and hygiene education. The WHO offers guidelines for the implementation of environmental hygiene programmes to improve the general status of health. A contaminated water supply can play a huge role in pollution and the spread of disease. The most common sources of domestically and publicly used water include rainwater, surface water, and ground water. Ground water is the least threatening of all potable water. Sources of ground water are usually wells and springs. These are commonly untainted by waste

disposal. The most threatening source of water contamination is often surface water. If waste materials are not disposed of properly, they may come in contact with water accumulated on the surface, which may be collected for drinking and cooking. Contamination can be caused by household trash and human and animal waste products. The consumption of tainted water can cause an outbreak of disease or the spread of a current outbreak (Banks, 2003-2011).

Human excreta always contain large amounts of germs, some of which may cause diarrhoea. When people become infected with diseases such as cholera, typhoid and hepatitis A, their excreta will contain large amounts of germs that cause those diseases. When people defecate in the open, flies feed on the excreta and may carry small amounts of it away on their bodies and feet. Excreta and the germs it contains are transferred to the food touched by the carrier flies. Some germs grow quickly on food and in a few hours their numbers can increase dramatically. Where there are germs, there is always a risk of disease, which puts those humans who come in contact with tainted food at risk. During the rainy season, excreta may be washed away with rainwater, which then finds its way into wells and streams. The germs contained therein will then contaminate the water in those wells and streams, which may be drawn by people for drinking (WHO, 2011).

Primarily, local authorities are the organizations responsible for waste collection. It is much more costly to clean up the litter left on streets and public spaces than it is to

collect waste through formal, household waste-collection systems. The public should therefore accept co-responsibility for the cleanliness of the towns and cities where they reside and ensure that they dispose of litter and waste in allocated bins. Traditional waste-collection systems are inappropriate, inefficient and costly when applied to informal settlements. Recently developed and innovative ways of managing waste removal in disadvantaged communities are required. The trend will move towards community-based waste collection by:

- Paying people to bring litter or waste to a central collection site, and
- Involving the community in programmes to keep their neighborhoods clean.

The emphasis should be more on preventing pollution and minimizing waste materials at their source since it is much more costly to clean up waste after it has been negligently discarded. This approach is based on the following principles:

- Reduction of waste accumulation through re-use of waste products, e.g. using product packaging, such as plastic packets and containers to store things; using the blank side of printed paper before sending it to be recycled.
- Recycling to reduce the build up of mass in the waste stream.
- Recovering chemicals, gases and metals from waste (Mahlangu, 2011).

## 2.6 Hygiene-related diseases

In order to eliminate or eradicate hygiene-related diseases it is important to understand their causes, how they spread and how they can be prevented.

Lice are parasitic insects that can find a home on people's heads, bodies, and pubic area. Human lice survive by feeding on human blood. Lice infestations are mostly spread by close physical contact (Centers for Disease Control and Prevention, 2010a). Lice infestation can be easily controlled and prevented because head lice cannot jump from one person to another or crawl in homes. Steps to control and prevent head lice include:

- Avoid the use of objects that have been in contact with or near another person's head, including hair brushes, combs, hats, scarves, towels, helmets, pillows and sleeping bags.
- Children should be taught to hang their coats and hats on individual hooks or placed individually in isolated areas at school instead of throwing them on a pile with their classmates' clothing.
- Items that come in contact with a person's head should be cleaned regularly. These items include car seats, pillows and head phones, especially if they are shared with others.

- Parents should check their children for nits and head lice at least once a week. Although one may find head lice anywhere, they are commonly found at the back of a child's head, near the neck and behind the ears.
- One should learn the signs that indicate the presence of head lice, which include an itchy scalp and small red bumps or sores on the back of a person's neck and scalp.
- A person should wash their hair regularly, using shampoo and hair conditioner (Iannelli, 2008).

Scabies is a contagious skin infection that spreads rapidly in crowded conditions and is found world-wide. Personal hygiene is an important preventative measure and access to an adequate water supply is important in the control of scabies. The principle sign of this disease is a pimple like rash that is commonly found on the hands, especially on the webbing between the fingers, the skin folds of the wrist, elbow or knee, the penis, on the breasts or shoulders. Infestation often causes intense itching over the entire body, especially occurring at night. Scratching these areas results in sores that may become infected by bacteria (WHO, 2010).

Diarrhoea is caused by a variety of micro-organisms. According to Home Health (UK) Limited (2007) diarrhoea is indicated when a person (or an animal) passes stools more frequently than usual, the stools being usually loose or watery in consistency. Diarrhoea is a common problem, which affects people of all ages. Most

people have contracted diarrhoea at some point in their lives. Diarrhoea is the most important public health problem directly related to water and sanitation. The simple act of washing hands with soap and water can reduce diarrhoeal disease by one third (United Nations Children's Fund (UNICEF), 2005). Diarrhoea is usually caused by viral or bacterial infections and food poisoning. Common types of bacteria which can cause diarrhoea are *E.coli* (*Escherichia coli*) and *Salmonella*. Both can be found in contaminated food or water. Many micro-organisms that cause diarrhoea can spread from one person to another when people defecate in the open. Disposing of excreta safely, isolating excreta from flies and other insects, and preventing fecal contamination of water supplies, would greatly reduce the spread of diarrhoea (WHO, 2011).

Cholera is not as common as diarrhoea, though their routes of infection are similar. According to Huuhtanen & Laukkanen (2006), about 140 000 people world-wide have been infected, resulting in 5000 cholera deaths every year. The disease is caused by vibrio cholera bacteria. Cholera epidemics spread more widely than diarrhoea, the latter usually occurring in a localized environment. Vaccinations, quarantines and travel bans do not prevent cholera from spreading. As many as 90% of all cholera cases are symptomless, still the carrier of the disease may infect others. The most important measures for preventing cholera from spreading are similar to those for diarrhoea. An adequate and safe supply of drinking water and good food hygiene are the primary measures to prevent cholera. It is also recommended that people avoid eating raw fish and seafood in areas where there are outbreaks of

cholera. When the incidence of the disease is high, gatherings of people should be avoided.

The Centers for Disease Control and Prevention (2010a) stated that typhoid is a life threatening illness caused by the bacterium *Salmonella paratyphoid*. Typhoid fever is very common in the developing world, where it affects about 21.5 million people each year. *Salmonella paratyphoid* lives only in humans. Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract. A small number of persons, designated as carriers, recover from typhoid fever but continue to carry the bacteria. Both ill persons and carriers shed *Salmonella paratyphoid* in their feces. Humans can get typhoid fever if they eat food or drink beverages that have been handled by a person who is shedding *Salmonella paratyphoid* or if sewerage contaminated with *Salmonella paratyphoid* bacteria gets into potable water. For those reasons, typhoid fever is more common in areas of the world where hand washing is less frequent and the water is likely to be contaminated with sewage. Once *Salmonella paratyphoid* bacteria are swallowed they multiply and spread into the bloodstream. The body reacts with fever and other signs or symptoms. Huuhtanen & Laukkanen (2006) stated that, typhoid fever can be prevented and treated with measures that are similar to those used for diarrhoea. Vaccination is recommended only if a person spends long periods of time in a region affected by typhoid fever. On the other hand, vaccination does not give complete protection against the disease.

Hepatitis A is another condition related to poor hygiene. It is transmitted through food and drink that has been contaminated by water or soil, an infected individual, excreta contaminated water, and direct person-to-person contact. Insufficient amounts of drinking water and poor sanitation and hygienic conditions increase the risk of infection. Hepatitis A causes fever, exhaustion, lack of appetite and jaundice. Symptoms may vary from mild to severe. The majority of infected individuals are children, who after recovery from the disease, gain immunity. According to Huuhtanen & Laukkanen (2006) the most important measures to prevent hepatitis A are:

- Improved access to safe water and sanitation services
- Access to adequate toilet facilities and proper handling and disposal of excreta
- Hygiene education
- Vaccination against hepatitis A
- Washing hands (also children's hands) before touching food
- Overall improvement of living conditions.

The common cold is a general term used to refer to a mild viral infection of the nose, throat, sinuses and upper airways. A cold can cause nasal stuffiness, running nose, sneezing, a sore throat and a cough. It is thought to be one of the most common health conditions affecting mankind. Adults typically experience between two and four colds per year on average, while children experience between three and eight. A

child's immune system is less developed in comparison with the immune system of most adults. Children, therefore, are more vulnerable to infection. Statistically women get more colds than men, possibly because they are more likely to come into close contact with children. Because there are over 200 different viruses that can cause a common cold, people easily become infected repeatedly. A cold is a self-limiting infection; treatment is therefore not required by an infected person (National Health Service, 2009). It is important to mention colds in the context of hygiene, since their frequency of occurrence and spread may be exacerbated by the infectious conditions that are related to poor hygiene. The linkage is significant and circular and may be associated with the spiraling of infectious conditions.

