

# CHAPTER 1

## 1.0 INTRODUCTION

### 1.1 BACKGROUND INFORMATION

#### 1.1.1 Typhoid Fever and Cholera

Typhoid fever and cholera continue to present a public health threat worldwide. They are both common in crowded unsanitary residential areas. Global experience has shown that the introduction of cholera in a country cannot be prevented, but cholera can create a problem in areas where sanitation is defective. Typhoid fever, similarly, is a major cause of morbidity with an estimated global incidence of approximately 2 each year. According to one of the conservative estimates, there were approximately 216,000 deaths from typhoid world wide in the year 2000 (Ochiai, 2008)

#### 1.1.2 Cholera

The disease is caused by the bacterium *Vibrio cholerae* and leads to high volume watery diarrhoea, which can be fatal to both adults and children (Hoeprich, 1983). Cholera affects all ages and both sexes, in endemic areas; the attack rate is highest in children (Spira, 1998). The incidence tends to be highest in the lower social-economic groups and this is attributable mainly to poor hygiene. There are a number of other factors that might contribute to *Vibrio* transmission in a community with poor environmental sanitation. These may include environmental factors like soil pollution, contaminated water and food; social factors such as low standards of personal hygiene, lack of education and poor quality of life (Hoeprich, 1983). It is on record that from the time of ancient written records, cholera epidemics and pandemics are well documented since the early 1800 (WHO, 1999). During the 19th Century several pandemics of cholera originated from India and spread to western countries (Park, 2005). The current severe seventh pandemic which began in 1961 in Indonesia is still continuing and has involved more than 80 countries in Asia, Africa and Europe (Hoeprich, 1983).

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Cholera is endemic in southern Asia and Africa where the disease takes a high toll in mortality. Epidemics of cholera are characteristically abrupt and often create an acute Public Health Problem.

In Zambia, cholera is an epidemic disease that appears during every rainy season (November to April). The Zambian Ministry of Health (MoH) report for the period 2000- 2006 indicated that there were a total of 865 deaths out of which 212 were under five (U5) and 656 were over five (O5) (MoH, 2006) . The total cases of cholera recorded in the same report were 35,580, out of which 11,612 were under 5 (U5) and 23,942 were over 5 (O5) Recently in 2007, the then President of Zambia (Levy Patrick Mwanawasa) launched the ‘Keep Zambia Clean’ campaign with the aim of cleaning the environment and preventing the spread of communicable diseases like Cholera and others.

### **1.1.3 Typhoid Fever**

Typhoid fever is a systemic illness due to the invasive pathogen, *Salmonella typhi* which gains access to the small intestinal mucosa and disseminates widely. The disease is clinically characterised by a typical continuous fever for three to four weeks. The commonest complication of typhoid fever is intestinal perforation, which, can result into high mortality rates. Intestinal perforation accounts for 75 per cent of all deaths (Tadataka et al, 1999).

The World Health Organization WHO estimates that 21.6 million cases of typhoid occur worldwide annually, leading to 216,000 deaths, highest in Asia and is also endemic in Africa. WHO currently ranks Southern Africa as a high incidence area (Crump, 2004). Tadataka et al, 1999 reports that in the United States the rate of typhoid has dramatically decreased, whereas it continues to be an endemic problem in developing nations. In Zambia the picture is not different. Between 2000 and 2006 the Ministry of Health (MOH, 2006) records show Typhoid fever at 2,141 aggregated typhoid cases, out of which 292 cases were in children under five years of age (U5) and 1,849 were in persons over the age of five (O5).

There were a total of 35 deaths out of which 7 were under five and 28 over five (MOH, 2006).

Worldwide typhoid fever affects 6,000,000 people with more than 600,000 deaths per year. Almost 80 percent of cases and deaths are in Asia and others occur in Africa and Latin America (WHO, 1996). Antibiotic resistance is emerging in *Salmonella typhi*. Consequently, typhoid has become a major public health problem for which prevention would be very desirable.

Data on typhoid incidence in Zambia are incomplete. Using the WHO classification, Zambia lies on the boarder between medium and high incidence zones of Africa. Typhoid incidence is generally highest in children up to the age of 20 years (Hoeprich, 1983). At times out breaks do occur. A few notifications of *Salmonella typhi* cases are made each year from the health facilities in Zambia. The University Teaching Hospital last reported in September 2007.

Despite the shortage of health facility based reports, recent data on surgical complications of typhoid suggest that disease is being under diagnosed in Zambian health institutions. J. Kachimba (2007) reported (personal communication) data on surgical operations from Ndola Central Hospital and UTH. These indicated that between January and December 2006, there were two cases for small bowel resections resulting typhoid perforation of the small intestines. Reports from the University Teaching Hospital (UTH) revealed that there were ten cases of small bowel resections for typhoid perforation during the one year period from November 2005 to October 2006. This represents 1 per cent of all the 915 surgical procedures audited.

Perforation of the small intestines is the most serious complication of typhoid which in hospital series has been reported in one percent of patients when untreated (Hoeprich, 1983). If perforation is seen so regularly in UTH, it means that typhoid is much more common in our communities than is believed. Possible reasons for under-diagnosis may include the following:

- failure of doctors and nurses to suspect it and to collect blood cultures from febrile patients,
- Inadequate blood culture facilities, or
- Misdiagnosis as malaria or pneumonia.

The Ministry of Health in Zambia and the international literature asset that most febrile illness are currently treated with both anti-malarial drugs and antibiotics in the peripheral clinics (and even with self medication using drugs bought at open market stands), so the diagnosis may be masked before the patient even reaches the hospital. Furthermore, the high prevalence of HIV may also obscure the clinical picture as cases of typhoid may be mistaken for opportunistic infections. The data on perforations presenting to the department of surgery in the two referral hospitals in the country indicate that typhoid is still a significant problem, especially in the most vulnerable age group, children of school-going age.

#### **1.1.4 Immunization**

Issues of immunization are a global concern and commitment. The World Health Assembly in 2006 endorsed the vision and strategy of UNICEF/WHO global immunization (GIVS) which stated that immunization is highly valued. It is seen as critical for the wider strengthening of health systems and a major element in efforts to attain the millennium development goals (MDGs.), particularly the MDGs which relate to reducing child mortality and the combating of HIV/AIDS, malaria and other diseases.

#### **1.1.5 Vaccines against Cholera**

Wild type *Vibrio cholerae* causes secretory diarrhoea by elaboration of several toxins, but quantitatively the most important is cholera toxin, which has two subunits, A and B. The subunit B binds to host cell, forming pentamers which act as conduits for the A subunit which causes cellular signalling disruption leading to chloride ion secretion. (Tailor D.N. et al, 2000)

Until recently a parenteral vaccine was the only specific prophylactic available against cholera. Currently two oral cholera vaccines are available: Orochol and Dukoral. Orochol is a live attenuated vaccine with deletion of both toxin genes. Dukoral is a heat-killed whole cell vaccine with recombinant toxin B. Dukoral is also a highly safe vaccine and effective (Berna Biotech, 2006). It is given as two doses by two weeks, which again has been proposed as an obstacle to implementation. The most important safety aspect of both of these vaccines against cholera is that the toxin subunit A is absent so diarrhoea does not occur (Clemens, 1990).

