

# **THE UNIVERSITY OF ZAMBIA**

**SCHOOL OF MEDICINE**

**DEPARTMENT OF POST BASIC NURSING**

SPR  
MED  
MBA  
2007

**KNOWLEDGE, ATTITUDE AND PRACTICE OF MOTHERS WITH UNDER FIVE CHILDREN ON THE USE OF CHLORINE IN WATER TREATMENT IN LUSAKA URBAN DISTRICT.**

**BY**

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**A STUDY SUBMITTED TO THE DEPARTMENT OF POST BASIC NURSING, SCHOOL OF MEDICINE, UNIVERSITY OF ZAMBIA, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARDS OF BACHELOR OF SCIENCE IN NURSING DEGREE**

**UNIVERSITY OF ZAMBIA**

**FEBRUARY 2007**

## **ACKNOWLEDGEMENTS**

I am greatly indebted to the Ministry of Health for offering me scholarship to pursue a Bachelor of Science in nursing degree and for sponsoring this research.

I wish to thank more sincerely, Mrs. C. Ngoma, the Head of Department at the Post Basic Nursing Department, UNZA, for her lectures which formed the foundation for this research.

Special thanks and appreciation go to my supervisor Ms Majory Kabinga, lecturer at Post Basic Nursing Department, UNZA, for her tireless guidance, supervision and always being there for me.

I wish to thank Dr Likwa, lecturer, at UNZA, for her lectures which made my understanding of research better.

I also wish to thank my classmates, Bsc IV, 2006 class for their psychological and logistics support without which I would not have succeeded.

Special gratitude goes to my husband Mr. Elvis Mbangweta and my children Claudia, Lubasi and Mbangweta for their unceasing love and support.

My sincere gratitude goes to the Almighty God for his everlasting care and protection.

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## **List of acronyms**

<b>CBoH-</b>	<b>Central Board of Health</b>
<b>CDD-</b>	<b>Controlled Diarrheal Disease</b>
<b>CSO-</b>	<b>Central Statistics Office</b>
<b>DHBs -</b>	<b>District Health Boards</b>
<b>DHMT-</b>	<b>District Health Management Team</b>
<b>FDGs_</b>	<b>Focus Group Discussions</b>
<b>GMPs-</b>	<b>Growth Monitoring Points</b>
<b>HIPC-</b>	<b>Highly Indebted Poor Countries</b>
<b>HMBs -</b>	<b>Hospital Management Boards</b>
<b>IEC-</b>	<b>Information Education and Communication</b>
<b>IMR-</b>	<b>Infant Mortality Rate</b>
<b>JICA-</b>	<b>Japanese International Cooperation Agency</b>
<b>LDHMB-</b>	<b>Lusaka District Health Management Board</b>
<b>MMD-</b>	<b>Movement for Multiparty Democracy</b>
<b>MOH-</b>	<b>Ministry of Health</b>
<b>NHC-</b>	<b>Neighborhood Health Committee</b>
<b>ORT-</b>	<b>Oral Rehydration Therapy</b>
<b>SFH-</b>	<b>Society for Family Health</b>
<b>UNICEF-</b>	<b>United Nations International Children's Fund</b>
<b>USAID-</b>	<b>United States of America International Development</b>
<b>UTH-</b>	<b>University Teaching Hospital</b>
<b>WHO-</b>	<b>World Health Organization</b>

## DECLARATION

I, In'utu Muzungu Mbangweta, hereby, declare that the work presented in this study for the Bachelor of Science in Nursing Degree has not been presented wholly or in part for any other Degree nor is it being currently submitted for any other Degree.

Signed: Ign

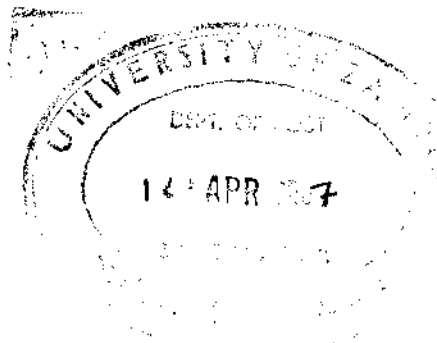
Date: 5<sup>th</sup> April 2007

**CANDIDATE**

Approved: Daliec

Date: 12/04/07

**SUPERVISING LECTURER**



## STATEMENT

I, hereby, testify that this is entirely the result of my own individual investigations.

The various sources to which I am indebted are clearly indicated in the text and in the references.

Signed: Ign

**CANDIDATE**

## **DEDICATION**

I dedicate this study to my late father, Mr. Progress Mubita Muzungu, and my mother, Mrs. Getrude Lubasi Mushala Muzungu.

## **ABSTRACT**

Diarrhoea is one of the major global public health problems especially in developing countries. Children under the age of five are mostly affected. Among the factors that contribute to occurrence of diarrhoea is drinking unsafe water. Water saves life but the same water if not safe can end life.

The aim of this study was to determine knowledge, attitude and practice of mothers with under five children on the use of chlorine in water treatment in Lusaka Urban District.

The literature review was discussed under global, regional and national perspectives. From the studies reviewed, it has been shown that people may know about the use of chlorine in water treatment but they may not use it for several reasons. This may have contributed to the high incidences of diarrhoea among the under five children.

A descriptive non experimental study design was used which had both qualitative and quantitative dimensions.

The study was conducted in September to October 2006. A multi stage random sampling was used to come up with a sample of 60 mothers with under five children. The study was conducted at growth monitoring points in Mtendere, Kanyama and Chilenje clinics in Lusaka Urban District.

Data was collected using structured interview schedule and focus group discussion guide. The data was analyzed manually and the findings were presented in frequency tables, bar charts and cross tabulations

The study findings were that 62% of the respondents had high knowledge, 36% had medium knowledge and 2% had low knowledge. Ninety percent (90%) of the respondents had positive attitude and 10% had negative attitude. Seventy five percent (75%) of the respondents had good practice while 25% had poor practice. Overall, only 37% of the respondents added correct amount of chlorine to the right container of water.

Furthermore, the study findings also indicated that the knowledge, attitude and practice of the respondents on the use of chlorine for water treatment were largely influenced by peer pressure, forgetfulness, illiteracy, misconceptions and educational level. To a smaller extent, inadequate income and shortages of chlorine had an influence on the knowledge, attitude and practice.

Based on the above findings, the following major recommendations were made:

- The Government of the Republic of Zambia must consider free distribution of chlorine to the communities especial to areas where water is drawn from unsafe water sources.
- The Ministry of Health should design Information, Education and Communication messages for the Lusaka district communities written both in English and local languages to encourage mothers to use chlorine for water treatment.
- Lusaka District Health Management Team should conduct more workshops for the Neighborhood Health Committees to encourage them to use chlorine in their homes who in turn will educate other members of community.
- Society for family health must consider indicating a tick for desirable and a cross for undesirable containers to be used for storing water meant for chlorination to act as an aid in distinguishing the right containers to use.

## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1 Background information**

Zambia is a landlocked country covering an area of 752 612 square kilometers. It shares borders with Democratic Republic of Congo and Tanzania in the north, Zimbabwe and Botswana in the south, Malawi and Mozambique in the east and Angola and Namibia in the south west. Situated in the heart of Central-Southern Africa region, Zambia is sparsely populated and is inhabited by more than seventy (70) ethnic groups. The country is divided into nine (9) provinces: Lusaka, Northern, Luapula, Western, Northwestern, Southern, Central, Eastern and Copperbelt provinces. The provinces are further divided into 72 districts.

According to the preliminary report of the population and housing census 2000, Zambia's population was estimated to be 10 285 631 as compared to 7 759 169 in 1990. The country experienced a high population growth during 1963 to 1990 when it grew from 3.5 million to 7.8 million at an annual growth rate of 3%. Forty percent of the population lived in urban areas in 1999, making Zambia one of the most urbanized countries in the region (World Health Organization, 2005). The national population density is as low as 13.8 per person per square kilometer. However, this average conceals large in- country variations: the Copperbelt and Lusaka provinces, which account for a total of 7.1% of the land area of the country, are home to around one third of the population (47 persons per square kilometer (World Health Organization, 2005). As a result of the high density, Lusaka district is characteristic of poor water services due to deterioration, poor maintenance and repair of piped water. The poor water services are worse in squatter areas and unplanned settlements due to overcrowding.

The population pyramid in Zambia is typical of the demographic patterns of other countries in sub-Saharan Africa, with 45% of the population under the age of 15 years and a large portion of the women (25%), in the reproductive age group. The fertility rate is high and was reported to be 6.1 in 1996 (World Health Organization, 2005).

Growing poverty is the socioeconomic characteristic of Zambia today which affects more than two thirds of the population although the country is endowed with abundant water resources, mineral wealth, and climatic conditions favorable to agriculture. The economy is largely based on mining and agriculture, with potential in tourism, energy and industry. In 1996, the poverty levels were 53% for extreme poverty and 70% overall poverty. In 1998, 58% of the population was in extreme poverty and the level of the overall poverty was 73%. The rural areas were hard hit with overall poverty levels estimated at 83% (Central Statistics Office, 2000).

Zambia's economy has also been worsened by the external debt servicing which stood at US\$ 3.7 billion and increased to US\$ 4.2 billion and US\$ 8.4 billion in 1994 and 1997 respectively. In, 2000, the debt stock stood at US\$ 6.5 billion (WHO, 2005). Zambia has since qualified for debt relief under the Highly Indebted Poor Countries (HIPC) initiative after successfully attaining the conditions for HIPC. The funds released by the implementation of the HIPC initiative are expected to facilitate an increase in funding to the health sector. The poor socio-economic status of most Zambians (73%) predisposes them to numerous public health problems such as diarrhoea because the poorer the family, the likelihood of access to unsafe water sources.

### **1.1.1 Health profile**

The Zambian government had been offering the people of Zambia with free health services since independence in 1964. However inadequate foreign exchange which started in the late seventies adversely affected the health

system leading to frequent shortages of drugs, other essential supplies and medical care. Therefore, in 1991, the Movement for Multiparty Democracy (MMD) initiated the National Health Reforms. The vision of the health reforms was to provide Zambians with equity of access to cost effective quality health care as close to the family as possible. The government was concerned with offering the people of Zambia better health services. The main focus of the health reforms was decentralization of health services. A system that would bring accountability was instituted by bringing health services management down to the level of the family through the creation of Hospital Management Boards (HMBs), District Health Boards (DHBs) and the Neighborhood Health Committees (NHCs). Major restructuring of the Ministry of Health (MOH) with creation of Central Board of Health (CBoH) was undertaken. The Ministry of Health was to be responsible for policy and strategic planning while Central Board of Health was created with the responsibility of implementing government health policies. Financial and administrative powers were given to the hospital and district health boards (Ministry of Health, 2004). There are 72 District Health Boards and 20 Health Management Boards operational in the country (WHO, 2005).

Despite the restructuring of the Ministry Of Health, public health problems continue to exist. The people of Zambia continue to suffer from huge burdens of preventable and treatable diseases such as diarrhoea and health indicators are generally very poor. The problem of diarrhoea is not only in Zambia but elsewhere in the world apart from the developed countries where the cases of diarrhoea are low due to provision of safe water. Diarrhoea is a leading cause of illness and death among children in developing countries, where an estimated 1.3 thousand million episodes and 3.2 million deaths occur each year in those under five years. Overall, these children experience an average of 3.3 episodes per year (WHO, 1994). In Haiti, diarrhoea is the most leading cause of death among children aged between 1 – 11 months and the second leading cause of death among children between the ages of 12 – 59 months. Diarrhoea is

endemic in Haiti and occurs all year round with peaks during summer months ([file://water\\_saves\\_lives\\_haiti.htm](file://water_saves_lives_haiti.htm)).

Diarrhoea is a major cause of morbidity and mortality among children in the African region. In South Africa, diarrhoea accounts for 28% of deaths in children under the age of five years with highest risk occurring in children under the age of one year living in poor socioeconomic conditions (Kibel and Wagstaff, 2003). A marked seasonal cycle of diarrhoea disease is evident in South Africa with high morbidity rates reaching peak from December to March.

In Zambia, diarrhoea is third among the top 10 causes of morbidity in under five children (CBoH, 2002). The country's infant mortality rate (IMR) was 109 per 1000 live births and the under five-mortality rate was 197 per 1000 live births in 1996 (CSO, 1996). In 2002, the under five mortality rate was estimated at 202 per 1000 live births. Seventy-five percent of the child mortality is due to preventable diseases such as malaria, diarrhoea, pneumonia, malnutrition and anemia (CBoH, 2002).

Lusaka urban district continues to suffer from a huge burden of preventable diseases, which is reflected in the high morbidity and mortality. Diarrhoea among the under five children is one of the top five causes of morbidity and mortality. Diarrhoea ranks third among the top five causes of morbidity and fifth, among the top five causes of mortality in under five children (LUDHMB, 2005). The table below illustrates the incidence of diarrhoea among the under five children in Lusaka district.

**TABLE 1: DIARRHOEA INCIDENCE AMONG UNDER FIVE CHILDREN IN LUSAKA DISTRICT**

<b>YEAR</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
<b>INCIDENCE</b>	542.8	567.4	298.3

**SOURCE: LDHMB ACTION PLAN 2006-2008**

The incidence of diarrhoea among the under five reduced from 567.4 in 2003 to 298.3 in 2004 showing a 47.5% decrease in diarrhoeal diseases probably due to an increase in the number of households with access to safe water from 48% in 2003 to 60% in 2004 (LUDHMB, 2005). Apart from diarrhoea, other diarrhoeal diseases like cholera in some health centres occur with regularity and have become endemic. Other water borne diseases such as dysentery are also endemic. Cholera out breaks usually occur in low income settlements where water supplies are obtained from shallow wells, which are in close proximity to pit latrines.

Repeated episodes of diarrhoea in children results in malnutrition because children with diarrhoea eat less and have impaired absorption of nutrients from the gastrointestinal tract related to infection. Children with diarrhoea are prone to developing infections such as pneumonia and measles due to lowered immunity. Malnutrition may also result in stunting. Children with persistent diarrhoea lose a lot of nutrients and take in less over longer periods. The resulting poor nutrition may lead to arrest of growth and the child becomes stunted for their age. Children with acute diarrhoea may loose lots of fluids and electrolytes resulting in dehydration which may, eventually, cause death.

In an effort to reduce the high mortality and morbidity due to diarrhoea among the under five children in developing countries, the World Health Organization established the Controlled Diarrhea Disease (CDD) program in 1978 aimed at providing technical support to national programs. Zambia adopted the CDD program in 1982 and in 1989 the program appeared for the first time in the National Development Plan. This was followed by the establishment of the diarrhoea training unit at University Teaching Hospital (UTH). The activities of the CDD program led to the introduction of Oral Rehydration Therapy (ORT) corners in health centres through out the country. Zambia has since achieved a high level of Oral Rehydration Salt use in the treatment of diarrhoea (Himonga, 1996).

Furthermore, in response to the high prevalence of diarrhoea among the under five children, in 1998 the Society for Family Health, with donor funding from United States of America International Development (USAID), introduced Chlorine in Zambia (Singh, 2000). Chlorination is a technique that was developed by the Centers for Disease Control and Prevention for home water treatment. It is a dilute bleach solution that is used to disinfect contaminated water at the household level. Consumers add a specific amount of Chlorine to water stored in 5 liter, 10 liter or 20 liter jerry cans, shake well and wait 30 minutes for the water to be safe for drinking. Society for Family Health (SFH) produces, markets and distributes Chlorine nationwide. Since 1998 SFH has slowly expanded its sales operation to include all nine provinces in Zambia. The product is subsidized by USAID, and sold in 250 ml bottles for an affordable price of K800 by drugstores, pharmacies, clinics, Neighborhood Health Committee (NHC) members and the District Health Management Teams (DHMT) throughout Zambia (Singh, 2000).

The Lusaka Urban District Health Management Team undertook the following measures to reduce the incidence of diarrhoea through contaminated water:

- Procure adequate supplies of chlorine
- Procure material for Information, Education and Communication on water and sanitation
- Conduct refresher training of environmental health technicians on water sampling techniques.
- Advocate to stakeholders and partners such as Lusaka City Council (LCC), Japanese International Cooperation Agency (JICA), CARE International and United Nations International Children's Fund (UNICEF) for provision of safe water.
  
- The district has procured 10, 000 shippers of chlorine with the help of partners, JICA and CARE International for distribution in the health centers from Society

for Family Health (SFH) who are the manufacturer and distributor of the commodity in Zambia.

## **1.2 Statement of the problem**

Diarrhoea is one of the major global public health problems especially in developing countries. Children under the age of five are mostly affected. Among the factors that contribute to occurrence of diarrhea is drinking unsafe water. Occurrence of diarrhoea in developed countries is generally low due to good systems of water treatment, distribution and monitoring. However, waterborne diseases are among the leading causes of morbidity and mortality in developing countries where approximately 900 million people suffer from diarrhoea and 2 million die of diarrhoeal diseases each year ([http://www.safe\\_water\\_on\\_line.Com](http://www.safe_water_on_line.Com), 2006). This is because in many parts of the developing world, drinking water is collected from unsafe surface sources of water outside the home. In 1990, more than one (1) billion people depended on rivers streams, unprotected wells and other unsafe sources for drinking water (Mintz, Reiff, Tauxe, 1995). Contamination may occur at the source, during transportation and during storage due to inadequately maintained pipes, low pressure and lack of chlorination. In Zambia, many communities drink water from unsafe sources. Contaminated water is a serious problem in Zambia. The piped water supply is not adequately or regularly treated. Even in situations where the water is centrally chlorinated it is often contaminated enroute due to the dilapidated piping system. Furthermore, 40% of the urban population in Zambia gets its water from shallow wells (Singh, 2000). Often the shallow wells are situated near pit latrines, which directly contaminate the well water through underground seepage. In fact, the 1996 Demographic Health Survey reported that 77% of the shallow wells in Lusaka are contaminated with E. coli (Singh, 2000).