Conjunctivitis is also a hygiene-related condition which can be described as an inflammation of the conjunctiva, the mucous membrane that lines the eyelids and covers the white of the eyeball. Symptoms of conjunctivitis include: redness, discharge, burning and sometimes itching and light sensitivity. The most common cause of conjunctivitis is a viral infection. Other causes include seasonal allergies, bacterial infection, and allergic reactions to eye medications. Viral conjunctivitis can be transmitted from one person to another by casual contact, sharing towels or pillow cases, facial contact or sharing cosmetics. It can occur before, during, or after a cold or upper respiratory infection because the virus which causes a cold can also cause conjunctivitis. Viral conjunctivitis is very contagious in the first 10 to 12 days and may last up to 2 to 3 weeks. Viral conjunctivitis can be treated using a cool wet cloth three to four times a day. Applying artificial tears will relieve the symptoms

(Callahan, 2011). The most important precaution is to be extremely strict concerning hand washing. In other words a person: should always wash hands with soap and water before and after touching the eyes, should avoid facial contact with others while showing symptoms, and should avoid sharing personal articles such as towels, pillows or cosmetics. People who provide healthcare, food services or education should not work until their eyes feel and look normal because of the risk of spreading the infection to others.

Trachoma is caused by an infection of the eye with *Chlamydia trachomatis*. Infection spreads from person-to-person and is frequently passed from child to mother especially under conditions where there are shortages of water, numerous flies or crowded living conditions. Infection often begins during infancy or childhood and can become chronic. If left untreated, the infection eventually causes the eyelid to turn inwards which, in turn, causes the eyelashes to rub on the eyeball resulting in intense pain and scarring of the front of the eye. This ultimately leads to irreversible blindness, occurring typically between 30 and 40 years of age (WHO, 2011). Trachoma occurs worldwide, mostly in the rural settings of developing countries (PubMed Health, 2010). Populations marked by poverty, crowded living conditions, or poor hygiene are at higher risk of contracting this illness. Antibiotics can prevent long-term complications if used early in the infection. In certain cases, eyelid surgery may be needed to prevent long-term scarring. As noted above, the latter can lead to blindness if not corrected. Improved sanitation and avoidance of sharing items, such as towels, are important measures for limiting the spread of trachoma.

According to Centers for Disease Control and Prevention (2010b) giardiasis is a diarrhoeal illness caused by a microscopic parasite called *Giardia intestinalis* (also known as *Giardia lamblia* or *Giardia duodenalis*). The parasite is found on surfaces or in soil, food or water that have been contaminated with feces from infected humans or animals. People become infected after accidentally swallowing the parasite. Marks & Anand (2011) stated that giardiasis occurs where there is inadequate sanitation or inadequate treatment of water. The parasite is one of the causes of what is known as ‘travelers’ diarrhoea’, which occurs during travel to less developed countries. Giardiasis is a common cause of outbreaks of diarrhoea in day-care centers because of the high probability of fecal-oral contamination among children. Children’s families and day-care center workers are all at risk. Medindia Health Network (2011) stated that giardiasis is prevented and controlled by improved water supply, proper disposal of human feces, maintenance of food and personal hygiene and health education. Unfortunately, no vaccine or effective chemoprophylactic drug is available for the prevention of giardiasis infection.

According to the Centers for Disease Control and Prevention (2010c) an estimated 576 to 740 million people in the world are infected with hookworm. Hookworm, ascaris and whipworm are known as soil transmitted helminthes. Together, they account for a major burden of disease worldwide. Hookworms live in the small intestine and eggs are passed in the feces of an infected person. If an infected person defecates outdoors (near bushes, in a garden or field) or if the feces of an infected person are used as fertilizer, eggs are deposited on the soil where they mature and

hatch releasing larvae (immature worms). The larvae develop into a form that is capable of penetrating human skin. Hookworm infection is mainly acquired by walking barefoot on contaminated soil. Another kind of hookworm can be transmitted through the ingestion of larvae. Most people infected with hookworms have no symptoms, especially persons who are infected for the first time. The most serious effects of hookworm infection are blood loss leading to anemia, and protein loss. Hookworm infections are treatable with medication prescribed by a health-care provider. Improvements in living conditions can greatly reduce hookworm infections.

Ascariasis is a type of roundworm infection and affects approximately 25 percent of the world's population. Most cases of ascariasis are so mild that infected persons show no symptoms. Ascariasis occurs most frequently in young children and is most prevalent in tropical and subtropical regions of the world, especially in areas where sanitation and hygiene are poor (MayoClinic.Com, 2010). It is caused by consuming food or drink contaminated with roundworm eggs (PubMed Health, 2008) and is found in association with poor personal hygiene, poor sanitation and in places where human feces are used as fertilizer. Once consumed, the eggs hatch and release immature roundworms, called larvae, within the intestine. It is estimated that one billion people are infected world-wide and symptoms may include: bloody sputum, cough, low-grade fever, passing worms in stool, shortness of breath, skin rash, stomach pain, vomiting worms, wheezing and worms exiting through the nose or mouth. An infected person may also show signs of malnutrition. Treatment for

ascariasis, include medications, such as albendazole or mebendazole that paralyze or kill intestinal parasitic worms. If there is a blockage of the intestine caused by a large number of worms, endoscopy and, in rare cases, surgery, may be needed. Improved sanitation and hygiene in developing countries will reduce the risk in those areas. In areas where this disorder is common, routine or preventive (prophylactic) treatment with deworming medications may be advised (Health Guide, 2011).

## **2.7 Summary of the chapter**

A literature review was carried out in order to document the views of authors qualified to make statements regarding the subject and practice of hygiene. The literature clearly indicates that most hygiene-related diseases occur in the developing world where there is a shortage of clean and safe water, and conditions of poor sanitation and hygiene prevail. In other geographical areas, hygiene-related disease occurs because of lack of awareness or commitment from healthcare institutions to provide education programmes addressing hygiene issues. Reviewed literature also provided the information that it is not always clear what agencies should take responsibility for hygiene in public areas.

Sanitation, water and hygiene are intertwined issues. It is of utmost importance to address them simultaneously in order to improve health-related conditions and

general living standards of people. It is also important to note that the literature review revealed that hand washing and proper waste disposal are two of the most important human behaviors for the reduction and prevention of most hygiene-related disease.

## **CHAPTER 3: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter addresses research methodology in terms of research design, population, sampling procedures, research instruments, data-collecting procedures and data analysis. It also highlights ethical concerns that the researcher took into consideration during the study. The purpose of this study is to explore and describe the knowledge of hygiene that the residents of Choto possess and to describe the practice of hygiene as it is observed in this informal settlement.

### **3.2 Research design**

An exploratory qualitative research design was used to elicit the knowledge and practice of the respondents in terms of personal hygiene and hygiene in general. The study is interpretive in nature; explorative descriptive strategies were used. Creswell (2003) stated that, qualitative research is interpretative research, with the inquirer typically involved in a sustained and intensive experience with participants. The following steps were used in this study.

- Determine a focus for the inquiry. This was done by establishing a location for the study, namely: the Choto informal settlement.

- Determine how the research paradigm fit the research focus. The researcher compared the characteristics of a qualitative paradigm with the goals of the research.
- Determine where, and from whom, data would be collected. The data was collected from people living in the Choto informal settlement.
- Determine what the successive phases of the inquiry would be. The first phase of inquiry was biographical data and is presented in a graphical format. The second phase investigated the hygiene and practices. The results are presented by means of narration supported by quotes.
- Determine what additional instrumentation could be used beyond the researcher as the human instrument.
- Plan data collection and recording modes. These include how detailed and specific research questions were formulated and how faithfully data was reproduced.
- Plan which data analysis procedures would be used.
- Plan the logistics of data collection, to include scheduling and budgeting.

Mack (2006) stated that the method outlined above is appropriate for the kind of survey represented by the current study because exploratory research uses open-ended and probing questions, giving participants the opportunity to respond in their own words, rather than forcing them to choose from fixed responses, as quantitative methods do. Open-ended questions have the ability to evoke responses that are:

- meaningful and culturally salient to the participant

- unanticipated by the researcher
- rich and explanatory in nature.