In a programme of vaccination in Beira, Mozambique, involving 11,070 adults, a subset of 215 HIV positive and HIV negative adults were analyzed closely and no adverse events were seen (Marcelino et al, 2005).

#### **1.1.6 Oral Vaccines against Typhoid Fever**

The only oral vaccine against typhoid, (Ty 21a, commercially available as Vivotif), protects against *Salmonella typhi*. It was developed in the 1980s. The vaccination requires 3 or 4 doses separated by only a few days (Biotech, 2006). Vivotif vaccine has an excellent safety record. It is derived from a naturally occurring mutant *Salmonella typhi* isolated in 1975. It has been administered in more than 200 million vaccines during its 20 years of use worldwide with only 0.002% spontaneously reported adverse events (Biotech, 2006). These very infrequent side effects are predominantly transient gastrointestinal disturbances and fever. This is an excellent safety record. In Egypt, protective efficacy was 95% over 3 years in 32,000 volunteers (Levine et al, 1987). In Chile the vaccine efficacy was also high it was at 67% over the period of 3 years in 109 volunteers. (Marcelino, et al, 2005)

The use of oral immunization against cholera and typhoid fever, coupled with improved sanitation, environmental and personal hygiene will substantially reduce the prevalence of Cholera and typhoid fever.

## 1.2 STATEMENT OF THE PROBLEM

Typhoid fever and cholera remain serious public health problems globally. Currently the seventh cholera pandemic that began in 1961 in Indonesia is still continuing and it has involved more than 98 countries in Asia, Africa and Europe (WHO, 1999). In Zambia cholera is an epidemic disease that appears every rainy season. In the period 2000-2006 the country recorded a total of 35,580 cholera cases out of which 11,612 were U5 years old and 23,947 were O5 years old. A total of 865 deaths were recorded, out of which 212 were U5 (U5) and 656 were O5 years old (MOH, 2006) these statistics are a way too much for a population of 11million. The Lusaka District Health Management Team (DHMT) reported the highest number of cholera cases of 716 for 2005-2007 cholera epidemic periods. This is a high burden.

Similarly, typhoid fever continues to be unabated in the developing countries of Asia, Africa and Latin America. Although data on typhoid incidence in this country is incomplete, Zambia lays between the medium and high incidence zones of Africa. In the period 2000-2006, the Zambian Ministry of Health (MOH) recorded 2,141 aggregated typhoid cases out of which 292 were under five and 1,849 were over five years. There were a total of 34 deaths, out of which 7 were under five (U5) and 28 over (O5) five years (MoH, 2006). Further more, recent data on surgical complications of typhoid fever suggest that typhoid is being under diagnosed in Zambian health institutions. If typhoid were causing a considerable burden of disease, which is not being diagnosed, prevention of typhoid by vaccination would be highly desirable. Currently the best approach to prevention is immunization which is the only specific preventive measure likely to yield a high benefit for the money spent on the resources used to try and prevent and control the diseases when an out break occurs.

Although safe and effective oral cholera and typhoid vaccines have been available for many years world wide, their use has been limited to other parts of the globe.

Considering the public health burden brought about by cholera and typhoid fever, these vaccines are seemingly being under utilised in countries where they are most needed. Vaccination is one of the comprehensive control strategies for typhoid fever and cholera. The oral typhoid fever and cholera vaccines address a critical public health need. Typhoid is a major health problem in Africa, Asia and South America. Parry et al (2004) states that although three vaccines are available, none are in use in the endemic areas. Zambia is one such area that has not used any of the available cholera and typhoid fever vaccines.

It is for this reason that the study sought to explore the extent to which cholera and typhoid fever vaccinations would be accepted. The researcher, therefore, sought to explore the acceptability of oral immunization against cholera and typhoid fever and find out if oral administration of the vaccines can impede the existing national vaccination programme.

### **1.2.1 JUSTIFICATION OF THE STUDY**

Many industrialised countries worldwide have safely administered the oral vaccines of cholera and typhoid to adults and children with minimal effects. Orochol cholera vaccine is licensed in Canada and Australia. Dukoral cholera vaccine is licensed in Canada and the European Union. Considering the magnitude of these diseases in Zambia and the availability of effective vaccines in other parts of the world, the researcher was prompted to carry out this study.

The Ministry of Health in Zambia is considering vaccine-based approaches to control of typhoid fever and cholera, but there are concerns about the dosing schedule which involves giving multiple doses. The Dukoral, cholera vaccine is a highly safe vaccine and effective. It is given as two doses separated by two weeks, which has been seen as an obstacle to implementation. Vivotif, the typhoid vaccine, requires 3 or 4 doses separated by only a few days (Berna Biotech, 2006). This unique dosing schedule has given rise to concerns also that it would be difficult to administer and that acceptance rates would be low.

Cholera affects all ages and both sexes but in endemic areas, it is said that the attack rate is highest in children. The Safety Archives in November 2006 reported that according to the Indian Health Services the majority of the cholera cases were among the elementary school aged children. The findings of the study will be beneficial to health policy makers in mapping out strategies to improve management and prevention of typhoid cases and minimize cholera outbreaks. Apart from the prevention aspect, the introduction of the vaccine will help in broadening the scope of the expanded programme of immunization (EPI) from its focus on infants and childhood conditions to encompass older age groups, and indeed improve their health status.