When centralized, safe water sources are inadequate or absent, the responsibility for making drinking water safe falls on the community. Traditional methods such as boiling and filtering are economically unstable due to reliance

on energy utilization and environmentally unstable because of the risk of contamination during storage. Therefore, the use of chlorine may be the most appropriate method. However, according to the Zambia Demographic Health Survey (ZDHS), 2001/2002 report, only 14 % of households reported treating water with chlorine (MOH, 2004). Comparing rural areas to urban areas, the same report indicated that only 27% in urban and 7% in rural areas use chlorine for water treatment (MOH, 2004). Therefore, most households in Zambia do not use chlorine for water treatment. This is likely to be one of the reasons why diarrhoea morbidity and mortality continue to exist in Zambia. The revelation by the Zambia Demographic Health Survey that only very few Zambian households use chlorine despite the availability of abundant unsafe water sources requires further investigation to determine knowledge, attitude and practice of mothers on the use of chlorine in water treatment. Probably, if people used chlorine, the incidences of diarrhoea would have reduced to very low levels. Lusaka district of Zambia is characterized by incidences of diarrhoea especially among the under five children. Since children have no capacity of ensuring that the water they drink is safe, the responsibility lies in their mothers or caretakers. The mothers' use of chlorine to make water safe to drink could be influenced by a number of factors such as inadequate Information, Education And Communication (IEC), education level, low income, age, laziness, lack of perceived seriousness of diarrhoea and misconceptions.

### **1.3 Factors influencing knowledge, attitude and practice of mothers in chlorine use for water treatment.**

The knowledge, attitude and practice of mothers in the use of chlorine for water treatment are assumed to be related to a number of factors. These could be service related, socio-cultural and economic, and disease related factors.

### **Service related factors**

The knowledge, attitude and practice of mothers in the use of chlorine for water treatment may be influenced by service related factors such as shortage of staff, poor staff attitude towards giving information, education and communication to clients and shortages of chlorine at health facilities.

#### **Shortage of staff**

Most hospitals and clinics in Zambia are faced with critical shortage of staff. The shortage of manpower has a negative impact on the provision of information, education and communication to mothers attending clinics. The few members of staff that are available at health facilities dedicate their time to direct care giving activities such as screening, immunizing and dispensing drugs leaving very little time to giving information, education and communication. The mothers would not access the information on chlorine use.

#### **Poor staff attitude towards information education and communication**

Some members of staff have a negative attitude towards giving information education and communication. The negative attitude of staff may be related to poor conditions of service. Such members of staff may neglect giving information, education and communication so the mothers are deprived of the information about chlorine use.

#### **Shortage of chlorine**

Some times, especially during the rainy season, chlorine runs out at the health center due to high demand. Mothers buy a lot of chlorine during the rainy season because most people perceive this period to be associated with diarrhoea. During such times, chlorine would not be available for the mothers to use. In addition to that, chlorine sales are usually at peak during cholera outbreaks which may increase further the mothers' inaccessibility to chlorine for use in water treatment.

## **Socio-cultural and economic factors**

Socio-cultural and economic factors that influence the knowledge, attitude and practice of the mothers with under five children on use of chlorine include laziness, forgetting, education level, misconceptions and age.

### **Laziness**

Some mothers may just be lazy and perceive the task of adding chlorine to water every time as being inconvenient or difficult. Mothers who are lazy would not use chlorine for water treatment.

### **Forgetfulness**

Some people may sometimes forget to add chlorine to their drinking water. Therefore, their use of chlorine for water treatment may not be consistent.

### **Education level**

Education level may contribute to the knowledge, attitude and practice of mothers on the use of chlorine in water treatment. Mothers with high education may understand the importance of adding chlorine to water, afford to buy it and may use it. However, because most mothers with high education are employed and spend most of their time at work, away from home, they may leave the task of chlorinating water to maids or children who may not see the need to add chlorine to drinking water. Mothers with low education on the other hand are mostly unemployed and live in poverty. Their household income may be inadequate. Mothers with inadequate income may not afford to buy chlorine or put it as a priority. Some mothers with low education are also illiterate. Illiterate mothers are not able to understand messages on information, education and communication on chlorine use. Furthermore illiterate mothers may not understand the reasons why they should treat water for drinking using chlorine. As such, illiterate mothers may not have adequate knowledge and may not use chlorine for water treatment. Those using it may not use the correct measurements.

## **Age**

Age of the mothers may influence their knowledge, attitude and practice on the use of chlorine in water treatment. Through experience, older mothers may be used to drinking untreated water or making water safe through other methods such as boiling. Mothers who are older may find it difficult to change from their old method of treating water to the use of chlorine. The older mothers may influence the young mothers to adapt to their practices. Some mothers may be illiterate because they dropped out of school due to early marriages. Illiterate mothers may not use chlorine for water treatment because they may not understand the need to do so. Moreover, those using it may not use the correct measurements. Both the young mothers and the older mothers may influence their peers about their attitude towards chlorine use for water treatment.

## **Misconceptions**

Some mothers may have a misconception that treating water with chlorine renders it tasteless or gives it an unpleasant taste and smell. Such mothers may influence peers about the tastelessness of water treated with chlorine. Mothers with misconceptions about chlorine do not use it for water treatment.

## **Disease related factors**

### **Lack of perceived seriousness of diarrhoea.**

Mothers who are younger may not take diarrhoea in children as being serious and may not bother to take measures to prevent diarrhoea. Those who are older perceive diarrhoea in children as a way in which children cleanse their intestines. Mothers who perceive diarrhoea as not being serious do not see the need to treat drinking water with chlorine.

**Seasonal occurrence of diarrhoea.**

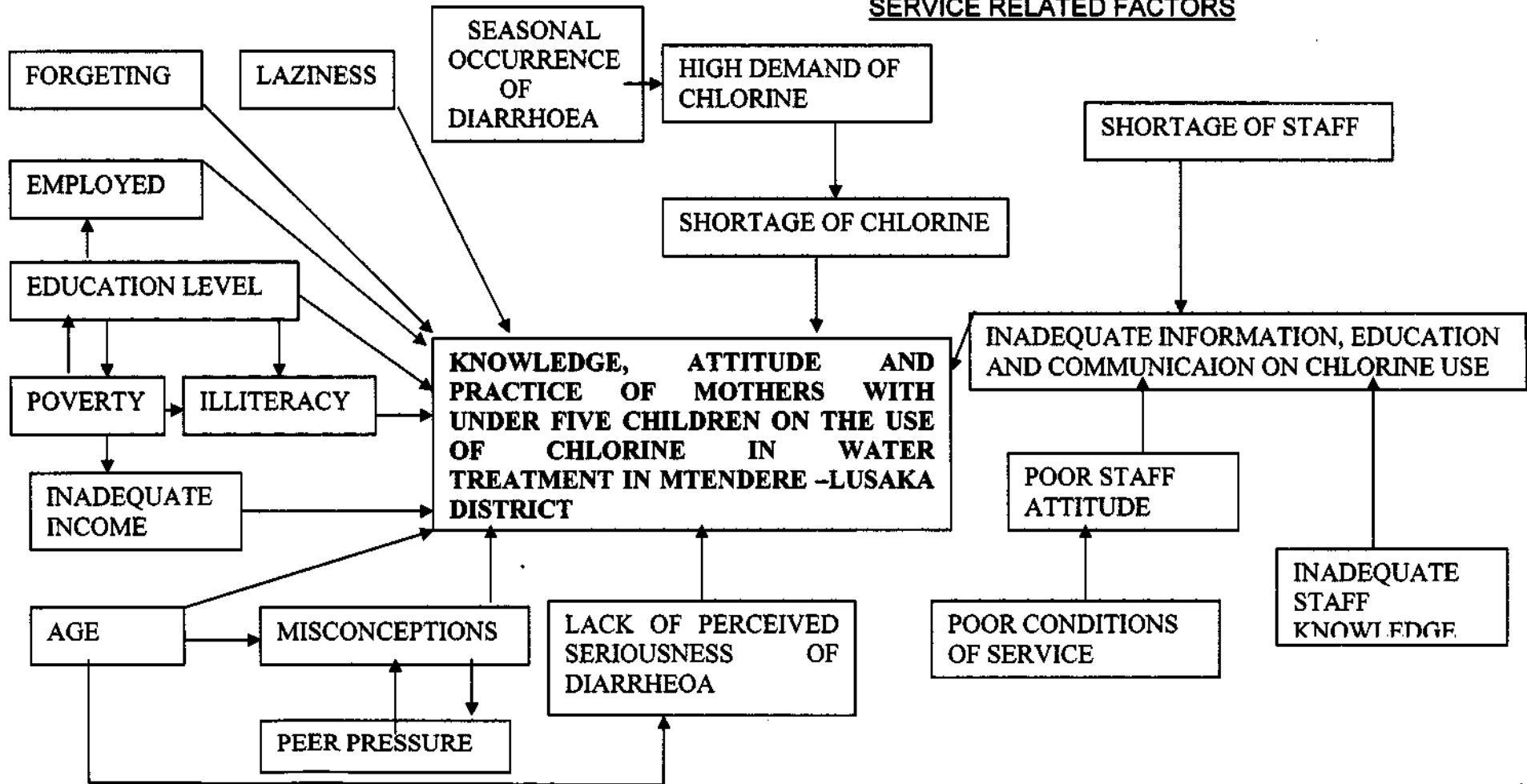
Since diarrhoea incidences are commonly at their peak during the rainy season and during cholera outbreaks, most mothers may only use chlorine for water treatment during these periods. Therefore, consistent use of chlorine over time may not be practiced by some mothers.

**1.4 Factors influencing knowledge, attitude and practice of mothers with under five children in the use of chlorine in water treatment**

**SOCIO-ECONOMIC & CULTURAL FACTORS**

**DISEASE RELATED FACTORS**

**SERVICE RELATED FACTORS**



## **1.5 Justification of the study**

The purpose of the study is to determine the level of knowledge, attitude and practice of mothers with under five children on the use of chlorine in water treatment in Lusaka urban district. The district is faced with high incidences of diarrhoea among the under five children which is a major public health problem in Zambia and many other developing nations. Unsafe drinking water is one of the major causes of the continued incidences of diarrhea among the under five children. Treating water with chlorine is the fastest, practical and inexpensive method of rendering water safe for drinking compared to other methods such as boiling which require the use of heat form sources like firewood, charcoal, electricity, solar kerosene and other fuels which are quite expensive. One bottle of Chlorine makes 1000 liters of drinking water safe, enough to last a family of six one month. It is 60 times more expensive to boil water with charcoal, the fuel most accessible to the poor, than to use Chlorine to treat water (Singh, 2000). Despite the mentioned advantages of chlorine use for water treatment, many mothers do not use it (MOH, 2004). There is need to find out the mothers' knowledge, attitude and practice on the use of Chlorine in water treatment to determine why the incidences of diarrhoea among the under five children continue to exist.

The researcher under took the study in order to obtain information that will contribute to the body of knowledge, identify gaps in the mothers' knowledge, establish attitudes of mothers towards chlorine use in water and identify the practices of mothers in chlorine use.

It is hoped that the findings of the study will be used by the Ministry of Health to design information, education and communication strategies for both the community and health personnel in line with water treatment aimed at reducing the incidences of diarrhoea in under five children. The child health personnel will use the findings of the study to identify areas needing more health education and generate awareness of the diarrhoeal problem in the community. The environmental health personnel will use the findings to link

the diarrhoeal problem to water contamination and teach the communities the importance of water treatment and how to use chlorine. The study is most significant to Lusaka District Health Management Team that will use it to implement more partnership programmes with partners such as JICA and CARE International aimed at increasing knowledge of mothers, motivating them and convincing them to change their behavior towards chlorine use in water treatment. The society for family health who is the producer and distributor of chlorine will use the findings of the study for marketing strategies aimed at promoting chlorine sales. The people of Lusaka community will use the findings to identify gaps in their knowledge, attitude and practices of chlorine use in water treatment and undertake behavior change towards making water safe for drinking to prevent diarrhoea.

## **1.6 Research objectives**

### **1.6.1 General Objective**

The main purpose of the study was to determine knowledge, attitude and practice of mothers with under five children on the use of chlorine in water treatment in Lusaka urban district.

### **1.6.2 Specific Objectives**

1. To assess the level of knowledge of mothers with under five children in the use of chlorine in water treatment.
2. To identify attitudes of mothers with under five children towards chlorine use in water treatment.
3. To identify the practices of mothers with under five children in chlorine use in water treatment.
4. To determine factors contributing to the knowledge, attitude and practice of mothers with under five children on chlorine use in water treatment.
5. To make recommendations to relevant authorities for implementation.

## 1.7 Hypotheses

1. There is a relationship between the level of education and the knowledge, attitude and practice by mothers in use of chlorine in water treatment.
2. Adequate information, education and communication enhance the knowledge, attitude and practices of mothers in chlorine use in water treatment.

## 1.8 Operational definitions

1. **Attitude** - women's feelings about chlorine use in water treatment
2. **Diarrhea** - refers to three or more watery or loose stool in twenty four (24) hours.
3. **Illiterate** - refers to women who do not know how to read and write.
4. **Incidence**- refers to new cases of diarrhea occurring during a particular period.
5. **Knowledge** - refers to women who know about chlorine and its use in water treatment.
6. **Morbidity** - refers to sickness from diarrhea
7. **Mortality** - refers to death from diarrhea
8. **Practice** - use of chlorine for water treatment using correct measurements
9. **Safe water**- refers to water treated with chlorine.

10. **Under five child-** refers to a child aged below five years
11. **Unsafe water-** refers to water not treated with chlorine.
12. **Water treatment-** refers to the act of adding chlorine to water to make it safe for drinking.

**1.9 Variables and cut off points**

**TABLE 2: Variables and cut off points**

<b>VARIABLES</b>	<b>CUT OF POINTS</b>	<b>INDICATOR</b>	<b>QUESTION</b>
<b>DEPENDENT</b> Knowledge	High	Responses to knowledge questions with scores 7-10	9 - 17
	Medium	Responses to knowledge questions with scores 4-6	
	Low	Responses to knowledge questions with scores 1-3	
Attitude	Positive	Responses to attitude questions with scores 6-10	18 - 24
	Negative	Responses to attitude questions with scores 1-5	
Practice	Good	Responses to practice questions with scores 6-10	25 - 29
	poor	Responses to practice questions with scores 1-5	

<b>INDEPENDENT</b>			
Age	Younger	15-34 years	1
	Older	35 years and above	
Education level	High	College or university.	3
	Average	Secondary school	
	Low	Primary or none	
Literacy	Literate	Able to read and write	4
	Illiterate	Unable to read or write	
Accessibility to information, education and communication	Accessible	Received correct IEC on Chlorine use.	31
	Not accessible	Did not receive correct IEC on chlorine use	
Perception of diarrhoea	Serious	Always treats water with Chlorine.	22
	Not serious	Sometimes or never treat water with Chlorine.	

## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

#### **2.1 Introduction**

Literature review refers to the activities involved in identifying and searching for information on a topic and developing a comprehensive picture on that topic (Polit and Hungler, 1995). The purpose of literature review is to help the researcher source for research ideas of what others have reported on the problem, get oriented to different types of methodologies that may be used in the study, avoid duplication of work that has already been done, discover aspects that must be included in the study to confirm or refute earlier findings, find comparative data that may be valuable to interpret findings of the study and provide a convincing argument as to why the study is necessary (Treece and Treece, 1986).

Diarrhoea may be defined as three or more loose or watery stool in a 24-hour period (Central Board of Health, 2002). There are three classification of diarrhoea according to Billings and Strokes (1982). These are acute diarrhoea lasting less than 14 days, persistent diarrhoea lasting more than 14 days and dysentery which is blood in stool.

Numerous publications and non published reports are available globally indicating the extent of diarrhoea and the importance of water treatment in reduction of incidences of diarrhoea among under five children. The knowledge, attitude and practice of target population may be established through on going research in order to develop strategies aimed at enhancing behavior change towards water treatment. In most households, mothers are responsible for preventive activities of diarrhoea through such measures like the use of chlorine for water treatment; hence many studies have targeted this sector of the population. Studies that establish the mother's knowledge about diarrhoea and those that examine factors contributing to diarrhoea in children are foundations for establishing knowledge, attitude and practice of mothers on the prevention of diarrhoea. Other studies have been conducted to

determine knowledge, attitude and practice of mothers on the use of chlorine in water treatment. In addition, some studies focus on the effectiveness of chlorine in water treatment. The literature review will be discussed under global, regional and national perspectives.

## **2.2 Global Perspective**

Howard, 2002, wrote that the pathogens found in water are what lead to infectious water borne diseases that affect millions of people world wide causing high mortality and morbidity rates particularly in vulnerable groups such as the very young. He went on to say that World Health Organization guidelines based on the risk to health from contaminated water supplies are likely to be achieved by chlorination of water. The use of chlorine in water treatment depends on the knowledge and attitude of mothers. The mothers need to know that water may not always be safe for drinking because it may contain microorganisms. If their knowledge is inadequate, effective use of chlorine will not be achieved. Mothers may not know why they have to treat drinking water. As such, infectious water borne diseases, which include diarrhoea, will continue to affect millions of people world over. In this study the researcher will be able to establish the knowledge levels of mothers in the selected sites on chlorine use in water treatment.

According to Mintz, Reif, and Tauxe, (1995) chlorine is very effective in killing microorganisms in water. The effectiveness of chlorine in water treatment has been illustrated in a two step manner. Firstly, the chlorine molecule penetrates the cell wall of the organism. Secondly, the chlorine kills the nucleic acid activity of the bacteria. This illustration is an indication that using chlorine for water treatment greatly makes water safe or drinking by killing the microorganisms. It will be determined from the study if the respondents have the knowledge that chlorine actually kills germs.

Furthermore, intervention studies have documented the ability of chlorine to reduce household diarrhoea diseases when used to disinfect household drinking water in developing countries. The studies concluded that

chlorination and storage of water in safe vessels reduces diarrhoea by 20% to 48% and significantly improves the microbial quality of water ([http://www.who.int/water sanitation and health](http://www.who.int/water_sanitation_and_health), 2006).