Mack (2006) further stated that another advantage of the qualitative research method is that it allows a researcher the flexibility to probe initial participant responses further: to ask why or how. In this study the researcher listened carefully to what participants said, engaged with them according to their individual personalities and styles, and used probing questions to encourage them to elaborate on their answers.

An exploratory strategy was used in this study to obtain greater understanding of the concept being researched. The study was conducted to explore the attitudes, behavior, knowledge and practices of hygiene by the residents in Choto informal settlement. Exploratory research is preliminary research conducted to increase understanding of a concept, to clarify the exact nature of the problem to be solved or to identify important variables to be studied (Wiley, 2009).

### **3.3 Population**

According to Stat Trek (2012, p.1), “a population includes each element from the set of observations that can be made”. The target population of this study was the people who had lived in Choto informal settlement for at least five years, and who were 18 years or older. People who have lived in Choto for a long period of time should have sufficient experience regarding specific hygienic knowledge and practices that have been applied in the informal settlement. This age group was specified to avoid

interviewing children who might not understand the questions, or who are not old enough to speak on their own behalf with regards to giving consent.

### **3.4 Sampling and sample size**

According to William (2006, p.1) “Sampling is the process of selecting units from a population of interest and by studying these units, to draw conclusions, through generalization, about the population from which they were chosen”. Purposeful sampling was used in this study. Creswell (2003, p. 185) stated that: “The idea behind qualitative research is that the purposeful selection of participants will best help the researcher understand the problem and the research questions”. With help from community leaders, the researcher approached individuals from Choto who were 18 years or older and who had lived in the settlement for at least five years. The researcher interviewed 40 people over a period of seven days.

### **3.5 Research methods and instruments**

Face-to-face, in-depth interviews were conducted with the participants. The researcher interviewed them by asking questions that had been formulated and articulated before the interviews. An interview guide, containing key questions, was used as a data collection instrument. For example, participants were asked: How do you practice personal hygiene? The researcher then wrote into notebooks to record the statements made by the respondents during the interviews in answer to the questions.

### **3.5.1 Development of the instrument**

Validation is an important aspect of the development of a research instrument. In this case, validity is used to determine whether research measures actually produce the data or qualitative results that they intend to measure and to approximate the truthfulness of the results (Colorado State University, 2012).

#### **3.5.1.1 Content validity**

The researcher submitted a draft of the proposed interview questionnaire to her academic supervisor for feedback on whether the questions could be considered valid for the intended study. Feedback indicated that some of the proposed questions were too personal since hygiene is a sensitive subject. The researcher was advised to construct objective questions. For instance, in the preliminary questions the researcher intended asking participants whether they had suffered from any hygiene-related disease in the last three months. This question was regarded as being too personal, hypothesizing that most people would not feel comfortable discussing personally experienced hygiene-related diseases or illness.

#### **3.5.1.2 Criterion validity**

The researcher accessed relevant articles available on the internet, as well as articles available in hardcopy which address the subject of hygiene knowledge and practices in order to develop an open-ended questionnaire for the interviews.

### **3.6 Procedure for data collection**

Before embarking on the study, the chairperson of Choto informal settlement was interviewed and the purpose of the study was fully explained to him. The researcher then proceeded from house to house to interview residents who were 18 years or older. To begin, the first house that the researcher approached was randomly selected. Before interviews were conducted the researcher asked prospective respondents how old they were. If they replied that they were minors they were asked to summon a person of maturity age; if one was not present in the house at the time, the researcher moved on to find other respondents. In order to protect the identity of potential participants, the researcher assumed that the information provided by them was truthfully given. In other words they were not requested to produce a formal identity document. All participants were interviewed in Silozi language except for two respondents who felt that they were fluent enough to use English. The researcher personally translated the responses from Silozi to English during the write-up phase of the field notes. Participants were asked questions in relation to their knowledge and practices regarding hygienic behavior, sanitation, source of water and hygiene-related diseases.

The researcher took notes during the interviews. For example, notes included information about *how* comments were made, in what tone of voice or with what body language. In addition, a participant's emotional reactions or behavior during the interview and what happened in the transitions between themes was also considered

valuable. Apart from these notes, the researcher included photographs as observational data.

### **3.7 Data analysis**

In a qualitative study, the process of data analysis begins during data collection. This may take the form of a skillful facilitation of discussions, which in turn generates rich data. It may take the form of complementary discussions with observational notes and other peripheral information or data. This process itself may be complemented or extended as the researcher familiarises him or herself with data by reading both observational notes, which accompany interviews, and summary notes, which are written immediately thereafter (Rabiee, 2004). Central themes, supporting themes and explanations were identified during this process and are described in the report.

Creswell (2003) stated that data analysis is an ongoing process of continual reflection about data, asking analytical questions and writing memos throughout a study. Analysis is not separated from the other activities involved in the process, such as data collection. It also employs open-ended questions which facilitate the collection of subjective information for analysis. This process involves asking general questions of the participants and developing an analysis from the information they supply. The following list presents eight steps of data analysis that were used in this study:

1. Read content in part, to make sense of the whole.
2. Identify commonalities in themes.

3. Cluster and label similar topics; formulate the major topic, define unique topics and catalogue “leftovers”.
4. Set up a preliminary organising system (comprised of major and unique topics).
5. Refine the organising system (topics become themes or subthemes).
6. Cluster collected data.
7. Assemble the data material belonging to each category in one place and perform preliminary analysis.
8. Recode existing (data if necessary).

The researcher was responsible for data analysis and used an open-coding process, by which data was organised in themes to facilitate analysis. However, one interview transcript was sent to the researcher’s academic supervisors as co-coders who discussed and agreed on themes. Once data was organised to place emphasis on the main themes and sub-themes were discussed in detail, the data was interpreted in the final step. Subsequently, themes and sub-themes were discussed with the academic supervisor before the report was written.

### **3.8 Research ethics**

It is important to highlight research ethics. An essential principle that must be observed in the conduct of a survey is to ensure that all information produced by it is treated with confidentiality. Furthermore, publishing the findings of a study must protect the confidential nature of participants’ identities. Respect for participants’

privacy also demands that their permission must be obtained before they are interviewed. After the study is completed, all field notes should be destroyed. It is also important that researchers familiarise themselves with the ethics policies of any relevant institutions they interact with during the study (Maree, 2007).

### **3.8.1 Permission from authorities**

The proposal was submitted to the University of Namibia's Post Graduate Studies Committee for its approval. Permission was also sought from the Katima Mulilo Town Council before beginning the research.

### **3.8.2 Informed consent**

The researcher obtained consent from prospective participants before interviews were conducted. William (2006) stated that informed consent means that prospective research participants must be fully informed about the procedures and risks involved in research and must give their consent to participate. Ethical standards also require that participants may not be exposed to situations that could cause them harm.

### **3.8.3 Confidentiality**

Information gathered from participants is kept confidential and may only be used for the purpose of the study. The researcher is responsible for the security and safe keeping of the information gathered. The information will be destroyed after the

thesis has been submitted for examination purposes. Creswell (2003) stated that, a researcher must respect the participants and the sites used for research. Respect for research sites means they are left undisturbed after the study, particularly after prolonged use for observation and interviews. The researcher must be cognizant of his or her impact and minimize disruption of the physical setting. Researchers also need to anticipate the possibility of harmful information being disclosed during the data-collection process. In these situations, the ethical code for researchers is to protect the privacy of the participants and to extend this protection to all individuals involved in the study.

#### **3.8.4 Anonymity**

The researcher took pains to ensure that each participant's identity was not revealed. During the course of the interviews, participants were not asked to reveal their names. The researcher referred to the participants by number, participant one (1) to forty (40). According to William (2006) anonymity requires that a participant will not be identified throughout the study even to the researchers themselves. This high standard of anonymity is a strong guarantee of privacy. The researcher obtained permission from participants to photograph them and to include their photographs in the written report of the study. All were assured that neither their names nor their responses would be linked to any of the photographic images.

### **3.8.5 Voluntary participation**

All participants agreed to participate in the study voluntarily. Their consent was received before any information was collected from them. They were informed they had the right to withdraw from the study at any point without being victimised or punished in any way.

### **3.8.6 References for information from external sources**

Information gleaned from the work of other authors and researchers was acknowledged by making appropriate citations in the body of the text and in the reference list.

## **3.9 Summary of the chapter**

This chapter described the methods that were used to carry out the study. Ethical concerns that were considered during the study were highlighted. A qualitative research method was used to explore the knowledge and practices of people living in Choto informal settlement with regards to hygiene. The population under study was comprised of people living in Choto informal settlement. Forty (n=40) persons meeting the inclusion criteria were interviewed and were selected using purposeful

sampling. Face-to-face interviews were conducted with the respondents using questions that were formulated in advance.