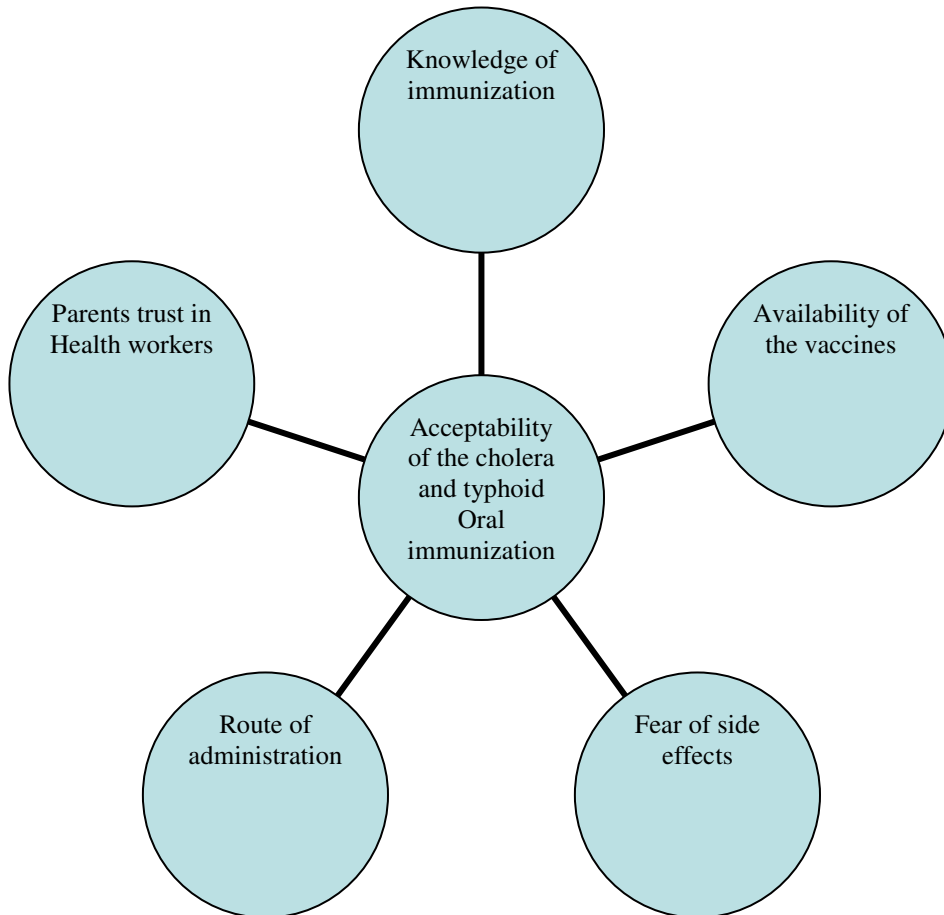
Experience in both developed and developing countries indicates that family and interest promotes sustainable behaviour change (Sterfield, 1998).



Therefore, understanding the factors associated with acceptability of the cholera and typhoid vaccines would be cardinal in disease prevention and control. Some factors associated with acceptability of oral immunization are highlighted in the diagram below:

**PROBLEM ANALYSIS DIAGRAM**

**FACTORS ASSOCIATED WITH ACCEPTABILITY OF THE VACCINES**



## **1.2.2 RESEARCH QUESTION**

In view of the overwhelming evidence of cholera and typhoid burden in Zambia what do the stakeholders, the teachers and parents in Lusaka urban believe and think about the use of oral immunization against typhoid fever and cholera strategy?

## **1.2.3 OBJECTIVES**

### **1.2.4 General Objective**

The main aim of the study was to determine acceptability of a new strategy of oral vaccination against cholera and typhoid fever

### **1.2.5 *Specific Objectives***

- To determine the knowledge level of the teachers and parents
- To explore the perception of teachers and parents towards administration of oral immunization as part of the School Health and Nutrition Programme
- To assess the concerns of stakeholders and regulatory agencies regarding the implementation of oral immunisation against typhoid fever and cholera in schools.

## CHAPTER 2

### 2.0 LITERATURE REVIEW

#### 2.1 INTRODUCTION

Enteric infections take a heavy toll on the world's population, particularly children living in the developing world. Cholera and Typhoid fever remains a serious public health problem throughout the world. Some studies state that an estimated 16-33 million cases and 500,000 to 600,000 deaths annually have been reported in South and South East Asia and South America. Current estimates place the death toll from diarrhoeal diseases at nearly 1.9 million deaths per year (Clemens J.D.1990) Outbreaks of cholera, shigellosis and typhoid fever occur in resource-poor countries, affecting also adults.

##### 2.1.1 Global Perspective

A number of studies have been done on the successful use of vaccines worldwide; these include evaluation surveys, retrospective and case control studies. A survey of more than 160 policy makers was conducted, on their views regarding the introduction of new generation against typhoid fever shigellosis and cholera in seven Asian countries. The results showed a considerable interest in the targeted use of Vi typhoid vaccine in most countries followed by the future use of cholera vaccines (Deroeck D. 2005).

Currently two (2) types of oral cholera vaccine (Dukoral and Orochol) are available, though the latter is no longer in manufacture. Both have shown to be safe and immunogenic and efficacious (Berna Biotech, 2005). A study was done in Peruvian military recruits, the results showed that, vaccine efficacy in preventing cholera was 86 % (95% CI 37-97%,  $p < 0.01$ ). In Bangladeshi, vaccine efficacy was 85% (Clemens J D, 1990). However, in another Peruvian study, efficacy was lower until a third dose had been given, then efficacy rose to 61%

(Clemens, 1990). The reasons for the difference are not clear, but may reflect lower vaccine efficacy in children under five years of age.

These two vaccines have been licensed in some countries and are mainly used by the travelling public from industrialized countries going to an endemic area (Fred F, 2005). Gerald Y (2006) asserts that these vaccines are now under consideration for use in developing countries as an additional control measure against cholera.

The World Health Organization recognizes that orally administered cholera vaccines are promising tools for the control of cholera in the endemic areas. It was further reported that new generation (Dukoral) cholera vaccines be considered in certain endemic and epidemic situations and that demonstration projects are needed to provide more information about the costs, feasibility and effects of using these vaccines.

Immunization against typhoid has also proved successful with a number of vaccines. Efficacy of the live, attenuated Ty21a vaccine (Vivotif) against *S. typhi* was 95 per cent effective in one study after 3 years (Tadataka Y. et al, 1999). Many other countries have recorded success stories of oral vaccine, as was reported in China where, a single dose locally manufactured Vi vaccine used either before or during outbreak showed to be effective in preventing typhoid fever infection (Gerald M.P. et al, 2006). Other field trials have also shown good protection rates

However, there has been a considerable concern over the cost of the vaccines. A cost-of-illness study was done in Vietnam which tracked the cost of culture-positive cases of typhoid found through surveillance in each site, including the out-of-pocket and indirect costs which ranged from 8% of cases in Karachi to 40%, this was a 3.5 months' income for some people in India and Vietnam, which meant that it was quite a burden to some families. Another study conducted in the slums of Delhi, India with the All India Institute of Medical Sciences (AIIMS) found that a blood culture confirmed case of typhoid costs, on average, for hospitalised cases

accounted for 11% of culture confirmed cases, i.e. cost \$511. This would truly be expensive for a number of families in Zambia comparatively.

### **2.1.2 Africa Region Perspective**

Typhoid is a major health problem in Africa, Asia and South America. The oral typhoid fever and cholera vaccines address a critical public health need.

Vaccination is one of the comprehensive control strategies for typhoid fever and cholera. Parry et al (2004) states that although three (3) vaccines are available; none are in use in the endemic areas.

Two case-control studies, done in Beira, to estimate the protective effect of the killed whole cell of oral cholera vaccine against treated culture-confirmed cholera revealed that Dukoral (the rBS-WC vaccine) was highly effective in clinically significant cholera in an urban sub-Saharan African population with a higher prevalence of HIV infection. (Marcelino et al, 2005).