An assessment of twenty four (24) studies from around the world suggested that improvement in the bacteriological quality of water alone reduced diarrhoea by 30% (Udipi, Bhattacharjee, Parulka and Varghese, 1998). Reducing diarrhoea by 30% which may be achieved through chlorination of water can be practised at household level. The eventual reduction in diarrhoea could contribute significantly to reduction in mortality from diarrhoea.

In Haiti, points of use water treatment approaches have shown reduction of 30% to 50% in diarrhoea with even higher reductions during water borne disease epidemics (<file://E:\water treatment saves lives, haiti.htm>). The people of Haiti used chlorine to treat water at household level which resulted in the reduction in cases of diarrhoea.

Chlorine, which is one of the ninety (90) naturally occurring elements, was first used in Europe and North America in the early 20<sup>th</sup> century for disinfecting water for drinking. It is a basic building block for our planet. The use of chlorine in water treatment prevented the spread of water borne diseases such as cholera and typhoid in North America. The wide use of chlorine is primarily due to its effectiveness ([file://E:IISG, Water Information Concern Fact \(WIC\), 2006](file://E:IISG, Water Information Concern Fact (WIC), 2006)). The people in this part of the world may have felt that chlorine was effective, so they used it. This led to the prevention of diarrhoeal diseases in their communities.

According to a study, conducted in a poor periurban community of Santo Domingo, Dominican Republic by McLennan (2000) which assessed the knowledge, practices and barriers relating to prevention of diarrhoea, deficits in preventive practices were identified but, knowledge about the practices was high among the caregivers, and was not related to the reported behaviours.

Several barriers were significantly related to practices, including lapses in care giving, limited resources, and erroneous beliefs. A total of 582 caregivers of children, aged less than 5 years, were systematically sampled from four communities and were assessed on several areas which included water purification. Twenty-seven percent reported that they chlorinated water. Out of these, seventy-four percent reported on an open question that the reason that people chlorinated drinking water was to kill germs, nineteen percent reported that chlorine was used for disinfecting water. Only 3% stated that they did not know why water was chlorinated. Among those that gave reasons for not using chlorine included reasons such as not liking the taste of chlorine, running out of the commodity and forgetting to add chlorine to water. The results of the study showed that the respondents had high knowledge about how to prevent diarrhea but were not using the measures due to reasons given above. Only less than one third (27%) of the sample used chlorine despite knowing that chlorine kills germs in water.

### **2.3 Regional Perspective.**

A cross-sectional community based study conducted on the prevalence of acute and persistent diarrhea in North Gonda zone in Ethiopia by Mitike, (2001) reported a relationship between diarrhea and water sources for drinking water. The general objective of the study was to determine the magnitude of dysentery and persistent diarrhea in children aged under five. Out of a total of 1101 under five children, 18 % had diarrhea within the two weeks period of study. Eighteen percent of these had persistent diarrhea, 3% had dysentery while 44.7% had non bloody diarrhea. Eight four percent of the same sample reported to have unprotected water sources (Mitike, 2001). Chlorination of water needs to be encouraged in the African region because a lot of people still have no access to safe water supplies. The challenge in this case is to establish whether communities have the knowledge that they can contract diarrhea from unsafe water sources.

According to a cross section community based study on determinants of diarrhoeal disease conducted in urban south west Ethiopia by Mekasha and

Tesfahun (2003), water sources may be related to occurrence of diarrhoea among the under five children. The study consisted of a sample of 605 under five children who were selected through simple random sampling of households. Results of the study showed that sources of water from wells among other factors were significantly associated with the occurrence of diarrhoea. The study also reported dual sources of water, which is using both piped water and water from the wells. Water collected from both wells and piped water may look clean but actually be contaminated.

Thomson, (2002) conducted a survey to provide baseline data on the knowledge, attitude and practice towards water safety and use among households in Malawi. The sample consisted of 1 052 households from 3 districts. The results of the study indicated that 66.9% reported having previously used chlorine, 99.6% reported that chlorine was added to water to make it safe for consumption and 94% indicated that the effect of making water safe for drinking was realized by the use of chlorine. Furthermore, comparative results from the 3 areas; Blantyre, Mangochi and Kasungu revealed differences in the use of chlorine in the urban and rural settings. In Blantyre and Mongochi, chlorine use was high in rural areas while in Kasungu, urban respondents reported using chlorine more than rural respondents. The respondents reported high knowledge of chlorine use in water treatment, almost 100% (99.6), but only about 70% (66.9%) reported having used chlorine. There were also contradictory differences practices between rural and urban areas in different districts surveyed.

#### **2.4 National Perspective**

A study conducted by Himonga, J.M (1996) in Lusaka district, revealed that 50% of the 100 respondents interviewed reported that their children had diarrhoea within the four weeks study. Himoonga concluded that safe water supply and health education were undoubtedly the most effective and long term solutions in the control of diarrhoea. The conclusion of the study showed that there is a need for people to know that safe water supply is an important factor in the prevention of diarrhoea which can be achieved through health

education. The health education given needs to be very informative to be effective.

In another study conducted by Kaziya, C (1998) in Mungwi district, northern province of Zambia on the factors contributing to high incidence of diarrhoea in the under fives, the investigator concluded that there is some association between water sources and the incidence of diarrhoea. Kaziya's conclusion is an illustration that the people of Mungwi district may not have been using chlorine in treating their water which may have been related to their knowledge and attitude.

A water quality intervention that consisted of water treatment, safe storage, and community education was field tested in Kitwe, Zambia. A total of 166 intervention households were randomly selected from one community and 94 control households from another. Baseline surveys were conducted and the intervention was distributed. Weekly active diarrhoea surveillance, biweekly water testing, and a follow-up survey were conducted. Compliance was high in intervention households: 97% reported using disinfectant and 72-95% had measurable chlorine in their water in biweekly testing. The subjects in the intervention were given free chlorine. The researchers concluded that this intervention is a useful tool for preventing waterborne diseases in families in developing countries who lack access to potable water. (Quick, Kimura, Thevos, Tembo, Shamputa, Hutwagner, and Mintz, 2002). The people of Kitwe were made to practice the use of chlorine in treating water and the study proved to them the benefit of treating water. The subjects adhered to the use of chlorine probably because they were given free chlorine. Among the factors attributed to reasons why people may not use chlorine is the cost attached to it.

The Zambia Demographic Health Survey (ZDHS), 2001/2002 report, showed that 75% of the house holds in Zambia have heard of chlorine, but only 14 % of households reported treating their water with chlorine (MOH, 2004). Comparing rural areas to urban areas, the same report indicated that 95% in

urban and 65% in rural areas households have heard about chlorine but only 27% in urban and 7% in rural areas use chlorine for water treatment (MOH, 2004). The report showed that almost 100% of the households heard about chlorine, thus they were aware of chlorine. According to this report, most households in Zambia had knowledge about chlorine but it is not known whether they also knew about its use in water treatment because only 14% reported using chlorine for water treatment. The researcher may reveal gaps between knowledge and practice through this study and also establish factors contributing to the differences.

## **2.5 Conclusion**

From the studies reviewed, it has been shown that people may know about the use of chlorine in water treatment but they may not use it for several reasons. This has contributed to the high incidences of diarrhoea among the under five children. The studies have also shown that chlorine use in water treatment is useful in the prevention of diarrhoea. Some of the literature reviewed showed that people used chlorine during intervention studies when it was given free. While other studies revealed that people may not be using chlorine due to barriers such as not liking the taste of chlorinated water, running out of the commodity and forgetting among other factors. Therefore, this investigation about knowledge, attitude and practice of mothers in the use of chlorine in water treatment in selected sites in Lusaka district may reveal inadequacies which may be associated to the incidences of diarrhoea among the under five children in the understudied areas.

## **CHAPTER THREE**

### **3.0 RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Research methodology refers to the study of the manner of collecting research data (Treece and Treece 1986). In other words methodology looks at using theory to obtain information in a process that is well conceptualized so that the findings of the study can be trusted.

#### **3.2 Research Design**

Research design refers to the overall plan for addressing a research question including the specifications for enhancing the integrity of the study (Polit and Hungler, 1999).

A descriptive, non experimental study design was used which had both qualitative and quantitative dimensions. This study design was suitable for this study for the following reasons:

- It involves systematic collection, analysis, presentation and interpretation of data to give a clear picture of the situation.
- It raises fewer difficulty ethical issues.
- It enables description of variables and finding the cause and effect relationship between them.

In this study, the researcher sought to determine the knowledge, attitude and practice of mothers with under five children on the use of chlorine in water treatment. The study was quantitative in nature because the variables were defined and presented by the investigator and data was translated in numbers and then statistically analyzed. Data was collected, processed and analyzed manually to find the cause and effect relationship between the variables. For instance, the relationship between knowledge about chlorine use and education level will be examined. The subject's responses were quantified and measured objectively.

The qualitative dimensions of the study involved exploring the mothers' opinions about the use of chlorine in water treatment.

### **3.3 Research setting**

Research setting is the physical location and conditions in which data collection takes place in a study (Polit and Hungler, 1995).

The study was undertaken in Lusaka urban district. The district is situated in Lusaka province, the capital city of Zambia and also the central part of Zambia. It lies at 28 degrees 10' east of Greenwich meridian and 15 degrees 30', south of the equator. Lusaka district has a surface area of 360 square kilometers. The district shares borders with Chongwe district in the east, Mumbwa district in the west, Chibombo district in the north and Kafue district in the south. The climate in Lusaka is temperate with three distinct seasons; the hot and dry season from August to October, the hot and rainy season from November to April and the cold and windy season from May to July.

Lusaka urban district is responsible for the provision of primary health care in Lusaka district through preventive, promotive and curative health programmes. The district is sub divided into 4 operational areas called sub districts. There are 27 health centers, 3 sub centers and 3 health posts under the supervision of Lusaka urban district. The district has eight (8) large health centres offering in-patient facilities, while the rest are categorized as medium and small health centres. The small health centres only offer out-patient services. The total in patient bed capacity in the district is about 500 against an estimated population of 1,676 321 for 2006 while the under five population is 402,317 (Lusaka Urban District Health Management Board, 2005).

The study was undertaken at three health centres in Lusaka district catchment's area; Kanyama, Chilenje and Mtendere. Kanyama and Chilenje

are among the 8 large health centres while Mtendere is a medium health centre.

### **3.4 Study population**

The study population is the aggregate of cases about which the researcher would like to make a generalization (Polit and Hungler, 1995). The population for this study consisted of women with under five children in Lusaka district. The study sample comprised 60 women who had under five children because women are usually the ones responsible for ensuring the safety of water in most homes.

### **3.5 Sample selection**

A sample is a smaller part of the population which is selected in such a way that the individuals in the sample represent as nearly as possible the characteristics of the entire population (Dempsey and Dempsey, 2000).

A multi stage sampling method was used to come up with the sample. Multi stage sampling is sampling that is carried out in stages or phases. Usually, sampling methods used involve more than one type of sampling method. The three health centres were chosen purposively. The researcher decided to undertake the study at two large health centres namely Kanyama and Chilenje and one medium health centre namely Mtendere because a lot of diarrhoeal cases had been reported in these areas. Simple random sampling was used to select the growth monitoring points from each health centre. Simple random sampling is the selection of study participants using the rotary technique. A sample frame of all the growth monitoring points at each health centre was obtained from the health centres, written on pieces of paper, folded and put in boxes which was then be shaken vigorously. Three papers were picked out of each box. The names of growth monitoring points picked were selected for the study. Nine growth monitoring points in all were selected for the study.

Similarly, random sampling was done to select the subjects at the health centre's growth monitoring points (GMP). The researcher wrote 'yes' on 6 to 7 papers (depending on whether the GMP was at a large or medium health centre) and 'no' on 100 papers. The papers were folded, and put in a box which was then shaken vigorously. The mothers were asked to pick a paper from the box. Those who picked papers written yes were selected for the study. Six respondents were interviewed each day at each growth monitoring point at Mtendere and seven at Chelstone and Chilenje. The simple random sampling method was appropriate because the mothers who brought their children for under five clinics all had an equal chance of being included in the study and the method was less time consuming and economical.

#### **Inclusion criteria**

1. All mothers with children below five years old
2. Mothers living within the catchment area of the health centre

#### **Exclusion criteria**

1. Mothers with children above five years
2. Mothers living outside the catchment area of the health centre
3. Care takers who are not mothers because they may not be living with the children they have brought for growth monitoring

### **3.6 Sample size**

A sample is a part of the whole. In research, the sample is selected in such a manner that it is representative of the entire population (Treece and Treece, 1986). A sample size is the actual total number of respondents to be included in the study. The sample comprised 60 respondents among which seven (7) were interviewed every day for three consecutive days at each growth monitoring point at the large health centres while six (6) respondents were interviewed every day at each growth monitoring point at Mtendere health centre. In all twenty one (21) respondents were interviewed at Kanyama and Chilenje clinics while eighteen (18) respondents were interviewed at Mtendere

clinic. The sample was limited to 60 respondents due to financial constraints and short period of time allocated for the study.

### **3.7 Data collecting tool**

A data collecting tool is an instrument that is used to measure variables and gather information on each concept of interest to the researcher (Polit and Hungler, 1995).

An interview schedule was used to collect data using orally in a face to face format. The questions consisted of wording of both open and closed ended questions and in most cases, the responses were pre-determined. The interview schedule had the following sections; demographic data, knowledge measurement, the measure of attitude, measure of practice and measure of factors contributing to knowledge, attitude and practice. This tool was chosen for the study for the following reasons:

- It gave the researcher a high response rate than a self administered questionnaire
- It permitted the researcher to clarify questions
- It permitted collection of in depth information and exploration of spontaneous remarks by respondents
- It could be used on illiterate people
- The researcher was able to observe non verbal behaviors and mannerisms during the interview that could be linked to the attitudes of respondents.

The interview schedule however has some disadvantages as follows:

- The presence of the interviewer may have influence the subject's responses
- The interview schedule was time consuming and so the subjects may hence been held too long for interviews
- There may have been biases when asking open ended questions where the interviewer will have to write the responses on behalf of the respondents

- The respondents' responses most times were restricted by the predetermined answers.

A focus group discussion guide was also used to conduct Focus Group Discussions (FGDs). The focus group discussion guide consisted of a set of topics to be covered during the discussion.

The advantages of focus group discussion guide were as follows:

- The researcher was able to conduct views of many people in a short time
- The instrument supplemented data collected by the interview schedule

The disadvantages of the focus group discussion guide were as follows:

- Some people may have been uncomfortable to express their views in a group
- A few influential people may have dominated the discussion.

The researcher held two focus group discussions, one at a large health centre, Kanyama and another at the medium health centre, Mtendere. This tool was chosen in order to supplement the data that was collected from the interview schedule.

### **3.8 Data collection technique**

Data collecting technique is the process of gathering information needed to address a research problem (Polit and Hungler, 1995).

Data was collected within a period of three weeks using interview schedule and focus group discussion techniques. Interviews were conducted in the morning when mothers brought their children to under five clinics. Permission to conduct the exercise was obtained from the District Management Team, in-charges and other relevant authorities.

The interviews involved a 20 to 30 minutes interaction between the interviewer and the interviewee using the interview schedule. The interviews were conducted in a private room or at a distance away from the main gathering at the growth monitoring points to ensure privacy. Two research assistants were trained and engaged in interviewing respondents. The interview process was done as follows:

1. The interviewer introduced herself or himself to the respondent and explained the nature and purpose of the interview
2. The interviewer created a rapport with the respondent by asking general questions to make the client feel at ease
3. The interviewee promised confidentiality and asked the respondent to provide frank opinions.
4. The interviewer asked questions in a systematic way using a language that the respondent could understand better and joted down the responses from the respondents in appropriate spaces on the questionnaire.
5. The interviewer thanked the respondent and ended the interview when all the questions had been asked.

The focus group discussions comprised 6- 12 members who did not participate in the interviews. The discussions were held in private rooms or at a distance away from the main gathering. The discussions were conducted as follows:

1. The researcher acted as the facilitator for the discussions and a note taker was engaged
2. The researcher asked the participants to introduce themselves before the discussions began and encouraged active participation by all the participants
3. The facilitator controlled the rhythm of the meeting , listened carefully and moved the discussion from topic to topic
4. At the end of the discussion the facilitator summarized and checked for agreement , thank the participants and declared the meeting closed

### **3.9 Pilot study**

A pilot study is a small preliminary investigation of the same general character as the major study. It is designed to acquaint the researcher with the problems to be corrected in preparation for the larger research project (Treece and Treece, 1986).

The pilot study was conducted at Mahatma Gandhi growth monitoring point in Mtendere which was excluded from the main study. Six mothers, who represent 10% of the sample who brought their children for under five clinic were interviewed using the interview schedule. A simple random sampling method was used to sample the mothers.

The pilot study was conducted in order to identify flaws in the data collecting tool and to find out whether the variables were measurable. Once the errors were identified, they were corrected before the actual study was embarked upon. For instance, question 11 in section B of the interview schedule (Appendix 1), had to be changed from reading untreated water to read, water that has germs because most respondents could not understand the meaning of untreated water. Also, an additional question had to be included to become question 41 in section E for respondents to give the reasons that the people who discouraged them from using chlorine for water treatment gave in order to identify factors contributing the use of chlorine.

### **3.10 Validity**

Validity refers to an instrument's ability to actually test what it is supposed to test (Treece and Treece, 1986). Validity constitutes both internal and external validity. External validity is the extent to which the findings of the research can be generalized to a larger population or to a different social, economical and political setting. The implication is to have a representative sample. To ensure external validity was not possible because the sample size (60) was too few to represent the district. The sample size was limited due to financial constraints. Non-probability purposive sampling was used to select the health centres included in the study where data was gathered to represent the

district. Simple random sampling of the growth monitoring points and study participants was done in order to give each mother a chance to participate. .