The researcher took notes during the interviews and was solely responsible for data analysis, utilizing the open-coding process. Data was organised according to categories in order to facilitate the analysis. Several principles of ethics were taken into consideration in the study in order to safeguard the identity of respondents and to acknowledge the work of other authors.

## **CHAPTER 4: DATA ANALYSIS AND ITS INTERGRATION INTO LITERATURE**

### **4.1 Introduction**

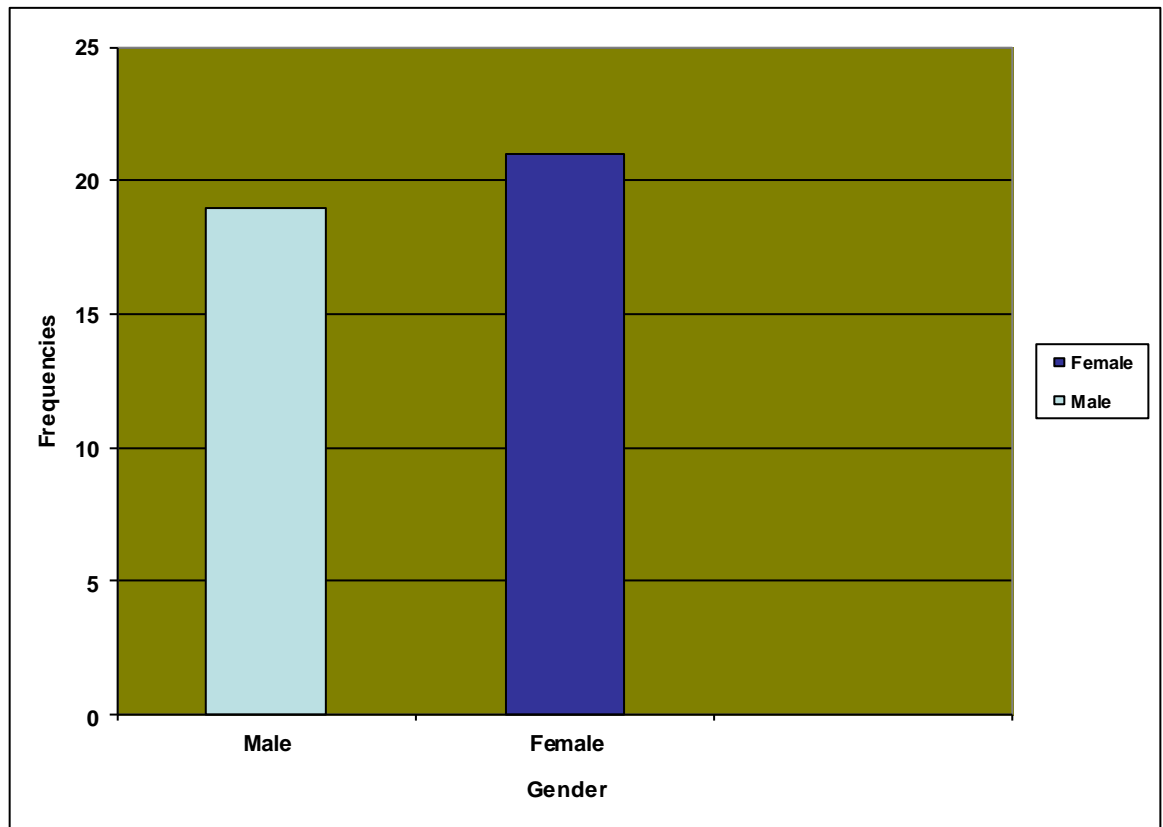
In the previous chapter the research methodology and design were discussed. In this chapter the data is presented, analysed and interpreted. Findings from the interviews regarding the demographics, the hygiene knowledge and the practices of people living in Choto informal settlement, are illustrated using narration based on identified themes. The respondents' (n=40) biographical data are presented and analyzed in section 4.2.1. Data of hygiene knowledge and practices are presented in section 4.2.2.

### **4.2 Presentation and interpretation of the data**

In 4.2.1 the biographical data are represented in Figure 4.1 in a graphical format. In 4.2.2 the responses obtained during the interviews, in terms of hygiene knowledge and practices are presented using italics for verbatim responses. In addition, photographs of respondents and/or surroundings are presented (see section 3.8) to illustrate themes. The narrations from the interviews were categorized into themes and sub-themes as presented in table 4.1 below:

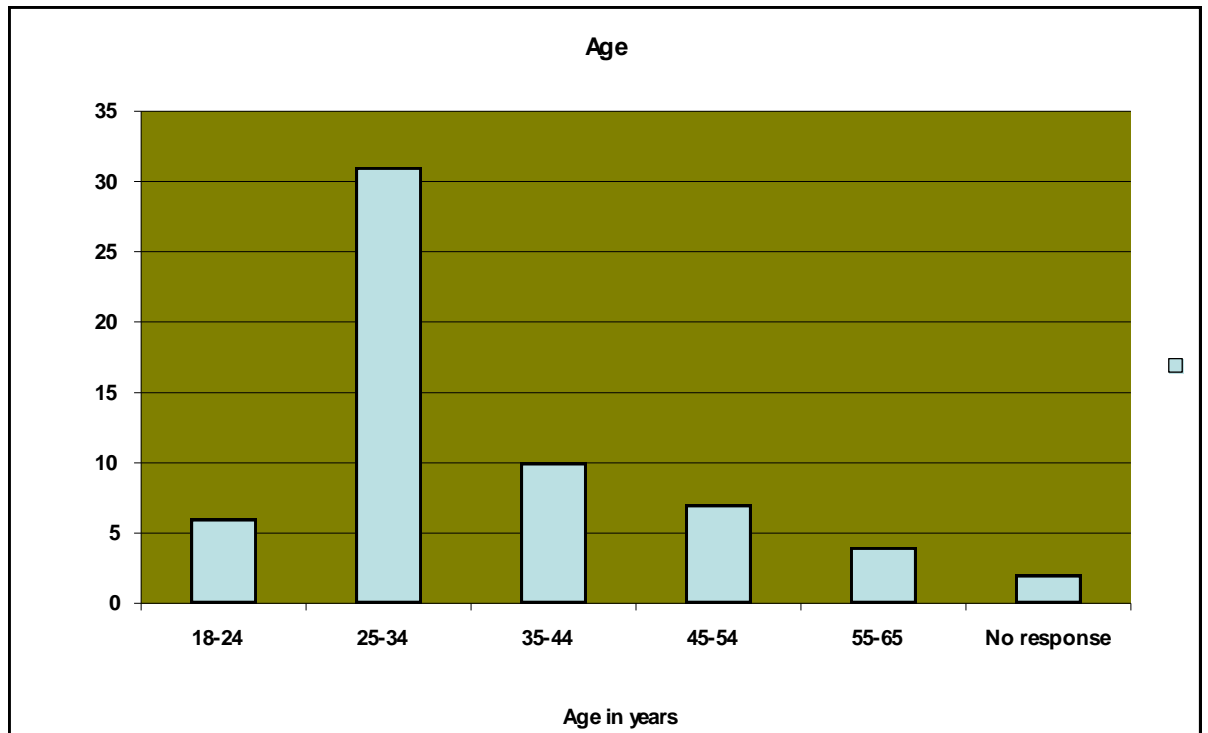
#### 4.2.1 Biographical data

Gender distribution of the respondents is depicted in Figure 4.1.



**Figure 4.1:** Gender distribution of respondents (n=40)

As indicated in Figure 4.1, 21 female (53%) and 19 male (47%) respondents, participated in the study. According to the Namibia 2011 Population and Housing Census, there are generally more females than males residing in Katima Mulilo (National Planning Commission, 2012, p. 51). The age distribution of the respondents (n=40) is presented in Figure 4.2.



**Figure 4.2:** Age distribution of respondents (n=40)

The majority of the respondents (53%) were between the ages of 25 and 34 years. Respondents between 55-65 years of age comprised 7% of all the age groups and were the least interviewed age group. For the purpose of the study, it is assumed that the study-population sample indicated in Figure 4.2 is representative of the age distribution of people living in Choto informal settlement. Thus, it is maintained that 53% of the people living in this informal settlement are between the ages of 25 and 35 years. It is, however, noted that an inclusion criterion required that participants be above 18 years of age.