### **2.1.2 Zambian Perspective**

The major epidemics with major occurrences in many parts of Zambia include cholera, dysentery, Malaria, meningitis Tuberculosis and HIV/AIDS pandemic. The water borne diseases such as cholera and dysentery have been common occurrences almost every rainy season in most of the crowded urban areas of the country, where they spread rapidly, and causing high levels of fatality. Every cholera epidemic, which occurs during the rainy season, claims many lives and causes massive disruption of the health sector to the extent of closing some urban health centres to be used as cholera centres. A case in point is what happened in Chiengi in Luapula province of Zambia. The safety archives report of 20<sup>th</sup> November 2006 stated that ‘the cholera centre in the area had continued to receive new cases, 5 people had already died of the disease, and that the situation had worsened hence the appeal by the Ministry of Health to Government to close the border between Zambia and the Democratic Republic of Congo (DRC) in Chiengi and other parts of Luapula province.’

While cholera no longer poses a threat to countries with minimum standards of hygiene, it remains a challenge to countries where access to safe water and proper sanitation are not guaranteed (Gerald M.P. et al, 2006) as is the case in Zambia. It is worth noting that Zambia has been particularly affected by poor sanitation and poor safe water supply. Partly because of the mushrooming of un-planned shanties in Lusaka, which are not serviced, poor personal and communal hygiene to mention a few. For the few that can afford to sink boreholes, even the underground water is also contaminated due to poor waste management, which implies that most people in Lusaka are at risk of drinking contaminated water. It is on record that although 75 per cent of water supplied by the local authorities and utility companies is treated surface water, the majority of Zambians drink untreated water (ECZ, 2000). It also revealed that inadequate sanitation and poor hygiene has contributed to high incidence of water borne diseases, noticeably typhoid, hepatitis A and E, cholera and the like.

Zambia is now recording significant numbers of typhoid complications that could be prevented if detected early. However, the MOH report on cholera and typhoid comparison epidemic weeks for 2005-6 and 2006-7 showed a significant drop in the cholera cases; 512 cases in 2005 to 204 cases in 2007. This can possibly be attributed to efforts being made by the Government to improve sanitation and the provision of safe drinking water. The Lusaka District Health Management Team has also carried out several sensitization campaigns in areas prone to cholera outbreaks (Safety Archives, 2006).

An effective and sustainable water environment is synonymous with the well being of the community as a whole. Currently Zambia has embarked on the 'Keep Zambia Clean' campaign, all in the quest of trying to minimize the spread of infectious diseases like typhoid and cholera. Recently the Environmental Council of Zambia has developed the National Health Care Waste Management Plan. This is to ensure that whatever waste is generated there must be safe and reliable

methods for its handling to avoid any serious public health consequences and any significant impact on the environment (MOH, 2008). Suffice to say that prevention of cholera and typhoid by vaccination would be highly desirable to complement the current efforts of cholera prevention in Zambia. Recent outbreaks in Zimbabwe show how desirable it would be to have OCV available in readiness.

## CHAPTER THREE

### 3.0 RESEARCH METHODOLOGY

#### 3.1 Study Design.

The purpose of the study was to determine the acceptability of a new strategy of oral immunization against cholera and typhoid fever by finding out the knowledge of respondents and their acceptability of the vaccines. A descriptive non-experimental study was done in 8 basic schools in Lusaka. The method was chosen because of its capacity to solicit opinions from parents and teachers.

#### 3.2 Study Setting

The study was conducted in Lusaka, the capital city of Zambia. Lusaka district has eighty (80) basic schools. Eight (8) out of eighty (80) Basic Schools were conveniently elected from the Lusaka District. The selected schools included Chibbelo, Chibolya, Kapwelyomba, Kasamba, Libala, Ngwerere, Twatasha and Vera Chiluba.

#### 3.3 Sample size and Sampling

The determined sample size was 400 respondents. Which comprised of parents and teachers; there were 224 parents and 176 teachers, these were selected from a total population of 16,237.

#### **Inclusion criteria**

- Parents with children in the schools that were sampled
- Teachers from the schools that were selected.

#### **Exclusion Criteria**

- Parents whose children did not belong to the selected schools
- Teachers from schools other than the selected ones



### 3.3.1 Sample Size Determination

The sample size was determined to be 400 respondents considering attrition rate. The following formula was used to calculate the sample size at 95% level of confidence:

$$N = \frac{Z^2 P (100-P)}{d^2}$$

Where

Z = 1.96 the factor from the normal distribution

P = Expected period prevalence

d = Absolute sampling error

n = sample size

The prevalence of cholera and typhoid fever were not available so 50% which is a standard number used when there is no prevalence:

$$\text{Therefore: } n = \frac{(1.96)^2 \times 50 (100-50)}{25}$$

$$= 392$$

Therefore a total of 400 respondents were used in this study.

### 3.3.2 Sample Selection

A systematic random sampling method was used to select 8 schools out of the 80 Lusaka district basic schools. The interval was calculated using the following formula:

$$K = N/n \quad \text{Where } K = \text{Interval}$$

$$N = \text{Study population}$$

$$n = \text{Sample size}$$

$$\text{Study population} = 80$$

$$\text{Sample size} = 8$$

$$80/8 = 10$$

The interval used was = 10

The teachers and parents constituted the study units. Fifty (50) respondents were selected from each school. Using the pupil's registers as a sampling frame, all pupils were listed at each school in order to identify their parents. A simple random sampling was done after which the parents of the sampled pupils were called for interviews. This was done because it was convenient for the researcher and it gave the parents an equal chance of being selected into the sample. The teachers were conveniently sampled. This was because there were few teachers. Initially the parents should have been 25 and the teachers 25, but because of the scarcity of teachers in schools they were conveniently sampled to come up with a total of 50 respondents in each school. The teachers were included in the study to establish their level of knowledge of immunization and to determine their perception on the implementation of a new oral immunization strategy in the schools.

### **3.3.3 Data Collection**

Data was collected using a structured questionnaire with both open and close-ended questions. Key informants were also interviewed on their views about the use of oral immunization against cholera and typhoid, these included stakeholders from the ministry of health, Ministry of Education, National infection prevention working group members, community members and the headmasters. These techniques were employed to maximize the quality of data to be collected and reduce chances of bias. Three research (3) assistants helped in the collection of data. Training of research assistance was done for a period of 1 week before carrying out data collection for the main study.

### **3.3.4 Data Processing and Analysis**

The questionnaires from the field were screened to ensure consistency and completeness of data. The data was organised, coded and analysed using the EPI-info version 6.0 statistical programme. Responses were analysed using column counts, cross tabulations, reflecting frequencies, percentages.

### **3.3.5 Ethical Considerations**

In order to conduct the study, permission was obtained from the Research Ethics Committee of the University of Zambia, the Ministry of Health and the Ministry of Education. This was done in recognition of the respective authorities and to gain cooperation. Consent was also obtained from individual respondents before interviewing them upon explaining the purpose of the study and how the results will be utilised. Confidentiality and anonymity were assured and maintained through out the data collection process by not using identity numbers on the questionnaires and by ensuring that all the information gathered is only used in private for the purpose of the study.