Internal validity refers to interpretation of the findings within the study or data collected. It seeks to find out if the effect on the dependent variable observed was actually due to the action of the independent variable. Internal validity was upheld by focusing the questions on the knowledge, attitude and practice of mothers on the use of chlorine for water treatment. To ensure that the tool used for data collection in this study was valid, the researcher put measures in place such as making the questions simple, concise and brief, asking an expert to go through the questionnaire and pre testing the tool. The researcher also ensured that the questionnaire was kept under lock and numbered at the beginning of the fieldwork. In addition, the investigator reviewed raw data for completeness and errors.

### **3.11 Reliability**

Reliability refers to the ability of the data gathering device to obtain consistent results (Treece and Treece, 1986). Two basic sources of inaccuracy may be present and these are:

- Deficiency in the instrument
- Inconsistency in taking readings from the instrument.

Reliability of the interview schedule was achieved by carrying out a pilot study in order to test the degree of accuracy with which the tool was to measure the knowledge, attitude and practice of mothers on the use of chlorine for water treatment. The pilot study also helped to ensure that the questions in the questionnaire were easily understood by making corrections to the instrument accordingly, revising all the questions that would not be understood so that the instrument could be used to collect accurate data in the main study. Reliability of the instrument used in the study was ensured by conducting the pilot study on subjects with similar characteristics to the main study subjects and the same questions were asked to each respondent in the same sequence.

### **3.12 Ethical and cultural considerations**

Ethical considerations refer to ethics which are a system of moral values that is concerned with the degree to which research procedures adhere to professional, legal and social obligations of the study participants (Dempsey and Dempsey, 2000).

The researcher obtained written permission to conduct the pilot study and the main study. Permission was sought from the Head of Department of Post Basic Nursing, the Director of Health for Lusaka District Health Management Board, the in- charges for the health centres and the Neighborhood Health Committee Chairpersons in the selected sites. Verbal permission was sought from the respondents during the time of interviews and the purpose and nature of the research was explained to them. Furthermore, the respondents were assured of anonymity and confidentiality by not writing names on the questionnaires, not publicizing or reporting individual names and keeping the interview schedules under lock and key.

## **CHAPTER FOUR**

### **4.0 Data Analysis and Presentation of Findings**

#### **4.1 Introduction**

The purpose of the study was to determine knowledge, attitude and practice of mothers with under five children on the use of chlorine for water treatment. This chapter discusses data analysis and presentation of findings. Data was collected from a sample of 60 women with under five children.

#### **4.2 Data Analysis**

Data analysis is the systematic organization and synthesis of research data and testing of the research hypothesis using those data (Polit and Hungler, 1995).

After data collection, all interview schedules were checked for accuracy, completeness and consistence. Responses from open-ended questions were categorized and together with responses from close-ended questions, the data was summarized on a data master sheet. The data was analyzed and processed manually with the aid of a calculator.

#### **4.3 Presentation of findings**

The findings were presented in frequency tables, pie charts, bar charts and cross tabulation tables to show the relationship between variables. Presentation of the findings is necessary for the purpose of interpreting the study findings. The findings will then be disseminated to relevant authorities.

## Section A: Demographic Data

**Table 3: Respondents demographic data**

n = 60

<b>AGE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
15 – 24	25	42
25 – 34	32	53
35 – 44	3	5
45 – 54	0	0
55 and above	0	0
<b>TOTAL</b>	<b>60</b>	<b>100</b>
<b>MARITAL STATUS</b>		
Single	9	15
Married	50	83
Divorced	0	0
Widowed	1	2
Separated	0	0
<b>TOTAL</b>	<b>60</b>	<b>100</b>
<b>EDUCATION LEVEL</b>		
University	0	0
College	9	15
Secondary	26	43
Primary	19	32
None	6	10
<b>TOTAL</b>	<b>60</b>	<b>100</b>
<b>ABILITY TO READ AND WRITE</b>		
Yes	45	75
No	15	25
<b>TOTAL</b>	<b>60</b>	<b>100</b>
<b>OCCUPATION</b>		
Employed	6	10
Business	14	23
Farming	0	0

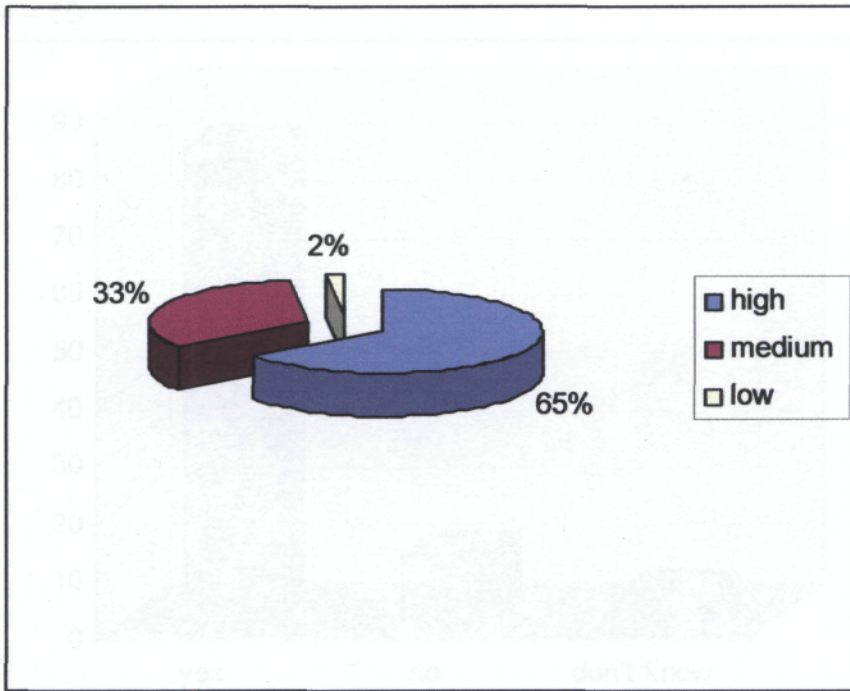
unemployed	40	67
<b>TOTAL</b>	<b>60</b>	<b>100</b>
<b>HUSBAND'S OCCUPATION</b>		
Employed	40	66
business	10	17
None	0	0
Farmer	0	0
Not married	10	17
<b>TOTAL</b>	<b>60</b>	<b>100</b>
<b>FAMILY INCOME</b>		
1 million & above	8	13
500 000 to 999 000	15	25
100 000 to 499 000	24	40
99 000 and less	0	0
Nil	6	10
Don't know	7	12
<b>TOTAL</b>	<b>60</b>	<b>100</b>
<b>AGE OF LAST CHILD (MONTHS)</b>		
1 – 11	33	55
12 – 23	13	22
24 – 34	6	10
35 – 45	3	5
46 – 56	5	8
<b>TOTAL</b>	<b>60</b>	<b>100</b>

Most of the respondents (53%) were aged between 25 to 34 years while those aged 35 to 44 were at 5%. Majority (83%) of the respondents were married. Forty three percent (43%) of the respondents had secondary education. Seventy five (75%) were able to read and write. Most (67%) of the respondents were unemployed. Those who were employed were only 10%. However majority (66%) of the respondents' husbands were employed. Forty (40%) of the respondents had a family income of less than K500 000 and only 13% had an income above one million (K1, 000 000). Most (55%) of the respondents had their last child aged less than 12 months (1 year).

**Section B: Knowledge of mothers on the use of chlorine in water treatment**

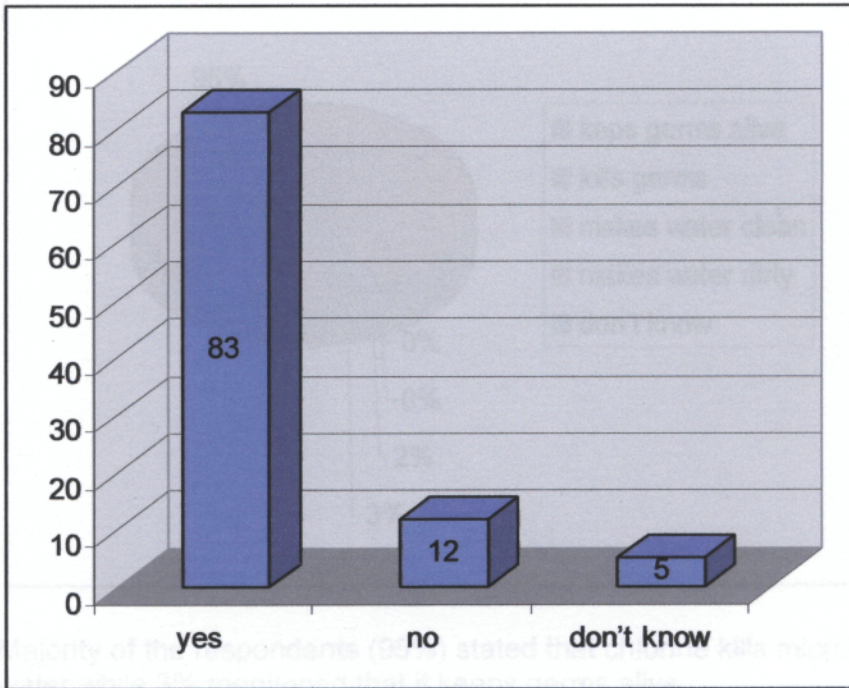
**Figure 1: Respondents' knowledge Levels**

n = 60



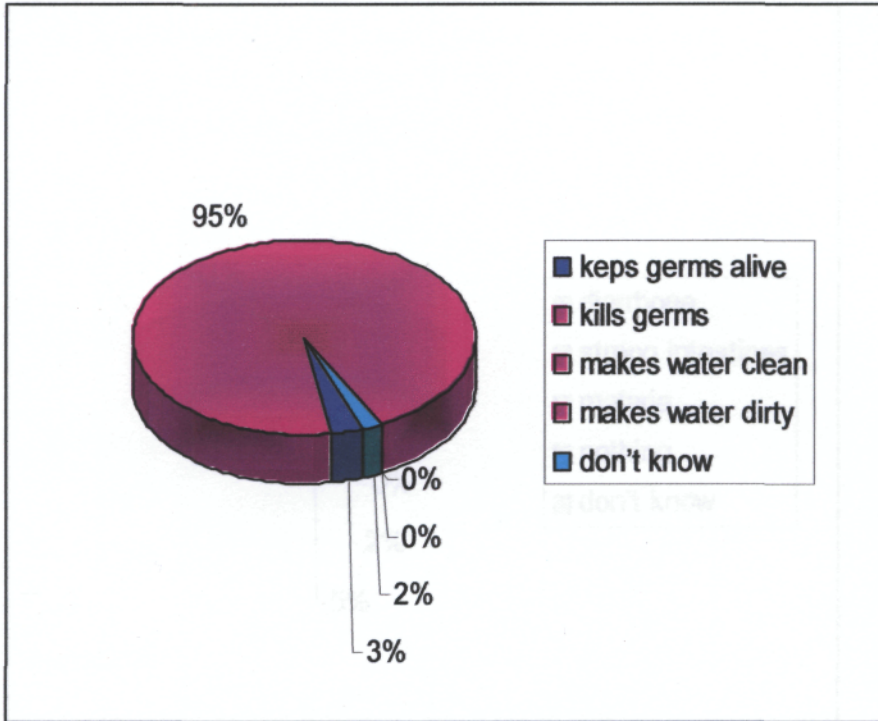
Majority of the respondents (65%) had high knowledge while 2% had low knowledge on chlorine use for water treatment (knew that clean water could have germs, effect of drinking contaminated water, length of time to wait after adding chlorine and effect of chlorine to water).

Figure 2: Possibility of presence of microorganisms in clean water  
n = 60



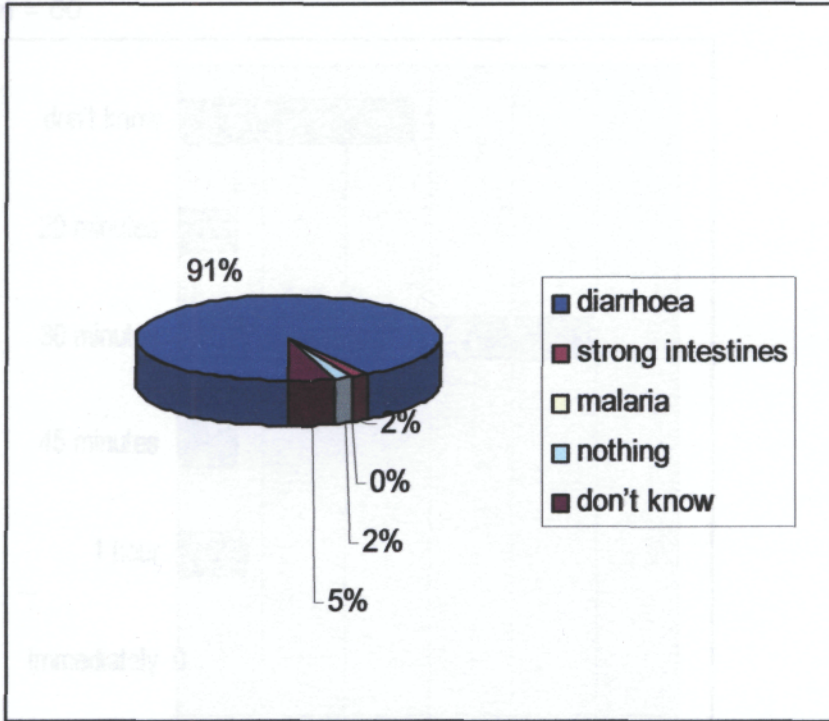
Most of the respondents (83%) knew that clean water could have microorganisms.

**Figure 3: Effect of chlorine in water**  
n = 60



Majority of the respondents (95%) stated that chlorine kills micro organisms in water while 3% mentioned that it keeps germs alive.

**Figure 4: Effect of drinking contaminated water**  
n = 60

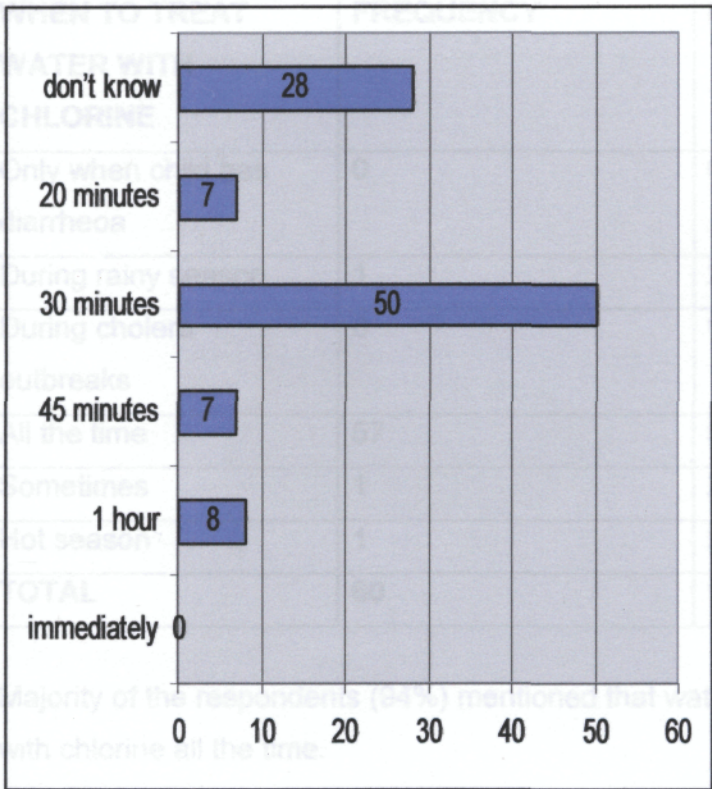


Majority of the respondents (91%) indicated that drinking water that has microorganisms can lead to diarrhoea.

Half of the respondents (50%) correctly mentioned that one has to wait for 30 minutes before drinking water after eating banana

**Figure 5: Length of time before drinking water following addition of chlorine.**

n = 60



Half of the respondents (50%) correctly mentioned that one has to wait for 30 minutes before drinking water after adding chlorine.

**Table 4: When to treat water with chlorine.**

n = 60

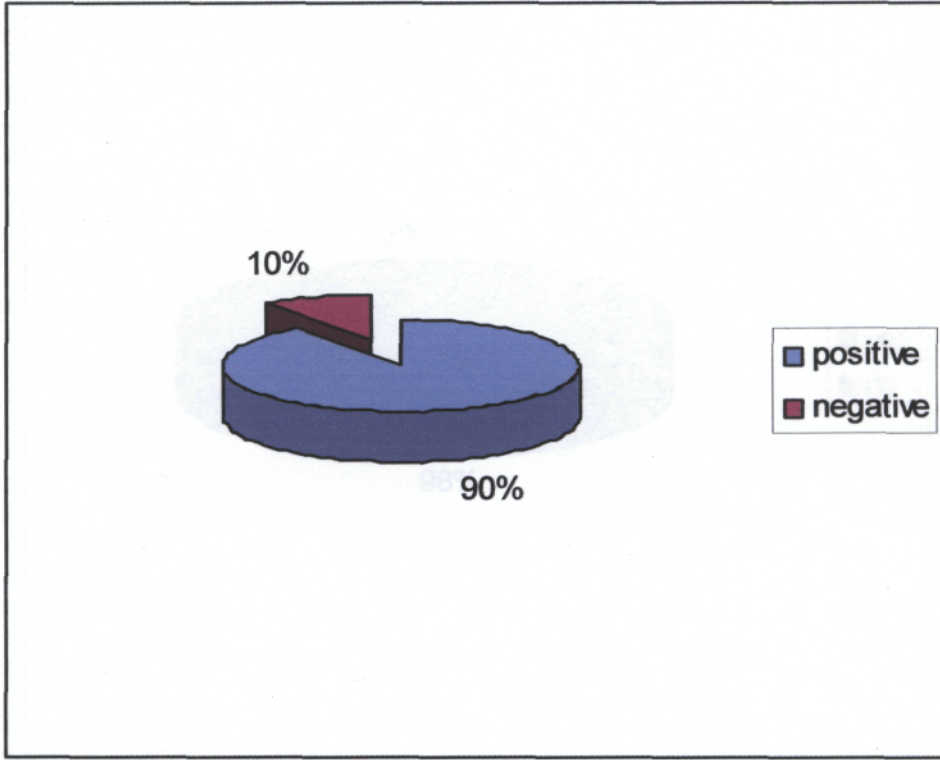
<b>WHEN TO TREAT WATER WITH CHLORINE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
Only when child has diarrhoea	0	0
During rainy season	1	2
During cholera outbreaks	0	0
All the time	57	94
Sometimes	1	2
Hot season	1	2
<b>TOTAL</b>	<b>60</b>	<b>100</b>

Majority of the respondents (94%) mentioned that water should be treated with chlorine all the time.