#### 4.2.2 Hygiene knowledge and practices

Respondents were given the opportunity to explain their attitudes pertaining to hygiene knowledge and practice beyond what was elicited through the questions. They were encouraged to answer the questions from a personal perspective. Three main themes and seven sub-themes emerged during the analysis of the data, namely: under sanitation were ordered hygiene in the house and surroundings, refuse removal, personal hygiene and knowledge of hygiene-related diseases; under the type of toilet used, human waste disposal was considered; and under water source, water for the community and water for hand washing was ordered.

**Table 2:** List of themes and subtheme

Main Themes	Subtheme
1. Sanitation	Hygiene in the house and surrounding
	Refuse removal
	Personal hygiene
	Hygiene related diseases
2. Toilet used	Human waste disposal
3. Water source	Water source for the community
	Hand washing

#### 4.2.2.1 Hygiene in the house and surroundings

The researcher asked the respondents to explain how they practiced hygiene in their homes. Most respondents responded with words to the effect *“the whole yard is thoroughly cleaned by sweeping to prevent the breeding of mosquitoes and occurrence of hygiene-related diseases”*. Figure 4.3 shows a woman using a rake to clean her yard. Some people stated *“the house, both the outside and inside, is thoroughly cleaned and also disinfected”*. Disinfection, according to the respondents, meant the removal of carpets from houses and washing them. They mop their floors using detergents such as *“Domestos”* and *“Sunlight” liquid*. The respondents, whose homes have earthen floors, wet the floor with water before sweeping to prevent raising dust in the air. One of the respondents stated: *“When I wake up, I sweep the house, the yard and make my bed. I water the mud floor and then sweep. I then put “Surf” in a dish of water and wash dishes. I also use “Surf” to wash my clothes.”*



**Figure 4.3:** A lady cleaning her yard using a plastic rake

Observation of cleaning activities at the households revealed that the majority of people cleaned their houses thoroughly. However, most of the people washed their dishes on the ground. Waste water from washing dishes was not re-used but poured onto the ground, as can be seen in Figure 4.4.



**Figure 4.4:** A boy washing dishes on the ground

As was discussed in section 4.2.2, the residents of Choto clean their homes regularly. Due to a lack of adequate facilities in the houses or the absence other home amenities, some residents wash their dishes on the ground, a practice which can result in cross contamination of germs from the ground to the dishes. According to Naidoo, Chidley and McNamara (2008) nearly a third of all urban residents worldwide live in informal settlements. This represents approximately a billion people residing in areas characterised by conditions that are below standard with regards to hygiene and which promote the spread of disease. Such conditions include:

- Poor water and sanitation services,
- Poor understanding of effective hygiene and hygiene practices,
- Overcrowded housing,
- Inadequate or insufficient drainage systems,
- Absence of refuse removal.

Choto informal settlement is no exception with regards to the challenges all people living under substandard conditions must face. The residents in this informal settlement face challenges, such as unemployment, poverty and a lack of adequate housing and services such as sewer systems and proper roads. These challenges make it difficult for residents of Choto to keep their surroundings hygienic and safe. These unacceptable conditions can become the cause of ill health. It is possible, however, for the people of Choto to devise initiatives to improve their lives. For instance, they could fashion kitchen racks for their wet dishware to ensure that while cleaning these utensils they do not become contaminated by the soil. It is also important for the residents of Choto to continue cleaning their homes and surroundings. According to India Parenting (2010) maintaining hygienic surroundings ensures that such areas do not become transformed into breeding grounds for bacteria and viruses. People need only follow a few simple rules to keep their surroundings hygienic. For example:

- *Properly dispose of waste:* if inappropriately disposed of, waste material can cause outbreaks of deadly diseases. Most epidemics in history have been caused by improper waste removal.
- *Always keep the home clean.*

- *Use garbage cans to store waste* while waiting for its removal. Though not always available, their use should be promoted whenever possible.
- *Do not to spit or urinate in public*. Such behaviour is socially unacceptable and also creates foul odors in the surrounding area.
- *Remain in constant communication with local administration* to ensure that offices and public spaces surrounding residential areas are maintained in a clean and hygienic condition.

#### **4.2.2.2 Refuse removal**

Respondents from Choto settlement were asked how they disposed of their domestic waste. Most people responded that they put their rubbish in plastic bags or cartons and a contractor, hired by the Katima Mulilo Town Council, removed the refuse once a week. For example, one respondent stated: *“After cleaning the house and the yard, I put the waste in plastic bags and leave it in front of the yard, where it is collected by the refuse removal contractors once a week”*. By contrast, another respondent maintained: *“the town council does not provide us with plastic bags to store rubbish. I therefore resort to dumping my rubbish across the road.”* Some respondents stated that they were not happy with the service provided because the Katima Mulilo Town Council did not give them plastic bags as well, and therefore most of the time they resorted to dumping the waste in open spaces. A few respondents indicated that the removal truck did not reach their households because the roads to them were not passable. These people also resorted to dumping their domestic waste in open areas.

It might be deduced from some of the comments made by respondents, that the service of refuse removal in Choto informal settlement is unsatisfactory. The researcher noted that the area is surrounded by piles of waste (see Figure 4.5). These can become a breeding ground for vectors, and other disease-causing agents, or micro-organisms.



**Figure 4.5:** Refuse dumped in an open space

Refuse removal in Choto informal settlement is a huge challenge. Many residents are not satisfied with the service they receive. Those who do not get the service at all resort to dumping waste in open spaces, thus polluting the environment. These areas are also breeding grounds for vectors, like mosquitoes, flies and rats, which transmit diseases to humans. The local council collects refuse from each household in Choto informal settlement once a week but in some places the truck cannot reach households because of poor infrastructure. The situation is an indication that this

service by the local council is inadequate. It is evident from the findings of the current study that the local council needs to engage the residents of Choto informal settlement to devise initiatives to keep the settlement clean. Initiatives such as recycling projects and clean-up campaigns could be considered.

Mahlangu (2011) indicates that local authorities are usually and primarily responsible for waste collection. It is much more costly to remove litter discarded on streets and public spaces than it is to collect waste through a formal household-waste collection systems. To make a public initiative viable, the population needs to accept co-responsibility for the cleanliness of its towns and cities and ensure that litter and waste is disposed of in allocated bins. Traditional waste-collection systems are inappropriate, inefficient and costly when applied to informal settlements. Innovative ways of managing waste in disadvantaged communities are required. The trend is to move towards community-based waste collection by:

- Paying people to bring litter or waste to a central collection depot.
- Involving the community in programmes to keep their neighborhoods clean.

The emphasis should be on preventing pollution and minimizing waste at the source, since it is much more costly to clean up afterwards. This approach can be based on the following measures:

- *Reduce the volume of waste* by re-using waste products. For example, using product plastic packaging and containers in which products are sold to store things; using the blank side of printed paper before sending it to be recycled.
- *Recycle waste* to remove mass from the waste stream.
- *Recover waste* in the form of chemicals, gases and metals which are bi-products of waste.

#### **4.2.2.3: Personal hygiene**

Respondents were asked how they practiced personal hygiene. Most of them stated: “*I take a bath and brush my teeth every morning*” (see Figures 4.6 and 4.7). Others said “*I wash my kids before they go to school*”.

Most of the respondents felt “*it is important to keep my body clean and wash my clothes regularly in order to look good and prevent sicknesses*”. Others expressed they felt that “*being clean portrays someone’s image as a neat and healthy person*”.



**Figure 4.6:** A man brushing his teeth



**Figure 4.7:** A plastic structure used as a bathing area

One respondent said, *“Every day I bath in the evening and in the morning. I brush my teeth and wash my face. When I bath I use soap and a face cloth”*.

Although residents show an interest in personal hygiene, the facilities they use for bathing are unhygienic (as evident in the above photograph). Stagnant water, visible in the photo, poses a threat to health. In addition, because it is openly exposed, children can play in that dirty water. Stagnant water can easily become a breeding ground for mosquitoes that cause malaria.

It was discovered through the study that respondents did not place much importance on personal grooming. Evaluation revealed the following among possible reasons: lack of knowledge, poverty and lack of water. Water for personal use is purchased from the local council. The majority talked of taking a bath or brushing their teeth, but personal hygiene needs to go beyond these activities. For example, washing hands at critical times such as after defecation or before preparing food are equally, if not more, important. As was stated in the literature review (see 2.4) Huuhtanen and Laukkanen (2006) maintain that the most important means in improving hygiene are:

- Adequate facilities (e.g. flush toilets, latrines or ventilated improved pit latrines),
- Proper handling and disposal of solid excrement and urine,
- Washing hands after defecation (also children's hands) and before touching food and water,
- Adequate storage and use only of clean water,
- Adequate storage and hygienic preparation of food and
- Controlling the number of vectors.