### **3.3.6 Pre-Test**

Prior to the formal research, a small-scale pre-test of the questionnaire was done at Kabulonga Basic School. Kabulonga Basic School was not one of the sampled study areas. A sample of twenty pupils was used. The pre-test was done to enable the researcher to ascertain reliability and validity of the research tool, as well as determine the appropriateness and clarity of the questions that were to be asked. Necessary corrections were done. The pre-test also helped to evaluate the success of the training of the research team.

### **3.3.7 Study Limitations**

The major limitation of the study was that the researcher could not do the initial experimental test of actually administering the oral vaccine in order to determine the compliance and acceptability of the pupils to the vaccines. This was due to the delay in the registration of the vaccines in the country.

## CHAPTER FOUR

### 4.0 PRESENTATION OF FINDINGS

This chapter presents the findings obtained from responses of 400 respondents comprising of 176 teachers and 224 parents from the randomly selected 8 Basic Schools in the urban areas of Lusaka district.

**Table 1: Demographic characteristics of the parents and teachers**

The majority 224 (56%), of the respondents interviewed were parents followed by 176 (44%) teachers, Out of which 292 (73%) were married. Most of them 222 (56%) attained college education and above, however, only 59 (26%) of the parents were in formal employment. Majority of the respondents 244 (61%) were Protestants.

**Table 1 Numbers of teachers and parents interviewed**

RESPONDENTS	FREQUENCY	PERCENTAGE
Parents	224	56%
Teachers	176	44%
<b>Total</b>	<b>400</b>	<b>100%</b>
<b>Marital status</b>		
Single	50	13%
Married	292	73%
Divorced	12	3%
Separated	32	10%
Unknown	2	1%
<b>Total</b>	<b>400</b>	<b>100%</b>
<b>EDUCATION</b>		
None	14	4%
Primary	98	25%
Secondary	66	17%
College and above	222	56%
<b>Total</b>	<b>400</b>	<b>100%</b>
<b>OCCUPATION</b>		
Unemployed	85	38%
Employed (formal)	59	26%
Self employed	80	36%
<b>Total</b>	<b>224</b>	<b>100%</b>
<b>RELIGION</b>		
Catholics	91	23%
Protestants	244	61%
SDA	59	15%
Non Believers	3	1%
<b>Total</b>	<b>400</b>	<b>100%</b>

## Knowledge of Immunizations

Table 2 shows that most of the respondents 338 (85%) had heard about immunizations in general, it was surprising that as many as 16% of these respondents denied any knowledge of immunization. The source of information was mostly 269 (67%) from the doctors and Nurses at the local clinics, 262 (66%). It is also interesting to note that 117 (32%) got information from places other than the clinics, schools and place of work.

**Table 2**

HEARD OF IMMUNIZATION	FREQUENCY	PERCENTAGE
Yes	338	85%
No	62	16%
<b>Total</b>	<b>400</b>	<b>100 %</b>
<b>Place where information was found</b>		
At home	13	1%
At local clinic	262	61%
At school	3	1%
Place of work	5	1%
Other places	117	32%
<b>Total</b>	<b>400</b>	<b>100 %</b>
<b>PEOPLE WHO SHARED INFORMATION</b>		
Doctor / Nurse	269	68%
Friends	18	5%
Others	41	10%
Unknown	72	18%
<b>Total</b>	<b>400</b>	<b>100 %</b>

The following tables 3a- 3d represent data on the respondents' knowledge of cholera and typhoid diseases. The tables shows that the majority 392 (98%) of the respondents had knowledge of cholera followed by 78% who had knowledge of typhoid fever. All the respondents had knowledge about boiling water, washing hands and maintaining good personal hygiene as useful preventive measures against cholera and typhoid. However, 78% had no knowledge of vaccination as a preventive measure for cholera.

It is worth noting that 331 (83%) of the respondents acknowledged immunization as a preventive measure of typhoid fever.

**Table 3a Respondents who had heard of Cholera**

<b>Heard of Cholera</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Yes	392	98%
No	8	2%
<b>Total</b>	<b>400</b>	<b>100%</b>

**Table 3b Knowledge of Methods of prevention of Cholera**

<b>Prevention method</b>	<b>YES</b>	<b>NO</b>	<b>Total</b>
Boiling water	348 (87%)	52 (13%)	400
Washing hands after using the toilet	391(97%)	9 (2%)	400
Maintaining good personal hygiene	375(94%)	25 (6 %)	400
Getting vaccinated	89 (22%)	311(78%)	400

**Table: 3c. Respondents who had heard about Typhoid Fever**

<b>Heard of Typhoid</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Yes	285	78%
No	79	22%
Total	400	100%

**Table: 3d. Respondents' knowledge of methods of prevention of typhoid fever**

<b>Typhoid Fever</b>	<b>YES</b>	<b>NO</b>	<b>TOTAL</b>
Boiling water	389(97%)	11 (3%)	400
Washing hands after using the toilet	381(95%)	19 (5%)	400
Maintaining good personal hygiene	391(98%)	9 (2.3%)	400
Getting vaccinated	331(83%)	69 (17%)	400



**Table 4 Respondents' children who had been vaccinated before.**

It shows that more than 85 % Of the respondent's children had been given BCG 364 (91. %), DPT (81.0 %), Measles (90.0%), Polio (362%), and Vitamin A 340 (85.0%) as part of the vaccination programme. Note that vitamin A is not a vaccine but it is given at the same time as the vaccines.

**Table 4**

<b>TYPE OF VACCINATION</b>	<b>YES</b>	<b>NO</b>	<b>TOTAL</b>
BCG	364 (91%)	36 (9%)	400
DPT	324 (81%)	76(19)	400
MEASLES	363 (91%)	37(9%)	400
POLIO	362 (91%)	38 (10%)	400

Table 5: Respondents' willingness to have their children immunized against cholera and typhoid fever. Majority of the respondents interviewed 313 (70%) gave an affirmative response towards getting their children immunized orally against cholera and typhoid fever.

**Table 5**

<b>REPOENDENTS WILLINGNESS TO HAVE THEIR CHILDREN IMMUNIZATION</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Yes	313	80%
NO	80	20%
<b>Total</b>	<b>393</b>	<b>100%</b>

Table 6 shows there were 369 (94 %) respondents who were willing to encourage other people to have their children immunized against cholera and typhoid fever orally as indicated in the chart below.

Table 6

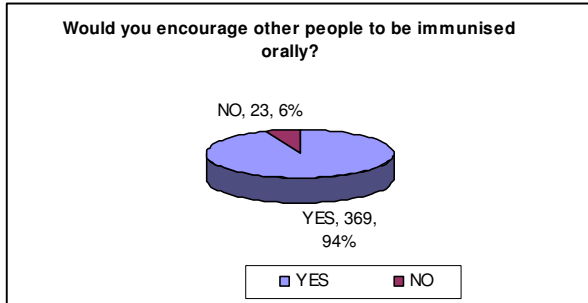


Table 7 Relationships between educational level and knowledge of Cholera

The table shows that at least 90% Of the respondents, both educate and uneducated had heard of cholera.