**Section C: Attitude of mothers on the use of chlorine in water**

**Figure 6: Attitude levels**

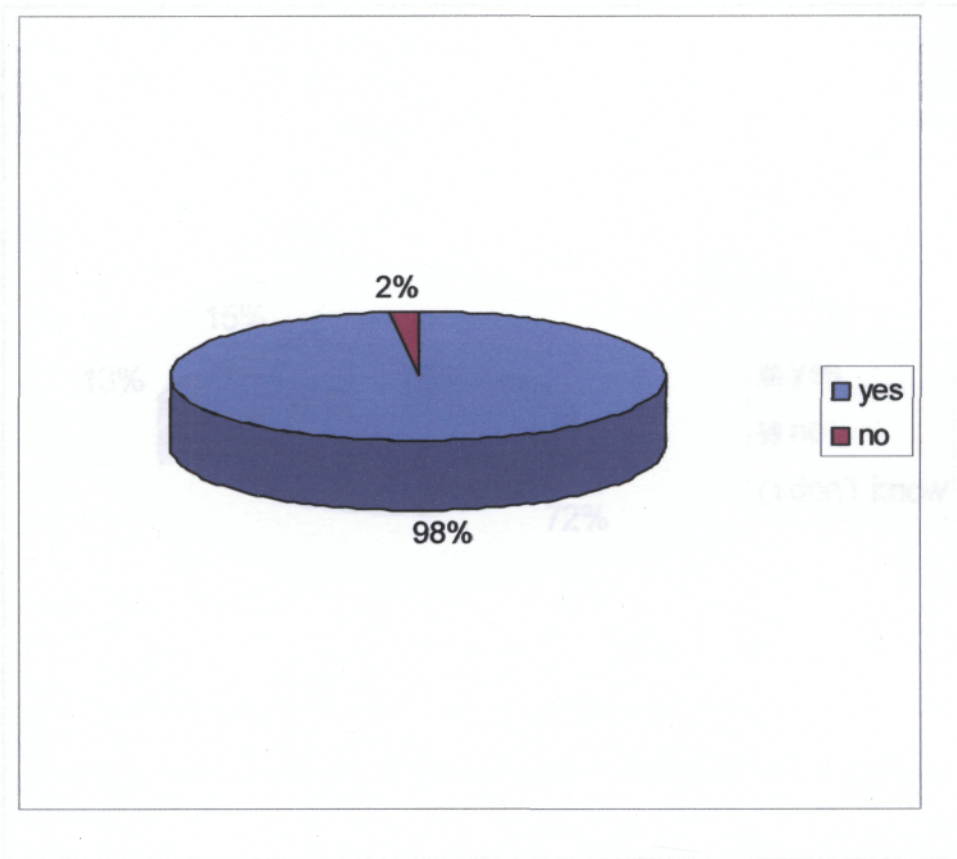
n = 60



Majority of the respondents (90%) had a positive attitude towards chlorine use for water treatment while 10% had a negative attitude (felt it was necessary to treat water with chlorine, taste of chlorine does not influence people not to use chlorine and that water disinfection is not an inconvenience).

**Figure 7: Is it necessary to treat water with chlorine**

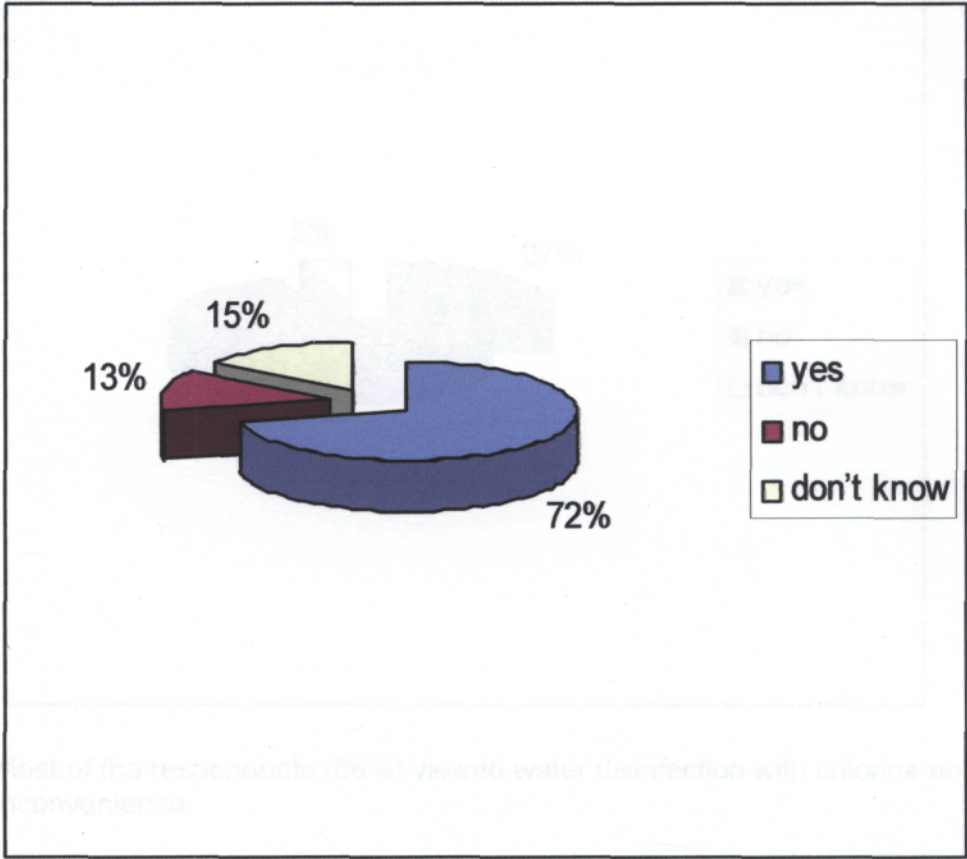
n = 60



Majority of the respondents (98%) stated that it was necessary to treat water with chlorine.

**Figure 8: The taste of chlorine influences people not to use chlorine**

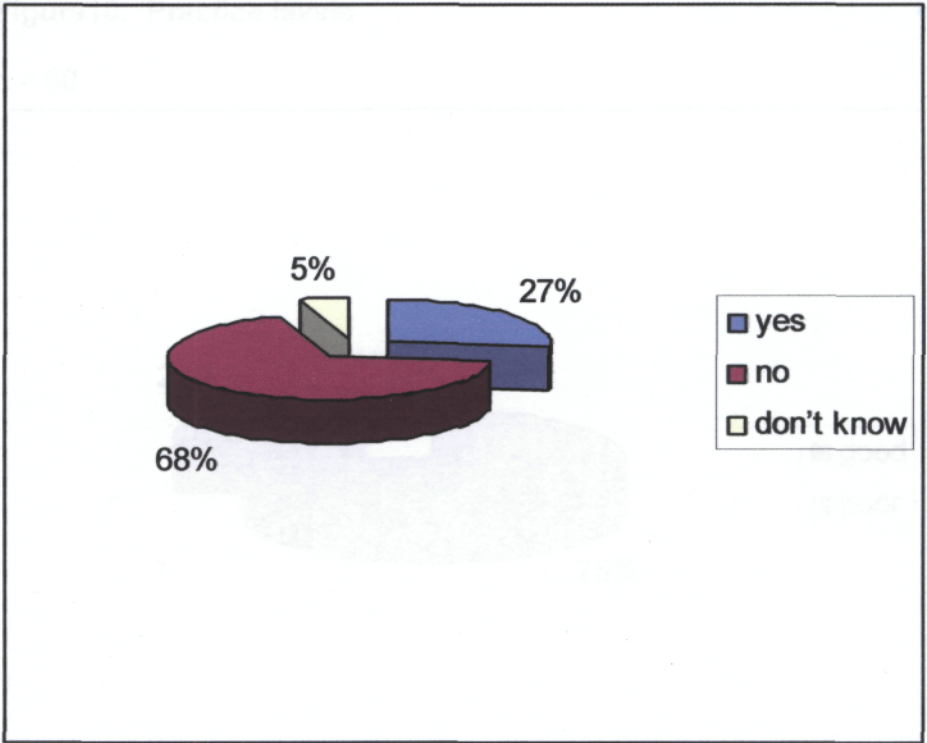
n = 60



Most of the respondents (72%) stated that the taste of water treated with chlorine influences people not to use chlorine for treating drinking water.

**Figure 9: Water disinfection with chlorine is an inconvenience**

n = 60



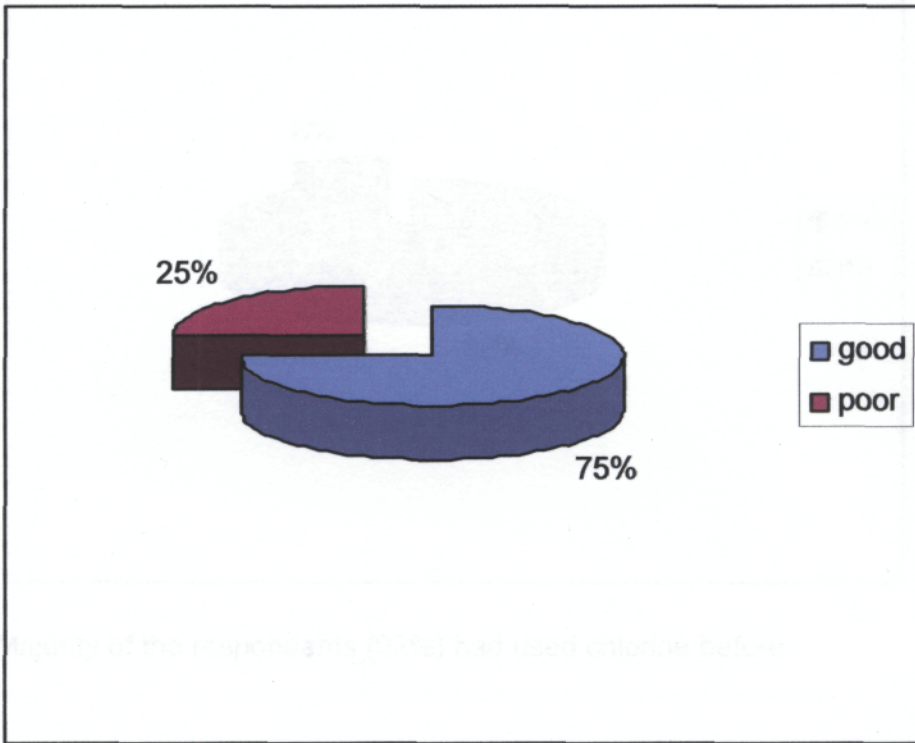
Most of the respondents (68%) viewed water disinfection with chlorine an inconvenience.

Majority of the respondents (68%) had used chlorine water disinfection practice before. In addition, most used type of container and applied right amount.

**Section D: Practice of mothers on the use of chlorine in water**

**Figure10: Practice levels**

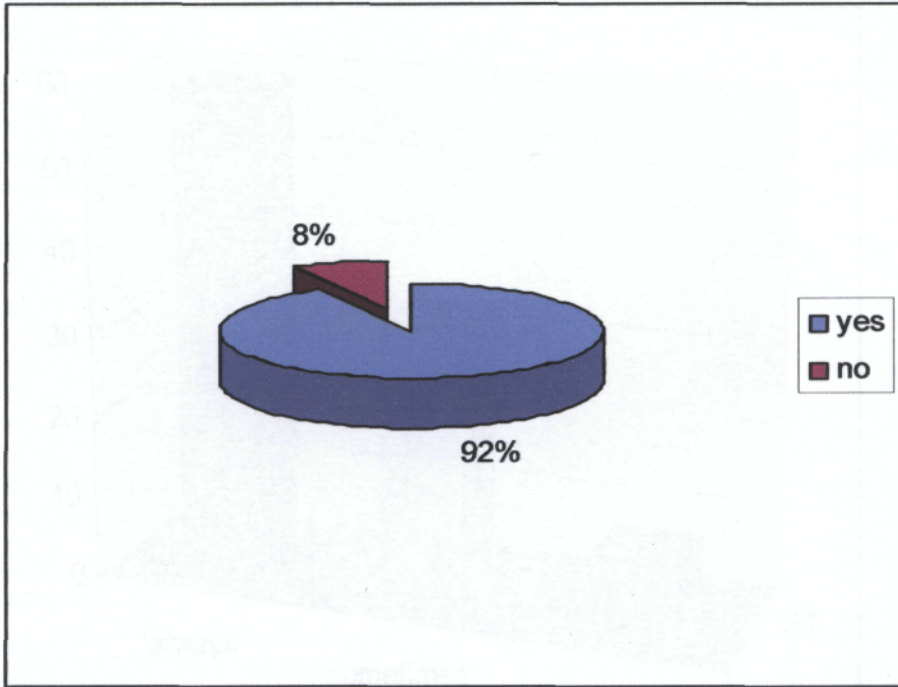
n = 60



Majority of the respondents (75%) had good practice while 25% had poor practice (Used chlorine before, frequently, used right type of container and added right amount).

**Figure 11: Use of chlorine before**

n = 60



Majority of the respondents (92%) had used chlorine before

Fifty nine percent (59%) of the respondents always used chlorine while 1% had never used it

**Table 6: Type of container for storing water**

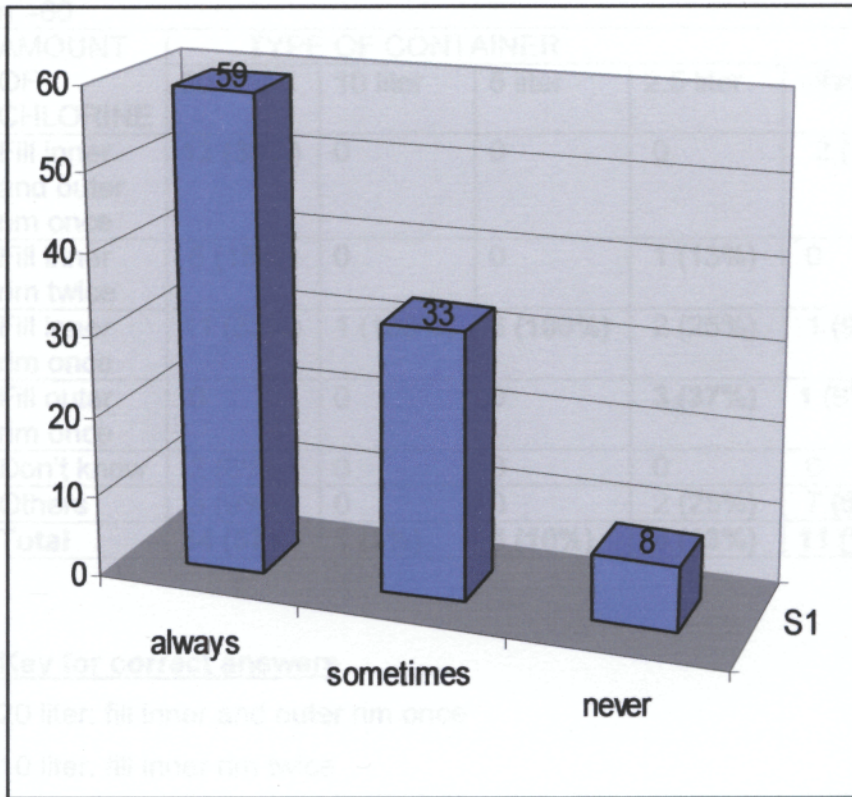
n = 60

TYPE OF CONTAINER	FREQUENCY	PERCENTAGE
20 litres	34	57
10 litres	1	2
5 litres	6	10
2.5 litres	4	7
others	11	18
TOTAL	60	100

Most of the respondents (57%) used 20 litre containers for storing water

**Figure 12: How often the respondents used chlorine**

n = 60



Fifty nine percent (59%) of the respondents always used chlorine while 8% had never used it.

**Table 5: Type of container for storing water**

n = 60

TYPE OF CONTAINER	FREQUENCY	PERCENTAGE
20 litres	34	57
10 litres	1	2
5 litres	6	10
2.5 litres	8	13
others	11	18
<b>TOTAL</b>	<b>60</b>	<b>100</b>

Most of the respondents (57%) used 20 litre containers for storing water.