- The majority of respondents spoke of taking a bath, brushing their teeth, washing their children and washing clothing. These are habits that are important because the lack of personal hygiene can also affect others. “eHow.com” (2011) stated that a person’s personal hygiene can have an impact on other people. People who do not wash their hands can pass infections or viruses to other people. Personal hygiene entails bathing regularly, keeping hair clean, trimming fingernails and toenails, brushing teeth and using deodorant. Personal hygiene can enhance one’s self-confidence and improve the chances of success in many areas of life. People who do not bathe regularly are more susceptible to fungal infections, such as jock itch, athlete’s foot or fungal toenail infections. A lack of oral hygiene can cause oral thrush, which is a fungal infection. People who fail to wash their hands regularly are more prone to getting viruses or bacterial infections from others. Furthermore, bed bugs are a common problem when good hygiene and regular cleaning are lacking.

#### **4.2.2.4 Knowledge of hygiene-related diseases**

Respondents were asked whether they knew of any hygiene-related diseases. Almost all did so. An example being: “...*diseases like diarrhoea, tuberculosis, malaria, flu and cholera can result from staying in dirt areas or by eating contaminated food*”. One respondent stated that “*People maintain good hygiene in order to prevent the*

*outbreak of diseases like cholera and diarrhoea*”. Although some respondents were aware of the importance of keeping themselves and surroundings clean, several were not able to name any diseases associated with hygiene. Some resorted to guessing, stating that flu and diarrhoea could be regarded as hygiene-related diseases. One respondent stated: “*Well I know it is good to stay in a clean environment but I am not sure of any hygiene related diseases, maybe flu*”. When the researcher probed further most respondents related that they have had someone in their family who suffered from diarrhoea, flu, eye infections and coughing during the past three month.

From the findings it is clear that people in Choto informal settlement have general knowledge regarding hygiene, although the depth of that knowledge is not sufficient. For example, some residents could not even name one hygiene-related disease. Another aspect that establishes the low standard of knowledge on the subject is that the residents do not know the relationship between hygienic practices, cause, transmission and prevention of hygiene-related diseases. Some residents on the other hand are knowledgeable about the treatment of diseases. When they get sick, they go to the local clinic or hospital for treatment. The knowledge people have regarding hygiene is often not put into practice due to a number of reasons: poverty, lack of an adequate supply of safe water and an absence of clean and functioning sanitary facilities.

It was evident that the practice of hygiene was below standard as most of the respondents confirmed that at least one of their family members had suffered from a hygiene-related disease during the past three months. It was also observed that residents needed improved services to be able to live comfortably, to improve their health or avoid hygiene-related diseases. According to Ustun, Kay, Fewtrell and Bartram (2004), the following conditions are common: schistosomiasis, trachoma, ascariasis, trichuriasis, hookworm, malaria, yellow fever, filariasis, dengue, hepatitis E, typhoid fever, arsenicosis, fluorosis and legionellosis. These diseases are all attributable to unsafe sanitation and hygiene.

#### **4.2.2.5 Human waste disposal**

Most respondents indicated that adequate facilities for human waste disposal, such as flushable water system toilets, are missing from their environment. Consequently the residents of Choto resort to alternative means of human waste disposal. For example, they allow their children to defecate behind the house and then they cover this human waste with soil. Adults, on the other hand, relieve themselves in nearby open areas. One of the respondents said “*We dig holes for children and cover after they defecate. As for adults we use the nearby bush to answer the call of nature*”. Some respondents also indicated that, during the night or the rainy season, people find it inconvenient to walk a distance to relieve themselves and therefore relieve themselves defecating in plastic bags. These are either thrown in the road or into other peoples’ yards. This practice is clearly unacceptable. It also promotes the spread of hygiene-related

diseases like diarrhoea. Referring to these examples it is apparent that proper and adequate means of disposing human waste are lacking in the settlement. In turn, the situation will automatically result in the spread of disease. By contrast, a few respondents did state that they used ventilated, improved pit latrines which they constructed themselves.

In Choto informal settlement one of the ways in which people relieve themselves is the use of plastic bags which they discard in the road. This practice escalates during the rainy season as people find it inconvenient to walk very far to relieve themselves. The implication of this situation is that fecal matter gets distributed around the settlement by surface water produced by the rain. It is obvious that people will come in contact with the attendant germs and bacteria in this waste material and they will eventually suffer from ill health. The situation may even cause an outbreak of disease such as cholera or diarrhoea. Sibeene (2008) echoed President Hifikepunye Pohamba's observation that sanitation remains a great concern in Namibia's informal settlements as many inhabitants resort to 'flying toilets' in their moments of need. 'Flying toilets' are those plastic bags just described, which slum dwellers may use to relieve themselves, discarding them on streets, in alleys, ditches or even roof tops. Though the euphemism "out of sight, out of mind" may apply, it should be noted that such 'toilets' rarely remain out of sight.

Lack of proper sanitation facilities not only causes disease but also has a detrimental impact on the development of the area in question. United Nations Children's Fund (2010) states that inadequate access to safe water and sanitation services, coupled with poor hygiene practices, kills or infects thousands of children every day and leads to impoverishment and diminished opportunities for thousands more. Poor sanitation, water and hygiene have many serious repercussions. Children, particularly girls, are denied the right to an education because their schools lack private and decent sanitation facilities. Poor farmers and wage-earners become less productive when they are ill. Healthcare systems are overwhelmed and national economies suffer. Without water, sanitation and hygiene, sustainable development is impossible.

#### **4.2.2.5.1 Type of toilets**

All the respondents were aware of two major types of toilet: a flushable water-system and a latrine. The respondents all stated they would prefer using a flushable water-system toilet. However, one respondent admitted that, *"I would prefer a pit latrine because here in Choto we do not have the sewerage system, but the town council should provide the material for the latrine."* Another respondent said, *"I want a flushable toilet because human excreta will be flushed through the sewerage pipes to the sewerage ponds and there is no smell"*. These responses reveal that people are aware that a flushable water system is convenient and when functioning properly can

dispose of human waste. A flushable water system would reduce the spread of disease and would make life easier for the residents of Choto.



**Figure 4.8:** A latrine

The home-made latrine in Figure 4.8 indicates that sanitation, with specific reference to human waste disposal, is an issue in Choto informal settlement. It is evident from this photograph that people resort to constructing latrines, which are clearly inadequate and which, in turn, will only exacerbate the situation or facilitate the spread of disease.

It seems that the town council does not regard sanitation as a priority in this area. The council opted instead to provide the community with water, roads and electricity before sanitation. As was indicated in the literature review, National Planning

Commission (2001) stated that, the 2001 Caprivi Census Report indicated that about 60% of the households in the Caprivi region of Namibia depend on public pipes and boreholes for water. According to public health standards, water from pipes and boreholes is regarded safe for drinking and cooking. For the region as a whole, slightly over 80% of the households have access to safe water. Safe drinking water is available in 98% of urban households and in 82% of rural households, respectively. This implies that approximately one out of five households in the rural areas rely on unsafe water for drinking and cooking, putting them at greater risk of contracting infections and parasitic diseases. Over 80% of the households in Caprivi region have no toilet facilities and the residents have to utilise open areas of the bush. Over 40% of the households in the urban areas have no toilet facilities and use the bush to relieve themselves as well. These statistics imply that only 60% of the households in the town have toilet facilities and these are mostly in the formal settlements. The most common means of disposing garbage in the Caprivi region is the use of a rubbish pit, which is utilized by 44% of all households. In the urban areas, only 23% of households have their garbage collected on a regular basis.

The findings of the current study also reveal that there is a lack of knowledge about types of toilets, as respondents could only identify flush toilets and pit latrines. There are, however, many different kinds of toilets to choose from. Some toilets are even cheaper to install or construct than a pit latrine or a flush toilet. For example, there exist the single, improved pit latrine, and the urine-diversion composting latrine. Mpotulo (2011) stated that a full range of technical options for providing basic, yet

adequate sanitation is still not widely understood. In particular, there is little appreciation for the long-term financial benefits of operating various sanitation systems. As a result, communities and local governments are currently choosing technical options that, over the long term, are either unaffordable or unsustainable. There are various technical options that meet the requirements for basic sanitation and these need to be considered in terms of sustainability, by way of affordability, operation and maintenance. Fundamentally, communities have an attractive range of options: the single, improved pit latrine, the double-ventilated, improved pit latrine, and the urine-diversion composting latrines.