Table 7

Education	Have you ever heard about cholera?			Total
	Yes	No	Unknown	
None	14 (100%)	0	0	14
Primary	93(95%)	0	5(5%)	98 (100%)
Secondary	66(99%)	0	0	66(100%)
College and above	212 (96%)	6(3%)	4(2%)	220(100%)
<b>Total</b>	<b>385(96%)</b>	<b>6(2%)</b>	<b>9(2%)</b>	<b>400(100%)</b>

Table 8: Relationships between educational level and knowledge of Typhoid fever. It shows that the knowledge of typhoid fever progressively increased with increasing educational attainment, that is, from 6(43%) for the uneducated to 175 (79%) for the educated.

**Table 8**

<b>Education</b>	<b>Have you ever heard about typhoid fever?</b>		
	<b>Yes</b>	<b>No</b>	<b>Totals</b>
None	6 (43%)	8 (57%)	14
Primary	48 (48.9)	50(51%)	98
Secondary	49 (74 %)	17 (26%)	66
College and above	175 (79%)	47 (21%)	222
<b>Total</b>	<b>278 (278%)</b>	<b>122 (31%)</b>	<b>400</b>

Table 9 shows that the acceptability of oral immunization against cholera and typhoid fever progressively declined with increased educational attainment, that is, from 93% of those that are not educated to 73% of the highly educated. However, on average above 80% of both the educated and the uneducated respondents were willing to have their children immunized against oral cholera and typhoid fever.

**Table 9**

<b>EDUCATION LEVEL</b>	<b>Would you be willing to have your child immunised against cholera and typhoid orally?</b>		
	<b>YES</b>	<b>NO</b>	<b>Total responses</b>
None	13 (93%)	1 (7%)	14
Primary	91 (95%)	7 (7%)	98
Secondary	65 (98%)	1 (2%)	66
College and above	163(73.8%)	59(27%)	222

## **Key Informants**

Key informants were interviewed from various institutions on their perception of the possibility of implementing a new strategy of immunization. They had varied reasons; some of them were concerned of the cost of the vaccines, the efficacy and the availability of the vaccines in the country. Some stakeholders from the Ministry of Health Had this to say “we are mindful of the use of vaccines especially during the out break for fear of spending too much money especially that we do not know how much these vaccines cost, we feel safe with current measures of prevention.” This may be true since there is no literature this far that shows the cost of these vaccines in the country.

Another acknowledged that, “Food borne diseases and oral faecal contamination goes on every day due to lack of hand washing and poor sanitation. This leads to diseases like cholera and Typhoid, which are almost the leading causes of hospitalization and death.” He highlighted key behavioural change issues that would help in the mitigation of the outbreaks; improve on hand washing, sanitation practices, water chlorination, safe water supply and examination of food handlers who are sometimes the carriers of typhoid.

Some members of the National Infection Prevention working group (IPWG) felt that the disease burden of cholera was heavy. “Having gone round the country training on Infection Prevention (IP) and conducting assessing and supportive visits, most institutions fall short in terms of behaviour change. There are poor IP practices like poor hand washing and poor personal and communal hygiene, which includes poor waste management despite the MOH providing support commodities for use in IP It, has been an expensive venture but I hope that people will change their attitude in future, otherwise oral immunization against cholera and typhoid may be a better supplement for now.”

Another key informant said, “as an educator I would recommend the immunization because prevention is better than cure, it is not everyone who knows how to maintain good personal hygiene, and given that people in the country generally have a bad attitude towards health, for me a vaccine would be helpful.” In the same vein someone said “I would accept the vaccine because every year the disease is with us and the Government spends a lot of resources in terms of material and human. The vaccine would assist in improving the standard of living.

However one of the medical Doctors said, “as much as I agree that cholera and typhoid fever are an eye sore, I would only recommend the cholera vaccine, typhoid can wait.”

## **CHAPTER FIVE**

### **5.0 DISCUSSION OF FINDINGS**

#### **5.1 INTRODUCTION**

The study sought to explore the extent to which oral immunization against Cholera and typhoid fever would be accepted in Lusaka urban basic schools, and also to find out if there would be resistance in the implementation of an immunization programme in schools. This was done by establishing the level of knowledge of immunization and finding out the perception of the parents and Teacher on oral immunization against cholera and typhoid fever. The key informants were also interviewed on how they perceived the implementation of a new immunization strategy.

The results were based on the responses from 400 respondents who were parents and teachers drawn from 8 basic schools in Lusaka urban; Chibbelo, Chibolya, Kapwelyomba, Kasamba, Libala, Ngwelele, Twatasha and Vera Chiluba. The schools were selected using a systematic random sampling method, after which the study units were selected using a simple random sampling method. A structured questionnaire was used to interview the respondents during a face- to - face interview. They were included in the study only after consenting in writing.

##### **5.1.1 KNOWLEDGE**

The results showed that the 84% of the respondents had heard about immunization programmes in Zambia. This can be attributed to the wide publicity of child immunization as can be seen from the results of the respondents' children that had been immunized against childhood diseases; more than 85% had been vaccinated against BCG 91%, DPT 81%, Measles 90%, and Polio 62%.

The respondent's main sources of information were Health providers at local clinics. This is also in line with what Mavin (1991) said; health workers are key in communicating information and motivating clients. The study also revealed that

above 90% Of the interviewed respondents had Knowledge of cholera, this is inevitable in Zambia in that, for years now there has been outbreaks of cholera every rain season, despite the formation of disaster management teams at all level of health facilities in the country. The national disaster management policy acknowledges that, the water-borne diseases such as cholera and dysentery has been common occurrences almost every rain season in most of the crowded urban areas of the country, where they spread rapidly, and causing high levels of fatality. Health information, education and communication on prevention of cholera in Health centres have been the order of the day. The local Government Minister was recently seen on media admonishing and demonstrating hand washing to the nation to emphasize the importance of maintaining good hygiene in the prevention of cholera.

In this study, it was very interesting to note that 98% of the respondents were aware that during cholera and typhoid epidemics they need to wash their hands, boil drinking water and maintain good personal hygiene.