**Table 6: Relationship between amount of chlorine added and the type of container**

n =60

AMOUNT OF CHLORINE	TYPE OF CONTAINER					TOTAL
	20 liter	10 liter	5 liter	2.5 liter	others	
Fill inner and outer rim once	13 (38%)	0	0	0	2 (18%)	15 (25%)
Fill inner rim twice	5 (15%)	0	0	1 (13%)	0	6 (10%)
Fill inner rim once	11 (32%)	1 (100%)	6 (100%)	2 (25%)	1 (9%)	21 (35%)
Fill outer rim once	0	0	0	3 (37%)	1 (9%)	4 (7%)
Don't know	2 (6%)	0	0	0	0	2% (3%)
Others	3 (9%)	0	0	2 (25%)	7 (64%)	12 (20%)
<b>Total</b>	<b>34 (57%)</b>	<b>1 (2%)</b>	<b>6 (10%)</b>	<b>8 (13%)</b>	<b>11 (18%)</b>	<b>60 (100%)</b>

**Key for correct answers**

20 liter: fill inner and outer rim once

10 liter: fill inner rim twice

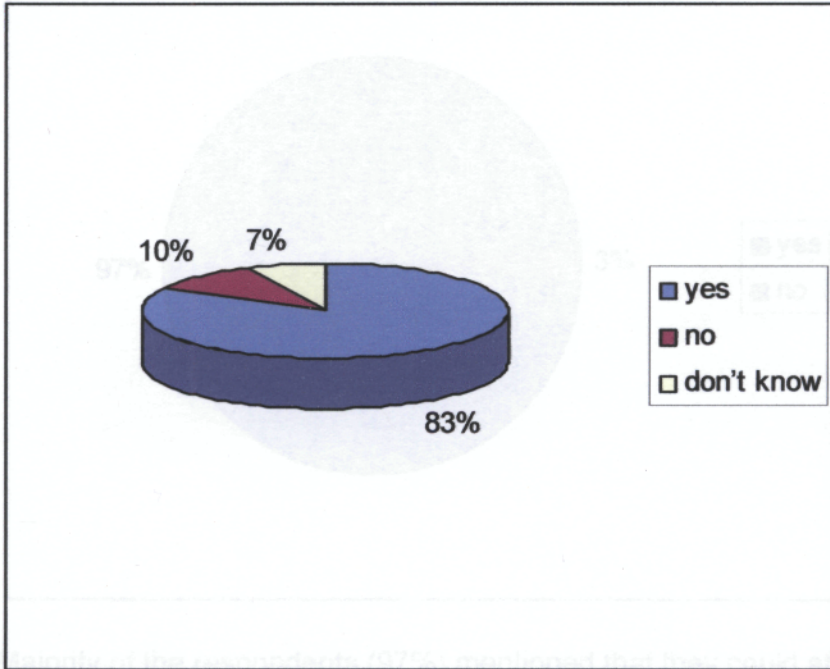
5 liter: fill inner rim once

2.5 liter: fill outer rim once

Thirty eight percent of respondents who used 20 liter containers added the correct amount of chlorine to the water. One hundred percent (100%) of the respondents who used 5 liter containers added the correct amount of chlorine. Twenty five percent (25%) of respondents who used 2.5 liter containers added the correct amount of chlorine. Over all, only 37% correctly added the right amount of chlorine to the right container.

**Section E: Factors Contributing to Knowledge, Attitude and Practice**

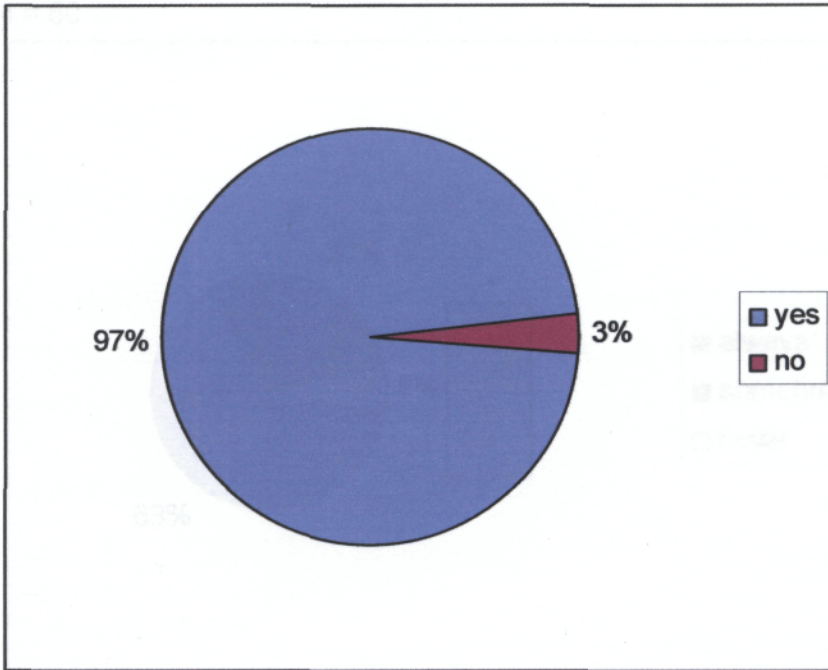
**Figure 13: Ability to treat water using information learnt about chlorine**  
n = 60



Most of the respondents (83%) stated that they were able to treat water using the information given about chlorine.

**Figure 14: Ability to buy chlorine**

n = 60



Majority of the respondents (97%) mentioned that they could afford to buy chlorine.

Most of the respondents (53%) always had chlorine in their homes, 33% had it some of the time and 14% never had chlorine in their homes.

**Table 7: Reasons for availability or unavailability of chlorine in respondent's homes**

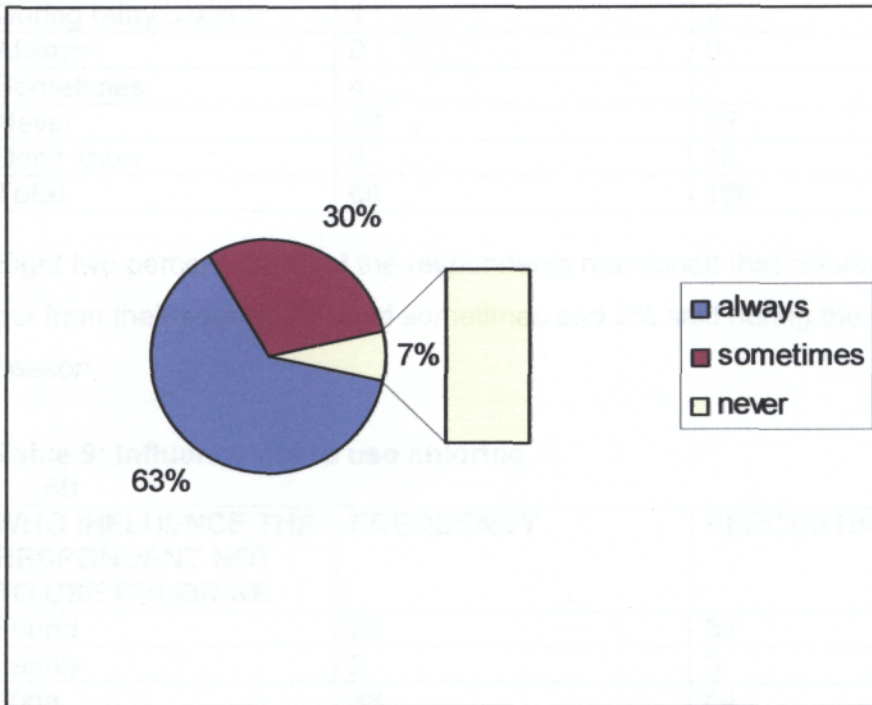
n = 60

REASON	FREQUENCY	PERCENTAGE
Ensures availability	33	55%
Whistle case	7	12%
Individual knowledge	7	12%
Insufficient money	6	10%
others	7	12%
TOTAL	60	100

Twelve percent (17%) of the respondents mentioned forgetting as the reasons for non-availability of chlorine in their homes, another 12% mentioned lack of knowledge while 9% mentioned lack of money.

**Figure15: Responses on how often respondents had chlorine in their homes**

n = 60



Most of the respondents (63%) always had chlorine in their homes, 30% had it sometimes while 7% never had chlorine in their homes.

**Table 7: Reasons for availability or unavailability of chlorine in respondent's homes**

n = 60

REASON	FREQUENCY	PERCENTAGE
Ensures availability	33	55
forgetfulness	7	12
Inadequate knowledge	7	12
Inadequate money	6	9
others	7	12
<b>TOTAL</b>	<b>60</b>	<b>100</b>

Twelve percent (12%) of the respondents mentioned forgetting as the reasons for non availability of chlorine in their homes, another 12% mentioned lack of knowledge while 9% mentioned lack of money.

**Table 8: Lack of Chlorine at Source**

n =60

<b>RESPONSE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
During rainy season	1	2
Always	0	0
Sometimes	4	7
Never	49	82
Don't know	6	10
<b>Total</b>	<b>60</b>	<b>100</b>

Eight two percent (82%) of the respondents mentioned that chlorine never ran out from their source, 7% said sometimes and 2% said during the rain season.

**Table 9: Influence not to use chlorine**

n = 60

<b>WHO INFLUENCE THE RESPONDENT NOT TO USE CHLORINE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Friend	20	33
Family	2	3
none	38	64
<b>TOTAL</b>	<b>60</b>	<b>100</b>

Most (64%) of the respondents were not influenced by anyone not to use chlorine. Thirty three percent (33%) were influenced were by friends.

**Table 10: Relationship between knowledge and age**

n = 60

<b>KNOWLEDGE</b>	<b>AGE</b>			<b>TOTAL</b>
	<b>15-24</b>	<b>25-34</b>	<b>35-44</b>	
<b>High</b>	13 (52%)	21 (66%)	2 (67%)	36 (60%)
<b>Medium</b>	11 (44%)	11 (34%)	1(33%)	23 (38%)
<b>Low</b>	1 (2%)	0	0	1 (2%)
<b>TOTAL</b>	<b>25 (42%)</b>	<b>32 (53%)</b>	<b>3 (5%)</b>	<b>60 (100%)</b>

Sixty seven percent (67%) of respondents between the ages of 35 to 44 had high knowledge.

**Table 11: Relationship between knowledge and educational level.**

n = 60

KNOWLEDGE	EDUCATIONAL LEVEL					TOTAL
	University	College	Secondary	Primary	None	
High	0	5(56%)	18(69%)	14(74%)	3(50%)	40(67%)
Medium	0	4(44%)	8(31%)	4(21%)	3(50%)	19(31%)
Low	0	0	0	1(2%)	0	1 (2%)
<b>TOTAL</b>	<b>0</b>	<b>9 (15%)</b>	<b>26 (43%)</b>	<b>19 (32%)</b>	<b>6 (10%)</b>	<b>60(100%)</b>

Seventy four percent (74 %) of respondents with primary education had high knowledge.

**Table12: Relationship between attitude and age**

n = 60

ATTITUDE	AGE			TOTAL
	15-24	25-34	35-44	
<b>Positive</b>	22 (88%)	29 (91%)	3 (100%)	54 (90%)
<b>Negative</b>	3 (12%)	3 (9%)	0	6 (10%)
<b>TOTAL</b>	<b>25 (42%)</b>	<b>32 (53%)</b>	<b>3 (5%)</b>	<b>60 (100%)</b>

One hundred percent (100%) of respondents with ages between 35 to 44 years had positive attitude.

**Table13: Relationship between Attitude and education level**

n = 60

ATTITUDE	EDUCATION LEVEL					TOTAL
	University	College	Secondary	Primary	None	
Positive	0	8 (89%)	25 (96%)	17 (89%)	4 (67%)	54 (90%)
Negative	0	1 (11%)	1 (4%)	2 (11%)	2 (33%)	6 (10%)
<b>Total</b>	<b>0</b>	<b>9 (15%)</b>	<b>26 (43%)</b>	<b>19 (32%)</b>	<b>6 (10%)</b>	<b>60 (100%)</b>

Ninety six percent (96%) of the respondents with secondary education had a positive attitude towards chlorine use while 33% of respondents with no education had a negative attitude.

**Table14: Relationship between Practice and Age**

n = 60

PRACTICE	AGE					TOTAL
	15-24	25-34	35-44	45-55	55+	
Good	17 (68%)	25 (78%)	3(100%)	0	0	45 (75%)
Poor	8 (32%)	7 (22%)	0	0	0	15 25%)
<b>Total</b>	<b>25 (42%)</b>	<b>32 53%)</b>	<b>3 (5%)</b>	<b>0</b>	<b>0</b>	<b>60 (100%)</b>

One hundred percent (100%) of the respondents aged between 35 and 44 years had good practice.

**Table14: Relationship between Practice and Level of education**

n = 60

PRACTICE	EDUCATION LEVEL					TOTAL
	University	College	Secondary	Primary	None	
Good	0	8 (89%)	20 (77%)	16 (84%)	1 (17%)	54 (90%)
Poor	0	1 (11%)	6 (23%)	3 (23%)	5 (83%)	6 (10%)
<b>Total</b>	<b>0</b>	<b>9 (15%)</b>	<b>26 (43%)</b>	<b>19 (32%)</b>	<b>6(10%)</b>	<b>60 (100%)</b>

Eighty nine percent (89%) of respondents with college education had good practice. Eighty three percent (83%) of respondents with no education had poor practice.

**Table 15: Relationship between Knowledge and Attitude**

n = 60

Knowledge	Attitude		Total
	Positive	Negative	
High	38 (70%)	1 (2%)	39 (65%)
Medium	16 (30%)	4 (66%)	20 (33%)
Low	0	1 (2%)	1 (2%)
<b>Total</b>	<b>54 (90%)</b>	<b>6 (10%)</b>	<b>60 (100%)</b>

Seventy percent (70%) of respondents with positive attitude had high knowledge while 2% of respondents with negative attitude had low knowledge.

**Table 16: Relationship between Knowledge and Practice**

n = 60

Knowledge	Practice		Total
	Good	Poor	
High	33 (73%)	6 (40%)	39 (65%)
Medium	12 (27%)	8 (53%)	20 (33%)
Low	0	1 (7%)	1 (2%)
<b>Total</b>	<b>45 (75%)</b>	<b>15 (25%)</b>	<b>60 (100%)</b>

Seventy three percent (73%) of respondents with good practice had high knowledge while 7% of respondents with poor practice had low knowledge.

**Table17: Relationship between Attitude and Practice**

n = 60

Attitude	Practice		Total
	Good	Poor	
Positive	44 (98%)	10 (67%)	54 (90%)
Negative	1 (2%)	5 (33%)	6 (10%)
<b>Total</b>	<b>45 (75%)</b>	<b>15 (25%)</b>	<b>60 (100%)</b>

Ninety eight percent (98%) of respondents with good practice had positive attitude.

## **CHAPTER 5**

### **5.0 Discussion of findings and Implications to health Care System.**

#### **5.1 Introduction.**

The general objective of the study was to determine knowledge, attitude and practice of mothers with under five children on the use of chlorine for water treatment. This chapter discusses the characteristics of the sample, the findings of the study, implications to health care system, conclusion, recommendations, plan for dissemination of findings and limitation of the study.

#### **5.2 Characteristics of the sample.**

The sample comprised 60 mothers with under five children. The respondents were aged between 15 and 44 years. The characteristics of the sample are tabulated in table 3 above. The respondents had different marital status, education level, literacy levels, occupations and family income.

Fifty three (53%) of the respondents were aged between 25 and 34 years. Forty two (42%) were aged 15 to 24 years. Only 5% were aged between 35 and 44 years (Table 3). Majority (83%) of the respondents were married, 15% were single and 2% widowed. This finding is slightly different from the findings of ZDHS 2001-2002 report which showed that 61% of the women in Zambia were married. The difference in the findings may be due to the composition of the sample that contained mothers with under five children.

The study revealed that 15% of the respondents had college education. This result is higher than the results obtained in the ZDHS 2001-2002 which reported that 4% of women in urban areas had attained more than secondary education (CSO, 2003). The higher percentage of respondents with college education may be attributed to the new government educational policy that allows girls who drop out of school due to pregnancy to go back to school. Forty three percent (43%) of the respondents had secondary education, 32% had primary education and 10% had no education. The ZDHS 2001-2002 report showed that 45% of women had primary education and 25% had no

education (CSO, 2003). The results for respondents in this study with primary education and those with no education are lower than those in the ZDHS 2001-2002 report. This is an indication that more women are now pursuing education.

Seventy five percent (75%) of the respondents mentioned that they could read and write while 15% could not. The illiterate levels among the respondents were almost similar to those indicated in the ZDHS 2001-2002 report which showed that 12.2% of women in Lusaka province were illiterate (CSO, 2003). The illiteracy levels among the women were still high.

Sixty seven percent (67%) of the respondents were unemployed, 23% were in business and 10% were employed. The ZDHS 2001-2002 report indicated that 49% of urban women were employed. The finding in his study about the employment status of the respondents indicated that employment levels among the respondents was low (10%). On the other hand, 66% of the respondents' husbands were employed, 17% in business and another 17% of the respondents were not married. Thus, women still find it difficult to find employment probably due to few employment opportunities available in the country and the gender bias against women among employers. Forty percent (40%) of the respondents had a family income ranging between k100, 000 and k499, 000. Those with no income accounted for 10% while 12% did not know their family income. Respondents who earned an income of K1, 000, 000 and above accounted for 13%. The income of most (40%) respondents was low which may be due to low employment levels among the women.

### **5.3 Knowledge of mothers on the use of chlorine in water treatment.**

The knowledge questions were included in section B of the questionnaire (Appendix 1) in order to determine the mothers' knowledge on the use of chlorine in water treatment. The knowledge levels were generally high. To assess the knowledge, the respondents were questioned about the possibility of presence of microorganisms in water that looks clean, the effect of chlorine

to water, the effect of drinking contaminated water, the length of time to wait after adding chlorine to drinking water and when to treat water with chlorine.

Sixty five percent (65%) of the respondents had high knowledge, 33% had medium knowledge and only 2% had low knowledge (figure 1). The result agrees with the study conducted by Thomson (2002) in Malawi among households which reported high (99.6%) knowledge of chlorine use in water treatment. The Zambia Demographic Health Survey (ZDHS) report of 2001-2002 also showed that 75% of the house holds in Zambia had heard of chlorine (MoH, 2004). The finding was an indication that there were still some (33%) who did not have adequate knowledge and 2% with little or no knowledge about the use of chlorine for water treatment. These groups of people need education on the use of chlorine by the staff at the health centers.

Figure 2 showed that 83% of the respondents knew that water that looks clean could have microorganisms. The secondary education that most of the respondents had could have contributed to the high knowledge as revealed by the study. However, some (17%) of the mothers in the sample did not know that clean water could have microorganisms. To them, as long as water looked clean, it was very safe for drinking. The mothers who did not know that even clean looking water could contain microorganisms probably had never been informed about the possibility of presence of microorganisms in clean water.