#### **4.2.2.6 Water source for the community**

Respondents were asked to describe how they source and use water. They indicated that they sourced water from communal taps and stored it in big containers for use later, for cooking, washing, cleaning and bathing. Most of the respondents indicated that the containers of stored water are covered with lids or big trays. A few indicated that they do not cover their water. One respondent stated: *“I collect water from taps we share with others and I only cover water we use for drinking and cooking”*. Others also indicated that they only covered drinking and cooking water. The respondents mentioned that they do not treat the water from communal taps because it has already been treated and therefore fit for human consumption. The only complaints they had related to sharing taps, to the dangers involved in fetching water

and the expensive cost of water. Some taps were so far distant from houses that they felt people, especially woman and children, were vulnerable to attack when fetching water at night. For example, one respondent stated: *“The tap we use to fetch water is two blocks away and it is not safe to draw water at night because we are targeted by thieves who take our cellphones. We are also surrounded by shebeens and there are many drunken people around who threatens us when we go to fetch water”*. Some respondents also indicated that they only bathe once a day because the water they buy from the town council is so expensive.



**Figure 4.9:** A boy fetching water at a communal tap

The researcher observed that some residents of Choto do not find it easy to source or handle water in their various homes. Some water containers were not properly

cleaned and some were used for a dual purpose: for bathing and also to fetch water for cleaning dishes. This practice definitely creates a situation conducive to the spread of hygiene-related disease.

In Choto informal settlement there is also a shortage of water. Residents share communal taps and the water drawn there is primarily used for cooking and drinking. Owing to a shortage of easily accessible water and due to the high cost of water, people are not likely to bathe more than once a day. Water is collected at a place distant from the house and is not free of charge. Water is sold by the council at the rate of N\$18 for five drums, each with a volume of 200 liters, for a total of 1000 liters of water.

Generally, the quality of water available to households in Namibia is safe. Approximately 90% of households do not treat their water before consuming or using it. For example, 16% of rural households treat their drinking water, whereas only 6% of urban households do so. Overall, drinking water is available in 81% of urban household premises and in 32% of rural households. Drinking water is usually collected by adult females (25%) for those households that must fetch water from an outside source. The amount of time used by a household to obtain water varies: 39% of rural households take less than 30 minutes to collect water, compared to 17% in urban areas (Ministry of Health and Social Services, 2008). Potable water is available in Choto informal settlement. Any source of contamination would probably originate in the way the water is collected or stored. The type of containers used to

collect water (if they are left open or are unsanitary) is of concern in terms of the findings of this study. It was noted that some residents do not cover the containers in which they store water while others do not thoroughly clean the containers they use before collecting water.

For decades, universal access to clean water and adequate sanitation have both been regarded as essential for reduction of the preventable infectious disease burden in the developing world. However, it is now clear that the goal is best achieved by programmes that integrate hygiene promotion with improvements in water quality and availability as well as sanitation. The neglect of hygiene goes a long way to explain why water and sanitation programmes have often not brought the expected benefits. The current focus in developing countries is on investment in community water supply and sanitation in order to meet the Millennium Development Goals (MDGs). But if the health benefits that are expected from achieving these goals are to be realised, then the sector professionals must look beyond the mere provision of water supply hardware and toilet facilities (Bloomfield et al., 2009).

#### **4.2.2.7 Hand washing**

The respondents were asked to explain their hand-washing techniques. A few respondents indicated they do not use the bowl they use to wash hands for other purposes. A cup or jar is often used to pour water on a person's hands (see Figure 4.10). Some indicated that they put water in a big bowl and everyone in the

household uses this water to wash their hands after going to the toilet or before eating. One of the respondents stated: *“We put water in a small dish and wash our hands. Adults share the same dish and sometimes we use soap whereas sometimes we just use water, but most of the time we use soap to wash our hands after answering the call of nature.”*

If the respondent used only water it is most likely because he or she could not afford to buy soap. The researcher believes there is a high degree of risk that residents could contract a disease because they share the same water for hand washing and do not use detergent. Lack of proper hand washing with soap will surely enhance the possibility of contracting and spreading a hygiene-related disease. Other respondents stated they also use the shared water method, but with a detergent (sunlight soap or sunlight liquid) to wash their hands.



**Figure 4.10:** A man washing his hands

The findings of the study indicate clearly that most of the respondents did not wash their hands correctly. Some share the same dish of water to wash their hands and thereby run the risk of contaminating themselves. In other words, they reuse the same dirty water to wash their hands before and after meals. Some respondents cannot afford to wash their hands with soap because they are poor. They simply cannot afford to buy soap. As stated in 2.4 the most important way to reduce the spread of infections is hand washing. Hands should be washed regularly with soap and water. In addition to hand washing, it is also important to get vaccinated for infections and viruses for which vaccines are available (Canadian Centre for Occupational Health and Safety (CCOHS), 2010).

It is also noted that the key to increasing the number of people who practice hand washing with soap is to promote behavioral change through motivation, information and education. There are a variety of ways of achieving this goal: high-profile national media campaigns, peer-to-peer education techniques, hygiene lessons for children in schools and the encouragement of children to demonstrate good hygiene to their families and communities (United Nations Children's Fund, 2008a).

### 4.3 Summary of the chapter

The researcher discovered that there are numerous institutions involved with the provision of water and sanitary facilities or that promote the practice of good hygiene. However, no single Namibian ministry takes a leading role in *awareness campaigns* which inform the public on these issues. The Ministry of Health and Social Services does promote awareness through its health inspectors. The Ministry of Agriculture, Water and Forestry is responsible for supplying water and sanitation in rural areas. The list of institutions that are responsible for specific functions impacting on water, sanitation and hygiene issues is very long, but unless a single institution is mandated to develop awareness campaigns to help the public change its patterns of behaviour regarding hygiene, the desired results of water, sanitation and hygiene initiatives will not be achieved despite the many efforts made.

This chapter covered the presentation and analysis of data, the latter comprised of biographical data and the respondents' knowledge and practice of hygiene. The following themes emerged during the analysis: hygiene in the home and its surroundings, refuse removal, personal hygiene, knowledge of hygiene-related diseases, human waste disposal (to include types of toilets), sources of water and hand washing. The next chapter covers the study's limitations, recommendations and conclusions.

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

### **5.1 Introduction**

This chapter outlines conclusions arrived at through the study, the limitations that were encountered and recommendations the researcher wishes to make based on the study's findings. The purpose of the study was to explore and describe the knowledge of hygiene possessed by the residents of Choto and the practices regarding hygiene they observe in this informal settlement in Katima Mulilo. The objectives of the study were:

1. To explore the hygienic practices of people living in Choto informal settlement.
2. To assess the knowledge of the people with regard to diseases associated with hygiene.

### **5.2 Conclusions**

Conclusions are presented in the context of the objectives of the study. The first objective, listed in 5.1 above, was met because the people of Choto informal settlement do practice a verifiable level of hygiene, a fact which indicates that they have general knowledge regarding the subject. A "level of knowledge" is better

understood, or verified, when evaluated relative to the *practical application* of that knowledge. In this particular case study, it was noted that people may not put into practice their knowledge of hygiene because of a number of limiting factors, such as poverty (some people cannot afford soap), or the lack of enough clean water or adequate sanitary facilities. Because they often do not practice good hygiene, the residents of Choto informal settlement are prone to suffer from hygiene-related diseases.

The findings, in terms of the second objective, listed in 5.1, revealed that the residents' knowledge of hygiene-related diseases was not satisfactory. It was obvious that some respondents tried to guess a suitable response, naming diseases like flu or tuberculosis. On the other hand, some respondents clearly indicated that they could not name a hygiene-related disease. Because it was observed that most of the residents in Choto informal settlement suffer from hygiene-related diseases, it was concluded that one contributable cause would certainly be their lack of knowledge on this subject. Conditions at the settlement were indicated in the problem statement.

A crucial challenge they face in their situation is that they are *not aware* they suffer from hygiene-related diseases. Neither is hygiene always regarded as an important subject. People sometimes fail to understand the connective relationship between hygienic practices, causes of disease, transmission and occurrence of disease, and ultimately the prevention of hygiene-related diseases. Most respondents confirmed

that one or more of their family members had suffered from a hygiene-related disease during the past three months.

The study revealed that the practice of hygiene and the occurrence of hygiene-related diseases should be of serious concern to people living in informal settlements. From the documentation in the literature review, it is clear that other informal settlements are faced with similar challenges. These challenges certainly apply to Choto informal settlement. This simply means that more action, more initiative, needs to be taken in order to adequately address the issues of hygiene, water and sanitation in a way that could bring about a reduction in hygiene-related diseases.