The study also showed that knowledge of cholera was independent of education, 100% the educated respondents had knowledge about cholera. Therefore, it is likely that they may have actually experienced the disease or their close relatives have been affected by cholera. However, it is worth noting that despite their knowledge of cholera the majority (78%) did not know that Immunization is one of the available preventive measures of cholera. This is a clear indication that there has been no health education provided on cholera immunization in the country despite the existence and use of the cholera vaccines in other countries worldwide. These findings agree with what was reported in the WHO position paper on Typhoid vaccine in 2000 epidemiological records in Vietnam which stated that despite the fact that WHO had recommended immunization against typhoid using the new generation vaccines “in areas where typhoid fever is a significant public health, the use of these vaccines in public health and cholera endemic countries has been very limited”. It may therefore mean that people in Zambia are not aware of the existence of the cholera vaccines

The results also show that the knowledge of typhoid fever progressively increased with increasing education attainment from 43% for the uneducated to 79% for those that had college education and above. This means that there is a correlation between a high educational level and the knowledge of typhoid fever. Given that literature on typhoid is scanty in the country, and that the uneducated have the lowest knowledge as compared to the highly educated, the possibility is that the highly educated have had access of information through various types of media where there is vast information on immunization. This is similar to what the ZDHS, 2007 reported; the proportion of children who received all basic vaccinations increases with mother's level of education

Interestingly, the result showed that the respondents had considerable knowledge of typhoid fever despite that it is not commonly publicised as cholera. An interview held with one of the key informants, one of the doctors in paediatrics, revealed that there were more typhoid fever suspects in paediatrics than meet the eye in UTH. He said that 'Typhoid is being under diagnosed in paediatrics because the children admitted with fever which is not responding to medication are treated with either Ciprobid or Ceflatoxin which are basically the drugs of choice for typhoid fever without first doing cultures. This may actually mask the infection and increase the potential of drug resistance. There is a possibility therefore that the carriers continue to spread the disease when they get discharged as it was not diagnosed. He did not say if the people that sit on the bed side of the patients are told about the suspected typhoid, however this could be further explored in this context.



### **5.1.2 PERCEPTION**

Key Informants were interviewed from various institutions on their perception on the possibility of implementing a new strategy of immunization. They had varied reasons; some of them were concerned about the cost of the vaccine, the efficacy and the availability of the vaccines in the country, whilst others affirmed the use of the new vaccine.

The study results also showed that 80% of the study respondents were willing to have their children immunized orally against cholera and typhoid fever. At the same time 94 %of the respondents were willing to encourage other people to have their children immunized. This may be attributed to community realisation of the gravity of the problem.

A recent study of the community conducted by (ZDHS, 2007) showed national immunization coverage of; BCG above 90%, Polio 78%, Measles above 75%, DPT/DPT-Hep-Hib above 90%. Similarly, this study showed that 85% of the respondents' children had been immunized against BCG, (91%), DPT (81%), Measles (90%) and Polio (62%). The fact that other childhood universal immunizations have been accepted before, may be reason enough for parents to assume that it is safe to have their children immunized against the potential oral immunization against cholera and typhoid fever.

### **5.1.3 ACCEPTABILITY**

The study revealed that, despite the majority (78%) of the respondents not knowing that oral immunization of cholera is one the preventive measures, the majority (93%) were ready to have their children immunized orally against Cholera and typhoid fever. This might be an indication that there is a gap in the knowledge of immunization as a preventive measure against cholera and typhoid, hence there will be need to bridge the gap by creating awareness.

The results also revealed that acceptability of immunization was more (93%) in the uneducated than the highly educated (73%). The willingness of the uneducated to accept oral vaccination might be attributed to what Mavin M. (1991) said in the resource for child health publication (REACH). He stated that that communication alone cannot sustain immunization services, but one of the determinants of acceptability seems to be parents' trust in Health workers. The fact that other childhood universal immunizations have been accepted before, may be reason enough for parents to have their children protected from cholera and typhoid. Contrary to the educated, they have to rationalize before accepting new trends especially that during that period there was a controversy on Depo-Provera reported on media. It was reported that Depo-Provera a family planning contraceptive was contaminated with HIV. I postulate that this may have affected the views of the highly educated respondents who were not willing to accept the idea of vaccination.

## CHAPTER SIX

### 6.1 CONCLUSION

The study sought to explore the acceptability of oral immunization against cholera and typhoid among the parents and teachers and the perception of stakeholders in the implementation of a new strategy of immunization. When interviews were being conducted for the study the community raised concerns about the safety of the immunization programme. The main concern was the issue of Depo-Provera, a contraceptive, which was said to be contaminated with an HIV virus at the time. However, with much explanation the respondents accepted to participate in the study.

Most of the key informants acknowledged the usefulness of the vaccines although some felt that good hygiene and improved sanitation could be a good complement to the vaccines. The study results have also showed a positive attitude towards the use of oral immunization against cholera and typhoid fever and indeed the implementation of the new strategy of immunization. The parents and teachers were overwhelmingly knowledgeable of immunization in general and the source of their information was through the local clinics. However, immunization as a preventive method for cholera and typhoid fever was hardly known among the parents and teachers, and yet it is worth noting that, they were still willing to have their children orally immunized against cholera and typhoid. This provides insight into the likelihood of the oral immunization program being utilized if it was integrated in the school health programmes.

The study is confident that all protocols followed the use of oral vaccine against cholera and typhoid fever will not only reduce its prevalence, but will protect large numbers of people both adult and children during the epidemic season. "A good service delivery guarantees better health and a good future".

## **6.2 RECOMMENDATIONS**

The outcome of the study concerning acceptability of oral immunisation against cholera and typhoid fever seems to be positive in that 90% of the respondents gave affirmation for their children to get immunized.

- This will require preparing the communities especially the schools to carryout a clinical trial for the use of cholera and typhoid fever vaccine.
- The Pharmacy and poisons Board has to sanction the safety of these vaccines in the event that their use is agreed upon.
- The Ministry of Health (MOH) along with the Ministry of Education (MOE) need to come together to give mandate for the clinical trials and preparation of immunization guidelines and IEC materials.
- A follow up study to interview the community should be done in this context.

## REFERENCES

- Dietrich G, Griot-Wenk M, Metcalfe IC, Lang AB, Viret J-F (2003). Experience with registered mucosal vaccines. *Vaccine*; 21: 678-683.
- Clemens JD, Nyamete, Mahoney RT (1990). Field trial of oral cholera vaccines in Bangladesh: results of 3 year follow up. *Lancet*; 335: 270-273.
- Crump JA, Luby SP, Mintz ED (2004). The global Burden of typhoid fever. *Bull World health organization*; 82:346-353.
- Doreick D, Clemens J.D, Wyam A, Mahoney R.T (2005) Policy makers view regarding the introduction of vaccines against typhoid fever and cholera in Asia; *Vaccine* 2005;23
- Environmental Council of Zambia, (2001). "State of environment in Zambia 2000". ECZ, Lusaka.
- WHO (2009). *Epidemiological Record* 2000, No. 32 (75): 257-264
- Fred. F. and Ferry. M.D. (2005), *Clinical Advisor: Instant Diagnosis and treatment*, Philadelphia, USA.
- Girard MP, Steele D, Chaignat C, Kiény MP (2006). A review of vaccine research and development: human enteric infections. *Vaccine* 24: 2732-2750
- Hoeprich PD (1983). *Infectious diseases*. Philadelphia: Harper and Row 662-668.
- Levine MM, Ferreccio C, Black RE, Germanier R (1987). Large scale field trial of Ty21a live oral typhoid vaccination in enteric-coated formulation. *Lancet* 1(8541): 1049-1052
- Mavin M (1991). *Resource for child Health (REACH)*, 1991 Mar (5), 34p (USAID)
- Marcelino CS. et al (2005). Effectiveness of Mass oral cholera vaccination in Beira, Mozambique. *New England J Med* 2005; 352:757-767.
- MOH. (2006), *Cholera National surveillance report*.
- MOH. (2008), *Annual Statistics Bulletin*, Lusaka. Zambia. Ndeke House.
- MOH. (2007), *2006-2007 Season DHMT Epidemic report*.
- Ochiai et al. (2008). *Bulletin of WHO*, April 2008; 86 (4)
- Parry E. Richard G, Geoffrey G, (2004) *Principles of Medicine in Africa*, 3<sup>rd</sup> edition. Cambridge: Cambridge University Press.