Figure 3 showed that 95% of the respondents indicated that chlorine kills microbes in water. This finding is similar to the results of the study conducted by McLennan (2000) in Dominican Republic which reported that 74% of respondents who chlorinated water mentioned that the reasons people chlorinated water were to kill microorganisms. The effect of chlorine in water is supported by Mintz, Reif and Taexe, (1995) who illustrated that chlorine is very effective in killing microorganisms in water and works by penetrating the cell wall then kills the nucleic acid of the bacteria.

Ninety one percent (91%) of the respondents stated that drinking water that has microorganisms could lead to diarrhoea (figure 4). Five percent (5%) mentioned that they did not know what could happen if a child drunk water that is contaminated, 2% felt they could have strong intestines and another 2% said that nothing could happen. The response by majority of the respondents can be supported by the result of the study conducted by Mitike in Ethiopia which revealed that 84% of the sample of under five children who had diarrhoea had unprotected water sources. Most water that is contaminated is usually from unprotected water sources. Thus, when one drinks this kind of water without treating it, the likelihood of diarrhoea is high. This is an indication of the need for further health education so that even the few mothers with no knowledge that water could be a source of diarrhoea could be informed.

Figure 5 showed that half (50%) of the respondents indicated correctly that one had to wait for 30 minutes before drinking water after adding chlorine. For the other half, 8% said they waited for one hour, 7% for 45 minutes, another 7% for 20 minutes and 28% said they did not know. The findings indicated that there were some (7%) of the respondents who drunk water that had not been effectively dealt with by chlorine because they waited for less than 30 minutes before drinking the water. This may have exposed them and their children to diarrhoea. There were also respondents who did not know how long to wait before drinking chlorinated water, meaning that they either waited longer, less or drunk immediately.

Table 4 indicated that 94% of the respondents mentioned that water should be treated with chlorine all the time. Despite the majority of the respondents knowing that water needed to be treated with chlorine all the time only 59% used it always (figure 12). Probably, the mothers who did not use chlorine all the time even with knowledge of the need to treat water with chlorine always did not perceive diarrhoea to be serious.

Examining the relationship between knowledge and age in table 10 showed that the older women, aged between 35 and 34 years had high (67%) knowledge. Two percent (2%) of the younger respondents aged 15 to 24 years had low knowledge. Probably the older women had received adequate education concerning chlorine use, since they may have been to health centres more times than the young ones where health education is mostly given.

The Zambia Demographic Health survey (ZDHS) 2001-2002 reported that women who are educated or at least have gone higher in their education assimilated information better than those who are not educated or did not progress to a higher level of education (CSO, 2003). This assumption was not so according to this study. Table 11, showing the relationship between knowledge and educational level indicated that 74% of respondents with primary education had high knowledge while 56% of those with college education had high knowledge. It is most probable that higher education does not always guarantee that one who has it would always understand issues better as shown in this finding. This is because people learn different varieties of subjects and may not have knowledge about everything. Those with primary education in this case may have been more exposed to hearing messages about chlorine use.

According to the focus group discussions conducted in Mtendere and Kanyama, the respondents exhibited high knowledge on chlorine use for water treatment. Most of them knew that clean water could have microorganisms and that when added to water, chlorine kills microorganisms.

#### **5.4 Attitude of mothers towards the use of chlorine in water treatment.**

Attitude refers to the mothers' feelings about the use of chlorine for water treatment. The attitude questions were included in section C of the questionnaire (Appendix 1). In order to assess their feelings about chlorine use in water treatment, the respondents were asked whether they felt that it was necessary to treat water with chlorine, whether the taste of chlorinated

water would influence people not to use it and whether they felt that water disinfection was an inconvenience. Figure 6 indicated that 90% of the respondents had positive attitude while 10% had negative attitude.

Almost 100% (98%) of the respondents stated that it was necessary to treat water with chlorine (figure 7). This result is an illustration that majority of the respondents accepted the use of chlorine for water treatment. Thus, given the right information about how to use chlorine, their attitudes could all be positive.

Figure 8 showed that seventy two percent (72%) of the respondents indicated that the taste of chlorinated water influenced people not to use it for treating drinking water. Thirteen percent (13%) said the taste of chlorine did not influence people not to use it for treating drinking water and 15% did not know. Although the question was not directed towards getting the personal view of the respondent, the researcher wanted to get the general attitude of the people in relation to their feelings about the taste of chlorinated water. The taste of chlorinated water seems to be one of the major reasons that people advance for not using chlorine to treat drinking water. In addition to that, it is common for people to deny the way they feel about issues and quick to point out what other people feel even though they may harbor the same feelings. Therefore, the responses to this question may actually represent the true feelings of most respondents.

It was reflected in the focus group discussions that while some people view chlorinated water as good, others don't like it because it spoils water since it smells and the taste is not good. Furthermore those who like chlorine said it would not smell when used in correct measurements while those who don't like it said it smells like sodium hypochlorite.

Sixty eight percent (68%) of the respondents mentioned that disinfecting water with chlorine was not an inconvenience. Twenty seven percent (27%) viewed water disinfection with chlorine an inconvenience while 5% did not

know (figure 9). According to the focus group discussions those who said that water disinfection with chlorine was an inconvenience felt that it was possible to forget. This may be attributed lack of perceived seriousness of diarrhoea and laziness. Mothers who do not want their children to suffer from diarrhoea would ensure to make water for drinking safe and would not forget to add chlorine.

Relationship between attitude and age indicated that 100% of the older women had a positive attitude towards chlorine use for water treatment and 12% of the younger women had negative attitude (Table 12). The older women probably through experiences of what can happen if one drunk contaminated water had developed a positive attitude towards chlorine use for water treatment.

Relationship between attitude and education level indicated that 96% of the respondents with secondary education had a positive attitude towards chlorine use for water treatment. Thirty three percent (33%) of respondents with no education had a negative attitude (Table 17). Respondents with secondary education may have had a better understanding of the importance of adding chlorine to water since they may have had many opportunities of accessing information which may have influenced their attitude positively. Their ability to read and write may have enabled them to access chlorine messages from various sources such as posters and chlorine bottles. Furthermore, since they may understand English, they could have listened to messages from radio and television. On the other hand, the respondents with no education may have had fewer opportunities of accessing chlorine messages because they mainly depend on verbal information, education and communication. Moreover, respondents with no education may have been more prone to being influenced by peers to having negative attitude towards chlorine use for water treatment.

Relationship between knowledge and attitude indicated that 70% of respondents with positive attitude had high knowledge and the remaining 30%

had medium knowledge (table 16). The finding may be an indication that knowledge about chlorine use in water treatment had an influence on the respondent's attitude. Those who knew reasons for using chlorine accepted its use and hence the positive attitude.

### **5.5 Practice of mothers on the use of chlorine in water treatment.**

Practice refers to the consistent use of chlorine in correct measurements in water treatment. The practice questions were included in section D of the questionnaire (Appendix 1). To assess practice, respondents were asked if they had used chlorine before, what type of container they used, the amount of chlorine they added and how often they used chlorine in their homes. The study revealed that 75% of the respondents had good practice while 25% had poor practice (figure 10).

Majority (92%) of the respondents had used chlorine before (figure 11). To indicate consistence, figure 12 showed that 59% had used chlorine always, 33% sometimes and 8% had never used chlorine before. In a similar study conducted by Thomson, (2000) in Malawi, out of a sample of 1052 households, 66.9% of the respondents reported having previously used chlorine. This is an indication that consistence in the use of chlorine for water treatment was not practiced. Besides not using chlorine consistently, adding correct amount of chlorine to the right container was practiced by only some of the respondents. Overall, only 37% of the respondents added correct amount of chlorine to the right container (table 6). This poses a risk of diarrhoea to under five children. The use of 20 liter container for storing water was popular among the respondents at 57% compared to the use of 10 liter containers which was least popularity at 2%. Some (18%) respondents used other forms of water storage container such as drums, wells and buckets to which they added various measurements of chlorine (table 5). Some respondents would add a few drops while others would just pour any amount without measuring. Such practices defeated the purpose of chlorine because the amounts added may have been too little or too much. Adding too much chlorine is the reason for the unpleasant taste and the smell of water.

One hundred percent (100%) of respondents aged between 35 years and 44 years had good practice. Thirty two percent of respondents aged 15 to 24 years had poor practice (table 14). Thus the older mothers had good practice compared to the younger ones. This finding is in line with the earlier result which in table 10 which showed that the older mothers had high knowledge.

Relationship between practice and level of education indicated that 89% of respondents with college education had good practice and 83% of respondents with no education had poor practice (table 15). Respondents with college education may have found it easier to add the correct amount of chlorine to the right containers since the chlorine bottles have instructions which they could have easily read and followed. The respondents with no education on the other had may have found it difficulty to follow the written instructions. Among the reasons responds gave for not understanding information about chlorine was the inability to follow written instructions.

Relationship between knowledge and practice indicated that 73% of respondents with good practice had high knowledge (table 17). The respondents with high knowledge probably also knew the right containers to use and the correct amounts to add. Therefore, knowledge is necessary for good practice.

Attitude too has an impact on practice. Table 18 showing the relationship between attitude and practice indicated that 98% of respondents with good practice had positive attitude. Practice is influenced by both knowledge and attitude.

## **5.6 Factors Contributing to the Mothers Knowledge, Attitude and Practice on the Use of Chlorine for Water Treatment**

The knowledge, attitude and practice of the respondents on the use of chlorine for water treatment were generally good. However certain factors were observed to have a relationship with the level of knowledge, attitude and

practice. The factors contributing to knowledge, attitude and practice were identified as age, educational level, forgetfulness, illiteracy, misconceptions and peer pressure on a larger scale. On a smaller scale were factors such as inadequate income and shortage of chlorine. To identify the factors, respondents were asked if they were able to understand information learnt about chlorine, if they were able to buy chlorine, how often they had chlorine in their homes, if chlorine ever ran out from their source and if anyone ever influenced them not to use chlorine.

Figure 13 showed that 83% of the respondents stated that they were able to treat water using the information they received about chlorine. Ten percent (10%) said they were unable to while 7% did not know. However the respondents' level of understanding information on chlorine use did not correlate with their levels of practice. Although majority (83%) indicated that they were able to treat water with chlorine using the information they learnt about chlorine, the high percentage of respondents who mentioned that they were able to treat water using the information learnt did not correlate with the findings in table 6 which showed that overall only less than half (37%), added correct amounts of chlorine to water. Instructions about how to use chlorine are written on the chlorine bottles but it requires constant checking of the correct amount to add to water before one internalizes the dose. The use of English language for the instructions on the chlorine bottles may have contributed to poor practices since some people may not have understood the English language. Inadequate health education may probably be cited as one of the contributing factors to the respondents' knowledge, attitude and practice on the use of chlorine for water treatment.

Figure 14 showed that 97% of the respondents mentioned that they were able to buy chlorine while 3% said they could not. Therefore, inadequate funds were not one of the major contributing to the knowledge, attitude and practice of the respondents on the use of chlorine for water treatment.

Figure 15 showed that 63% of the respondents indicated that they always had chlorine in their homes, 30% said sometimes and 7% said they never had chlorine in their homes. The reasons for not having chlorine in their homes were indicated in table 7 as forgetfulness 12%, inadequate knowledge 12% and inadequate funds at 9% (table 6).

Table 8 showed that 82% of the respondents mentioned that chlorine never ran out at their source, 10% didn't know, 7% said sometimes and 2% said during the rainy season. In this case, running out of chlorine from the source may have been somehow a contributing factor to the poor practice of the use of chlorine for water treatment.

Table 9 showed that 64% of the respondents indicated that they were not influenced by anyone not to use chlorine, 33% were influenced by peers and 3% family members. Peer influence was a major contributing factor to the respondents' use of chlorine for water treatment. Among the reasons forwarded by peers for the discouragement to use chlorine included reasons that chlorine may cause diseases and abortions. Others mentioned that chlorine is only appropriate for use in rainy season, it had unpleasant smell and taste and that it was not necessary. Such misconceptions can largely influence people not to use chlorine hence the need to dispel them through adequate health education. Those who are uneducated may be more prone to believing such misconceptions.

The objectives of the study which were to assess the level of knowledge, to identify attitudes, to identify the practices and to determine factors contributing to the knowledge, attitude and practice of mothers with under five children in Lusaka district on the use of chlorine in water treatment were all dealt with.

The researcher has tried to prove the two hypotheses which were as follows:

- There is a relationship between the level of education and the knowledge, attitude and practice by mothers in use of chlorine in water treatment.

- Adequate information, education and communication enhance the knowledge, attitude and practices of mothers in chlorine use in water treatment.

## **5. 7 Implications to health care system**

- Cases of diarrhoea may continue to rise as long as the community does not take measures such as adding chlorine consistently to treat water.
- The study revealed that most of the respondents did not use chlorine in correct amounts posing a risky of diarrhoea among the under five children.
- Therefore, health education must be intensified and demonstrations done on the correct measurements to add to the right containers.
- Measures such as use of posters in strategic areas such as markets, shops, clinics and schools may go a long way in disseminating information on chlorine.
- Consistent supply of chlorine to health centres by Lusaka District Health Management Team is necessary.

## **5.8 Conclusion and recommendations**

### **5.8.1 Conclusions**

The evaluation of the knowledge, attitude and practice of mothers with under five children on the use of chlorine for water treatment was a very important study to undertake as it served as a tool for assessing community involvement in the care of their health. The concept of primary health care encourages communities to participate in the care of their health to minimize the incidences of preventable diseases such as diarrhoea. The major findings of the study include the following:

The study revealed that 62% of the respondents had high knowledge, 36% had medium knowledge and 2% had low knowledge. Sixty seven (67%) of the older women had high knowledge while 2% of the younger women had low

knowledge. Relationship between knowledge and educational level indicated that 74% of respondents with primary education had high knowledge while 56% of those with college education had high knowledge.

The study findings also revealed that 90% of the respondents had positive attitude and 10% had negative attitude. One hundred (100%) of the older women had a positive attitude towards chlorine use for water treatment and 12% of the younger women had negative attitude. Ninety (96%) of the respondents with secondary education had a positive attitude towards chlorine use for water treatment and 33% of respondents with no education had a negative attitude

In addition to that, the study findings indicated that 75% of the respondents had good practice while 25% had poor practice. Eighty three percent (83%) of respondents with no education had poor practice. Overall, only 37% of the respondents added correct amount of chlorine to the right container of water.

Furthermore, the study findings revealed that the knowledge, attitude and practice of the respondents on the use of chlorine for water treatment were largely influenced by peer pressure, forgetting, illiteracy, misconceptions and educational level. To a smaller extent, inadequate income and shortages of chlorine had an influence on the knowledge, attitude and practice.

### **5.8.2 Recommendations**

#### **Recommendations to Ministry of Health**

- The Ministry of Health should design Information, Education and Communication messages for the Lusaka district communities written both in English and local languages to encourage mothers to use chlorine for water treatment.
- The Ministry of Health should support Lusaka District Health Management Team with financial resources and Information, Education and Communication material to use in encouraging mothers to use chlorine for water treatment.

### **Recommendations to Lusaka District Health Management Team (DHMT)**

- Lusaka District Health Management Team should conduct more workshops for the Neighborhood Health Committees to encourage them to use chlorine in their homes who in turn will educate other members of community.
- Lusaka District Health Management Team should solicit for more financial and material support from cooperating partners such as JICA and CARE International in order to maintain consistent supply of chlorine to health centres.

### **Recommendations to Society for Family Health (SFH)**

- Society for family health who is the manufacturer and marketer of chlorine in Zambia must consider including local languages on instructions on how to use chlorine indicated on the chlorine bottles in addition to English language. The local languages will be of help in following instructions for those who can not read English.
- Society for family health must consider indicating a tick for desirable and a cross for undesirable containers to be used for storing water meant for chlorination. This is necessary so that mothers are aware that they may not use storage facilities such as drums and wells for chlorinating water to avoid the danger of under or over estimation of the amount of chlorine added.
- Society for family health must consider including instructions for 10 liter and 2.5 liter containers on the chlorine bottles in order to giving a wider choice of containers within reach of the mothers. Currently, instructions on the bottles are only for 20 liter and 5 liter containers. This is important so that mothers can have more containers to use depending on availability.

### **Recommendation to health center staff**

- The health centre staff must intensify health education on chlorine use for water treatment which should include practical demonstrations. The demonstrations are important especially for those mothers who can not read.

### **Recommendations to the communities of Mtendere, Chilenje and Kanyama**

- The mothers of Mtendere, Chilenje and Kanyama communities should consider changing their behaviours towards good practices on chlorine use for water treatment.

## **5. 9 Dissemination of Findings**

Dissemination of the research findings will be done to ensure that utilization of the findings takes place. The dissemination will take the following processes:

- Copies of the research will be given to the Ministry of Health, Post Basic Nursing Department, University of Zambia library (Ridgeway campus) and Lusaka District Health Management Team (DHMT).
- A discussion of the findings shall be held between the researcher and the staff of the three health centers; Mtendere, Chilenje and Kanyama.
- The researcher shall also discuss the findings with neighborhood health committees of Mtendere, Chilenje and Kanyama so that they can disseminate the information to other members of these communities.

### **5.10 Limitations of the study**

1. The sample size for the study was limited to sixty (60) respondents and the study done in only three health centers in Lusaka district due limitations of time and money. As such, the findings of the study can not be generalized to the entire Lusaka district.
2. The study lacked literature on attitude and practice of mothers on the use of chlorine from the global and national perspective as no studies had been done directly focusing on these variables.
3. The study was done within the busy school calendar of the researcher which made it very difficult to concentrate on the study at the expense of other subjects.