An obvious conclusion that can be drawn from the data produced by the current study is that the local town council and the Namibian Ministry of Health should organise public information campaigns in which the people of Choto informal settlement could be taught:

- how to maintain an acceptable standard of cleanliness in their homes
- how to properly dispose of waste
- how to store and handle water properly
- proper hand washing techniques
- how these practices relate to the prevention of hygiene-related diseases.

According to Water Aid America (2011) hygiene education, or the promotion of hygiene, encourages people to replace unsafe hygienic behaviour with simple, hygiene-promoting practices. Most people are only too happy to use clean water and safe sanitation facilities once they become available, but without adequate knowledge of good hygienic practices, the actual health benefits produced by such infrastructural improvements will be minimal.

### **5.3 Limitations in the study**

At times, reduced or interrupted internet access posed a challenge to the research, making it difficult to access available literature on the subject. Another challenge was the lack of documentation available on the topic, specifically referring to Choto informal settlement. The researcher primarily used electronic communication through email, and voice communication via the telephone to stay in touch with her supervisors. The internet was utilised to search for background information.

### **5.4 Recommendations**

Recommendations are addressed to relevant stakeholders for their consideration when planning initiatives for the development of this region of our country. It must

be noted that these recommendations for improving hygiene awareness and practices in Choto are far short of exhaustive. Future research, as foundation for a holistic approach for improving hygiene and reducing the spread of diseases in this informal settlement, would be advisable. The recommendations may also be applied as a reference for the investigation of hygiene-related issues in other Namibian informal settlements. The literature certainly justifies such reference since all informal settlements face similar challenges. Four specific stakeholders are addressed through the recommendations.

#### **5.4.1 Katima Mulilo Town Council**

The researcher recommends that a meeting between the Katima Mulilo Town Council and herself be arranged, which meeting she is prepared to facilitate, to discuss the following strategies:

- Hygiene information campaigns need to be implemented in Choto informal settlement so that the people can be trained in the practice of hygiene and learn the health benefits that will be derived from these practices.
- The council should devise projects for the alleviation of poverty in light of the fact that some people can't even afford the soap necessary for basic hygiene. Possible initiatives could include provision of land along the river for gardening projects. Creation and hosting of commercial market activities

for small and medium enterprises parks would stimulate business and generate much needed income.

- Form a water, sanitation and hygiene committee in Choto informal settlement to initiate a programme of joint responsibility with the council that could organise and conduct awareness campaigns. Such a committee could also be mandated with safeguarding water, sanitation and hygiene facilities.
- The council should begin addressing the issues, meaning infrastructural development simultaneously with information initiatives, as it is counterproductive to separate them. Addressing only the “hardware” challenges does not bring about the desired improvement in hygiene or the prevention and reduction of disease.

#### **5.4.2 Ministry of Health and Social Services**

This ministry needs to focus more attention on the prevention of disease than on its cure. It is much more expensive to treat disease than prevent it (“an ounce of prevention is worth a pound of cure” the well-worn phrase extols). The ministry could save vast sums of money in the long term if a joint working agreement with other agencies, such as local authorities, could be forged for the promotion of good hygienic practices. The ministry should be the leading agency for all health-related issues and should monitor the activities of other institutions regarding hygiene and all healthcare related matters.

### **5.4.3 Ministry of Agriculture, Water and Forestry**

This ministry bears responsibility for the water supply and for sanitation in rural areas. Assuming a higher profile in the promotion of hygiene will greatly enhance awareness of the linkage between education and infrastructural development and ensure the establishment of the desired changes. In addition, the Ministry of Education needs to incorporate the promotion of hygiene and other health-related issues into the school curriculum. Such a measure will create a sound foundation for the sustainability of all healthcare related behaviour because it will become anchored in the general knowledge of all people.

### **5.4.4 The community**

The community will make great strides in the improvement of its own situation regarding hygiene when it understands the importance of proactive involvement in community awareness campaigns supporting clean water supply, sanitation and hygiene facilities. If appropriate measures are put in place through the coordinated action of all stakeholders and the community is continuously educated on hygiene matters, most of the diseases mentioned in the problem statement could be eradicated, or at least significantly reduced. The people also need to take good care of the facilities they have in the community and teach their children basic hygienic

practices like washing hands, construction of elevated kitchen racks, burying fecal matter and waste, proper storage of water and cleaning the surrounding environment.

#### **5.4.5 Further research**

Further research would be required to determine how an initiative to provide low-cost sanitation for informal settlements could be efficiently devised. There is also a need to conduct a large-scale survey that could pave the way for a well-grounded, national policy addressing hygiene practices in informal settlements across Namibia. A broadly based survey would be able to draft measures and disseminate information on good hygiene appropriate for the whole country.

#### **5.4.6 Conclusive remarks**

The purpose of the study was to explore and describe the knowledge of hygiene that residents of Choto possess and the practices of hygiene they observe. It was significant that the study produced first-hand information on the hygienic knowledge and practices of people living there. The study revealed that the people in Choto informal settlement have general knowledge regarding hygiene. However, it was also significant that the survey exposed a definite dichotomy between the residents'

knowledge and the hygiene they actually practiced. On the other hand, it was also discovered that residents do not possess a satisfactory level of knowledge, specifically regarding hygiene-related diseases. The study further revealed that hygiene practice and the occurrence of hygiene-related disease are of serious concern to people living in informal settlements in general. It is in this regard that the researcher outlined a number of recommendations that are addressed to the relevant stakeholders for their consideration in planning and decision making.

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## Annexure 1: Approval Letter from University of Namibia

### UNIVERSITY OF NAMIBIA

Private Bag 13301, 340 Mandume Ndemufayo Avenue, Pionierspark, Windhoek, Namibia



**FACULTY OF HEALTH SCIENCES  
SCHOOL OF NURSING AND PUBLIC HEALTH  
UNIVERSITY OF NAMIBIA**

**Letter of permission:  
Post graduate students**

Date: 24 AUG 2010

Dear Student: N M MUNDIA

The post graduate studies committee has approved your research proposal.

**AN ASSESSMENT OF HYGIENE KNOWLEDGE AND PRACTICE; A CASE  
STUDY OF CHOTO INFORMAL SETTLEMENT IN KATIMA MULILO**

You may now proceed with your study and data collection and formal registration for the degree.

It may be required that you need to apply for additional permission to utilize your target population. If so, please submit this letter to the relevant organizations involved. It is stressed that you should not proceed with data collection and fieldwork before you have received this letter and got permission from the other institutions to conduct the study. It may also be expected that these organizations may require additional information from you.

Please contact your supervisors on a regular basis.

Faculty Representative Post Graduate Studies Committee

*prof. Fran Dyle*

**Annexure 2: Approval Letter from Katima Mulilo Town Council**



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**KATIMA-MULILO TOWN COUNCIL  
OFFICE OF THE TOWN CLERK- KATIMA MULILO**

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Private Bag 5009  
Katima-Mulilo  
Namibia

Phone: +264 66 25 3117, Fax: +264 66 253212  
E-mail Address: [kmtc@iway.na](mailto:kmtc@iway.na)

23 September 2010

**Ms. N.N. Mundia  
Community Services & Public Health  
Katima Mulilo Town Council  
Namibia**

Dear Madam

**RE: PERMISSION TO CONDUCT A RESEARCH IN CHOTO INFORMAL SETTLEMENT**

Pursuant to your request as indicated in the captioned matter above, permission is granted to you to collect data in Choto Informal Settlement

I hope and trust that this suffices

Sincerely,

  
.....  
**Dr V.N Sazita  
Chief Executive Officer.**



### **Annexure 3: Interview Guide**

Q1: DEMOGRAPHIC INFORMATION:

- AGE AT LAST BIRTHDAY
- SEX: MALE / FEMALE

Q2: TELL ME HOW YOU PRACTICE HYGIENE IN YOUR HOME?

Q2: TELL ME HOW YOU KEEP YOUR HOME CLEAN WITH ALL ITS CONTENTS?

Q3: WHY DO YOU HAVE TO PRACTICE GOOD HYGIENE?

Q4: WHAT DISEASES CAN RESULT IF ONE DOES NOT PRACTICE GOOD HYGIENE?

Q5: HOW DO YOU DISPOSE HUMAN WASTE IN YOUR FAMILY?

Q6: TELL ME ABOUT THE TYPE OF TOILETS YOU ARE FAMILIAR WITH AND WHICH ONE DO YOU PREFER AND WHY?

Q7: TELL ME ABOUT YOUR WATER SOURCES AND HOW YOU HANDLE WATER OR KEEP THE WATER AT HOME?

Q8: TELL ME ABOUT HAND WASHING? IT'S IMPORTANCE