## REFERENCES

1. Addy, P. A. K, Antepim, G and Frimpong, E. H., (2004). **Prevalence of Pathogenic Escherichia Coli and Parasites In Infants And Diarrhea In Kumasi, Ghana.** East African Medical journal 80(2); 83-88.
2. Billings, D. M and Stokes, L. G., (1982). **Medical Surgical Nursing; Common Health Problems,** The C. V Mosby company, St Louis 1016-1019.
3. Central Board of Health, (2002). **Integrated Technical Guidelines for Frontline Workers,** Government Printers, Lusaka.
4. Central Statistical Office, (2001). **National Population Report of 2000,** Lusaka.
5. Central Statistical Office (Zambia), Central Board of Health (Zambia) and ORC micro, (2003). **Zambia Demographic Health Survey 2001-2002,** Calverton, Maryland, USA: Central Statistics Office, Central Board of Health AND ORC Macro.
6. Central Statistics Office, (1996). **Zambia Development Health Survey.** Ministry Of Health, Lusaka.
7. Dempsey, P. A. and Dempsey A. D., (2000). **Using Nursing Research Process, Critical Evaluation and Utilization,** 5<sup>th</sup> Ed, Lippincott, Philadelphia.
8. Himonga, J. M., (1996). **A Study to Determine Some of the Factors Associated with Incidence of Diarrheal Diseases in the under Five Children,** unpublished.

9. Howard, G., (2002). **Water Supply Surveillance; A Reference Manual**, Water Engineering and Development Center, Loughborough University.
10. Kaziya, C., (1988). **A Cross-Sectional Descriptive Study on the Factors Contributing to the High Incidence of Diarrhoea in the Under Fives in Mungwi District**, unpublished.
11. Kibel, M. A and Wagstaff, L. A., (2003). **Child Health for All**, 3<sup>rd</sup> Ed, Oxford University Press, Cape Town.
12. Lusaka Urban District Health Board, (2005). **Action Plan for (2006-2008)** Lusaka District Health Management Team, Lusaka.
13. McLennan, J. D., (2000). **Prevention of Diarrhoea in a Poor District of Santo Domingo, Dominican Republic: Practices, Knowledge and Barriers**, htm, 2006.
14. Mekasha, A and Tesfahun, A., (2003). **Determinants of Diarrhoea Disease: A Community Based Study in Urban South Western Ethiopian**. East African Medical journal 80(2): 77-82.
15. Ministry Of Health, (2004). **National Health Strategic plan 2001-2005**. Central Board of Health, Lusaka.
16. Mintz E, Reiff, F, Tauxe, R., (1995). **Safe Water Treatment and Storage in the Home; A Practical New Strategy To Prevent Water Borne Disease**. JAMA 273: 973-958.
17. Mitike. G., (2001). **Prevalence of Acute and Persistent Diarrhoea in North Gondar Zone, Ethiopia**. East African Medical journal 78 (8):433-437.

18. Polit, F. D and Hungler, P. B., (1997). **Essentials of Nursing Research**, 5<sup>th</sup> Ed, Lippincott Co. Philadelphia.
19. Polit, F. D. and Hungler, P. B., (1995). **Using Nursing Research**, J. B. Lippincott, New York.
20. Polit, F. D. and Hungler, P. B., (1999). **Nursing Research: Principles and Methods**, 6<sup>th</sup> Ed, Lippincott Co, Philadelphia.
21. Quick, A, Kimura, A, Theros, M, Tembo, L, Hutwagner and Mintz, E., (2002). **Diarrhea Prevention through Household-Level Water Disinfection and Safe Storage**. The American Journal of Tropical Medicine and hygiene 66 (5): 584-589.
22. Siame, K., (1999). **Factors Contributing to High Incidence of Diarrhoea In the Under Five Children in Kazungula District**, unpublished.
23. Singh, R., (2000). **Chlorin, a Home Water Purification Intervention Studying Financial Sustainability of Socially Marketed Health Products**, clorin, htm, 2006.
24. Society for Family Health: **Chlorin Home Water Chlorination Guidelines for Training Curriculum**, htm, 2006.
25. Thomson, T., (2002). **Knowledge, attitude and practice towards water safety and water use in Malawi**, <http://w.w.w.p.s Malawi.org>, 2006.
26. Treece, E. W. and Treece, J. W., (1986). **Elements of Research in Nursing**, 4<sup>th</sup> Ed, C. V. Mosby Company, St. Louis.

27. Udipi, S.A, Bhattacharjee, L.T, Parulkar, R and Varghese, M. A., (1998). **Water Availability, Mobility and Nutritional Status among Socially Disadvantaged Preschool Children in Bombay, India.** International Child Health; A digest of current information volume 10:111
28. Uys, H. H. M. and Basson, A. A., (2000). **Research Methodology in Nursing**, Kagiso Tertiary, Cape Town.
29. Water Information Concern Fact (WIC) file://E:IISG, 2006.
30. Water treatment saves lives, haiti file://E:\.htm, 2006.
31. WHO, MOH, UNICEF, World Bank, (2000). **Independent Review of the Zambian Health Reforms Volume 1 Main Report**, unpublished.
32. WHO: water sanitation and health, <http://www.who.int/>, 2006.
33. World Health Organization, (1995). **Division of Diarrhoeal and Acute Respiratory disease Control: Interim Report**, unpublished.
34. World Health Organization, (2005). **WHO Country Cooperation Strategy; Zambia 2004-2005**, WHO, Brazzaville.

## APPENDIX 1

### STRUCTURED INTERVIEW SCHEDULE

#### THE UNIVERSITY OF ZAMBIA

SCHOOL OF MEDICINE

DEPARTMENT OF POST BASIC NURSING

**STRUCTURED INTERVIEW SCHEDULE ON KNOWLEDGE, ATTITUDE AND PRACTICE BY MOTHERS WITH UNDER FIVE CHILDREN ON THE USE OF CHLORINE FOR WATER TREATMENT IN LUSAKA URBAN DISTRICT.**

**DATE OF INTERVIEW:** \_\_\_\_\_

**RESPONDENTS' NUMBER:** \_\_\_\_\_

**Place of interview:** \_\_\_\_\_

**INTERVIEWER'S NAME:** \_\_\_\_\_

#### INSTRUCTIONS TO INTERVIEWER

1. Introduce yourself to the respondent
2. Explain the purpose of the interview
3. Reassure the respondent that all responses will be held in strict confidence
4. Individual names and addresses should not appear on the interview schedule
5. Ensure that all questions are answered and indicate response by ticking (✓) in the appropriate box or filling in the space(s) provided.
6. Thank the respondent at the end of each interview.

**SECTION A: DEMOGRAPHIC DATA**

FOR OFFICIAL  
USE ONLY

1. How old were you on your last birthday?

- (a) 15-24 years
- (b) 25-34 years
- (c) 35-44 years
- (d) 45-54 years
- (e) 55 and above
- (f) Don't know


--

2. What is your marital status?

- (a) Single
- (b) Married
- (c) Divorced
- (d) Widowed
- (e) Separated


--

3. What is your educational level?

- (a) University
- (b) College
- (c) Secondary
- (d) Primary
- (e) None


--

4. Are you able to read and write?

- (a) Yes
- (b) No


--

5. What do you do for a living?

- (a) Employed
- (b) Business
- (c) Farming
- (d) Housewife


--

(e) Other, specify \_\_\_\_\_

6. What does your husband do for a living?

(a) employed

(b) business

(c) farmer

(d) none

(e) other, specify \_\_\_\_\_


7. How much is your income?

(a) 1 million and above

(b) K 500 000 to K 999 000

(c) K 100 000 to K 499 000

(d) K 99 000 and less

(e) Nil


8. How old is your last child?

(a) 1-11 months

(b) 12-23 months

(c) 24-34 months

(d) 35-45 months

(e) 46-56 months


**SECTION B: KNOWLEDGE**

9. Can water that looks clean have germs?

- (a) Yes
- (b) No
- (c) Don't know


--

10. What can one do to make water safe for drinking?

---

11. What can happen if one drunk water that is not treated?

- (a) Can have diarrhea
- (b) Have strong intestines
- (c) Can have malaria
- (d) Nothing
- (e) Don't know


--

12. How long should one wait before drinking the water after adding chlorine?

- (a) can drink immediately
- (b) one hour
- (c) 45 minutes
- (d) 30 minutes
- (e) 20 minutes


--

13. When should water be treated with chlorine?

- (a) Only when the child has diarrhea
- (b) During rainy season
- (c) During cholera outbreak
- (d) All the time
- (e) Sometimes


--

14. What does chlorine do to the water?

- (a) Keeps germs alive
- (b) Kills germs
- (c) Makes water clean
- (d) Makes water dirty
- (e) don't know


15. Does the amount of chlorine added to water matter

- (a) Yes
- (b) No
- (c) Don't know


16. What can happen if too little chlorine is added to drinking water?

---

17. Where can you obtain chlorine?

- (a) Shop`
- (b) Community health worker
- (c) Clinic
- (d) Don't know
- (e) Others, specify \_\_\_\_\_


**SECTION C: ATTITUDE**

18. Is it necessary to use chlorine for treating water?

- (a) Yes
- (b) No
- (e) Don't know


19. Give reasons for your answer to question 18.

\_\_\_\_\_

20. What are your feelings about the taste of water treated with chlorine?

\_\_\_\_\_

21. Does the taste of water treated with chlorine influence you not to use chlorine for water treatment?

(a) Yes

(b) No


22. Do you think that diarrhea in children under five years is a problem?

(a) Yes

(b) No

(c) Don't know


23. Give reason for your answer to question 24

24. Is water disinfection with chlorine a difficulty task or an inconvenience to you?

(a) Yes

(b) No


**SECTION D: PRACTICE**

25. Have you ever used chlorine?

- (a) Yes
- (b) No
- (c) Don't know


--

26. If you use chlorine, how often do you use it?

- (a) Always
- (b) Sometimes
- (c) Never


--

27. If not using chlorine, give reasons

---

28. What kind of container do you use for storing drinking water?

- (a) 20 liters
- (b) 10 liters
- (c) 5 liters
- (d) 2.5 liters
- (e) Others, specify \_\_\_\_\_


--

29. How much chlorine do you add to the container you use?

- (a) Fill inner and outer rim once
- (b) Fill inner rim twice
- (c) Fill inner rim once
- (d) Fill outer rim once
- (e) Don't know


--

**FACTORS CONTRIBUTING TO KNOWLEDGE, ATTITUDE AND  
PRACTICE**

30. Where did you learn about chlorine use?

(a) health worker

(b) friends

(c) media

(d) posters

(e) others, specify \_\_\_\_\_


31. Were you able to treat water using the information you were given?

(a) Yes

(b) No

(c) Don't know


32. Give reasons for the above answer

---

33. Who adds chlorine to water in your house?

(a) self

(b) Children

(c) Maid

(d) None

(e) Others, specify \_\_\_\_\_


34. If the answer to question 24 is not self, give reasons

---

35. Can you afford to buy chlorine?

(a) Yes

(b) No


36. Do you have chlorine in your home?

- (a) Always
- (b) Sometimes
- (c) Never
- (d) Don't know


--

37. Give reasons for the above answer

\_\_\_\_\_

38. Does chlorine ever run out from your source?

- (a) Yes
- (b) No
- (e) Don't know


--

39. If the answer to question 19 is yes, when does it run out?

- (a) Only during the rain season
- (b) Always
- (c) Sometimes
- (d) Never
- (e) Don't know


--

40. Who influenced you on the use of chlorine?

- (a) friend
- (b) Family
- (C) Health worker
- (d) Community health worker
- (e) None


--

**THANK YOU FOR YOUR PARTICIPATION**

## APPENDIX 2

### FOCUS GROUP DISCUSSION GUIDE

**TOPIC: KNOWLEDGE, ATTITUDE AND PRACTICE BY MOTHERS WITH UNDER FIVE CHILDREN ON THE USE OF CHLORINE FOR WATER TREATMENT IN LUSAKA URBAN DISTRICT.**

**DATE:** \_\_\_\_\_

**NUMBER OF PEOPLE:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**DURATION:** \_\_\_\_\_

1. What do you know about diarrhea?
2. What do you know about chlorine and its use?
3. How do you use chlorine to make water safe for drinking?
4. What are people's feelings about treating water with chlorine?
5. Why do some women fail to use chlorine for water treatment?
6. What suggestions can you give to improve the women's use of chlorine?

**THANK YOU FOR YOUR PARTICIPATION**

### APPENDIX 3

#### RESEARCH WORK SCHEDULE

<b>TASK TO BE PERFORMED</b>	<b>DATES</b>	<b>PERSONNEL</b>	<b>DAYS REQUIRED</b>
Literature review	Continuous	Researcher	Continuous
Compiling Research Proposal	15 <sup>th</sup> April to 18 <sup>th</sup> Aug, 2006	Researcher	16 weeks
Clearance from School and authorities	23 <sup>rd</sup> Aug to 1 <sup>st</sup> Sept, 2006	Researcher	7 days
Pilot study	7 <sup>th</sup> Sept, 2006	Researcher	1day
Data collection	11 <sup>th</sup> Sept. to 1 <sup>ST</sup> Oct, 2006	Researcher and Research Assistant	21 days
Data analysis	2 <sup>nd</sup> Oct. to 6 <sup>th</sup> Oct, 2006	Researcher	5 days
Report writing and typing	9 <sup>th</sup> Oct. to 18 <sup>th</sup> Oct. 2006	Researcher	10 days
Draft reporting to PBN	23 <sup>rd</sup> Oct. to 26 <sup>th</sup> Oct. 2006	Researcher	4 days
Finalization of report	30 <sup>th</sup> Oct. to 12 <sup>th</sup> Nov. 2006	Researcher	14 days
Monitoring and evaluation	Continuous	Researcher	Continuous
Dissemination of results	20 <sup>th</sup> Dec. to 24 <sup>th</sup> Dec. 2006	Researcher	5 days



## APPENDIX 5

### BUDGET

BUDGET CATEGORY	UNIT COST (K)	QUANTITY	TOTAL (K)
<b>Stationery</b>			
(a) Bond paper	25,000.00	4	100,000.00
(b) Pens	1,000.00	5	5,000.00
(c) Pencil	500.00	10	5,000.00
(d) Rubber	1,000.00	2	2,000.00
(e) Note books	500.00	4	2,000.00
(f) Tipex	8,000.00	2	16,000.00
(g) Staplers	20,000.00	2	40,000.00
(h) Staples	5,000.00	2 boxes	10,000.00
(i) Files	5,000.00	2	10,000.00
(j) Scientific calculator	60,000.00	1	60,000.00
(k) Flip chart	40,000.00	1	40,000.00
(l) markers	3,000.00	6	18,000.00
<b>Subtotal</b>			<b>308,000.00</b>
<b>Personnel</b>			
(a) Lunch Allowance			
(i) Researcher	50,000.00	10 days	500,000.00
(ii) Research Assistant	50,000.00	10 days	500,000.00
(b) Transport			
(i) Researcher	10,000.00	10 days	100,000.00
(c) Statistician	100,000.00	2 days	200,000.00

Training of research assistants	100,000.00	1 day	100,000.00
<b>Subtotal</b>			<b>1,400,000.00</b>
<b>Secretarial Services</b>			
(a) USB	180,000.00	1	180,000.00
(b) Bag for stationery	25,000.00	2	50,000.00
(c) Questionnaire typing	3,000.00	10 pages	30,000.00
(d) Questionnaire photocopying	300.00	600 pages	180,000.00
(e) Research Report Writing	3,000.00	100 pages	300,000.00
(f) Research Report photocopying	300.00	400 pages	120,000.00
(g) Typing and binding Proposal	250,000.00	1	250,000.00
(h) Binding Report	60,000.00	5	300,000.00
<b>Subtotal</b>			<b>1,410,000.00</b>
<b>Total</b>			<b>3118,000.00</b>
Contingency 10%			311,800.00
<b>GRAND TOTAL</b>			<b>3,429,800.00</b>

## BUDGET JUSTIFICATION

### 1. STATIONERY

Stationery is required for typing the research proposal, writing the final research report as well as typing and printing the report. In addition, 61 interview schedules have to be produced.

The University of Zambia  
School of Medicine  
Department of Post Basic Nursing  
P. O. Box 50110  
**LUSAKA**

15<sup>TH</sup> August, 2006

The District Director of Health,  
Lusaka District Health Management Team,  
P. O Box 50827,  
LUSAKA.

UFS: The Head of Department,  
Department of Post Basic Nursing,  
P. O. Box 50110,  
**LUSAKA.**

Dear Sir/Madam,

**Re: PERMISSION TO CONDUCT A RESEARCH STUDY**

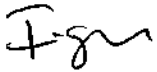
I am a fourth year student in the Department of Post Basic Nursing, School of Medicine, University of Zambia, pursuing a Bachelor of Science degree in Nursing.

In partial fulfillment of this programme, I am required to conduct a research study. My topic is "knowledge, attitude and practice by mothers with under five children on the use of chlorine for water treatment in Lusaka urban district."

I therefore request for permission to carry out the pilot study on 7<sup>th</sup> September 2006 at Mtendere health centre and actual study from 11<sup>th</sup> September to 1<sup>ST</sup> October, 2006 at Chelstone, Chilenje and Mtendere health centres by collecting data from women with under five children at growth and monitoring points.

Thanking you in anticipation for a favorable response.

Yours faithfully,



I'nutu Muzungu Mbangweta (Ms.)

**4<sup>th</sup> YEAR B.Sc. NURSING STUDENT**

cc Neighborhood Health Committee chairpersons



Republic of Zambia



# MINISTRY OF HEALTH

## LUSAKA DISTRICT HEALTH MANAGEMENT TEAM

..... 21/09/....., 2006

The In-Charge

..... Health Centre

LUSAKA .

Dear Madam,

RESEARCH KNOWLEDGE ATTITUDE AND PRACTICE OF MOTHERS WITH UNDER FIVE CHILDREN ON CHLORINE USE IN WATER TREATMENT

MRS. IANITU MIBANGWETA MIZUNGU.....

Be informed that permission has been granted for the student to be attached to your Health Centre for practicals.

However this should be done with minimal disruption to the day to day activities at the Health Centre.

Your usual cooperation will be highly appreciated.

Yours faithfully,

DR. M. KABASO  
CLINICAL CARE EXPERT  
FOR DISTRICT DIRECTOR OF HEALTH

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