- Safety Archives, 006 [internet] <<http://allafrica.com/stories/200611201323.html>>  
Accessed on 13.6.2007
- Sterfield B. (1998), *Primary Care: Balancing health needs Services and technology*. New York: Oxford University Press
- Spira WM (1998) *Bull WHO*, 58 (5) 738 9.
- Tadataka Y, Lippincott W, Wilkens, (1991) *Textbook of gastroenterology*, 1991; 1461-1462.
- Taylor DN, et al. (2000) two-year study of the Protective efficacy of the oral whole cell plus recombinant B subunit cholera vaccine in Peru. *J Infect*; 181: 1667-1673.
- World Health Organisation (1999). *Health situation in SA East Asia Region*, New Delhi.
- World Health organisation, (2005), *Global Task Force on Cholera Control*, cholera web site <http://www/Int/cso/diseases/cholera>.
- World Health Organisation. (2006). *Global immunization vision and strategy* <http://ww.who.int/html> (GIVS)
- WHO. (2002), *Instant Diagnosis and treatment in 2000*, *Epidemiological record*, No. 32 (75): Philadelphia, USA
- Central Statistical Office (CSO), Ministry of Health (MOH), Tropical Disease Research Centre (TDRC), University of Zambia (UNZA), Macro International Inc. 2009. *Zambia Demographic and Health Survey (2007)*. Calverton, Maryland, USA: CSO and Macro International Inc.

**APPENDIX 1**

**QUESTIONNAIRES AND CONSENT FORMS USED**

**THE ACCEPTABILITY OF ORAL IMMUNIZATION AGAINST  
CHOLERA AND TYPHOID FEVER IN SCHOOL CHILDREN IN  
LUSAKA URBAN QUESTIONNAIRRE**

**DATE** **OF** **INTERVIEW:**

.....

**SCHOOL:**.....

.....

**QUESTIONNAIRE**

**SERIAL**

**NO:**.....

**INSTRUCTIONS TO THE INTERVIEWER**

1. Ask questions as indicated and write the responses in the spaces provided by circling the appropriate response.
2. Read out the questions or phrases exactly the way they appear in the text.
3. Interpretation/Translation should be carefully done to mean exactly what is in the text.

**SECTION A**

**SOCIO-DEMOGRAPHIC DATA**

1. How old is your child?.....Years

2. What is your marital status?

- a. Single
- b. Married
- c. Divorced
- d. Widowed
- e. Separated

3. What is your level of education?

- a. None
- b. Primary education
- c. Secondary education
- d. College
- e. University

a. What is your occupation?

- b. Unemployed
- c. Employed
- d. Self employed

5. What is your religion?

- a. Catholics
- b. Protestants
- c. SDA
- d. Non believer
- e. Others, (specify).....



**SECTION B: VACCINATION**

8 Have you ever heard about Immunizations before?

- a. Yes (if yes go to question 9-11)
- b. No (if no go to question 12)

9 Where did you hear about it?

- a. At local clinic
- b. Other, Specify.....

10. Where did you hear it from?

- a. Doctor / Nurse
- b. Friends
- c. Other, specify.....

11 Have you ever heard about typhoid fever?

- a. Yes
- b. No

12. Have ever heard about cholera?

- a. Yes
- b. No

13. How can you prevent typhoid fever? (Circle all answers mentioned unprompted)

- a. Boiling drinking water
- b. Washing hands after using the toilet
- c. Maintain good personal Hygiene
- d. Getting Vaccinated
- e. Others specify.....

14. How can you prevent cholera?

- a. Boiling drinking water
- b. Washing hands after using the toilet
- c. Maintain good personal hygiene
- d. Getting Vaccinated
- e. Others specify.....

15. Has your child ever been vaccinated before? (Circle all that apply)

- a. BCG
- b. DPT
- c. measles
- d. polio
- e. Vitamin A

16. Would you encourage other people to have their children immunized orally against cholera and typhoid fever?

- a. Yes
- b. No

17. Would you like your child to be immunized orally against cholera and typhoid fever?

- a. Yes
- b. No (if no explain...)

## APPENDIX 2

### INFORMATION SHEET FOR THE PARENT / GUARDIAN

Title of the Research Study

The information is being provided to you on the study 'Acceptability of Oral Immunization against Cholera and Typhoid Fever in School Children in Lusaka Urban. It is being conducted by Esther Mukokomena Masebe

#### **Introduction**

This information form explains the Research study you are being asked to join to enable you to give voluntary and informed consent to your participation in the study. Kindly read it carefully or let someone else read to you before signing the consent form.

Purpose of Research study

The purpose of this study is to find out if the oral typhoid fever and Cholera vaccines are acceptable in Zambia despite the long administration schedule.

We would like to offer you oral immunization against typhoid fever and cholera. Typhoid causes a fever, like malaria, and cholera causes severe diarrhoea. Both of these diseases kill children in Zambia, though this is much less common in Zambia than malaria for example. There are currently two oral vaccines available; Dukoral is the vaccines for cholera, Vivotif the vaccine for typhoid. These vaccines are in use in other parts of the world (notably South America) but they have never been used in Zambia. Both vaccines have an excellent safety record Vivotif has been administered in more than 200 million people during its 20 years of use worldwide, with only 0.002% spontaneously reported adverts. Dukoral is also a highly safe vaccine. In a programme, of vaccination in Beira, Mozambique, involving 11,070 adults, a subset of 215 HIV positive and HIV negative adults were analyzed closely. No adverse events were seen. The vaccine is also effective. In Peruvian military recruits, vaccine efficacy in preventing cholera was 86%. If they are found to be acceptable the vaccines could also be used in

Zambia. Given the magnitude of cholera and typhoid fever, these vaccines may be a good complement to the already existing measures of prevention and control.

Your school is one of the four schools in Lusaka that has been selected. If you agree to participate in this study, the research team will proceed to ask you relevant questions using a structured questionnaire. After which your child will be immunized by taking capsules and liquids. There are no needles involved in this immunization.

### **Administration of vaccines to children**

The study will be done in four (4) Primary schools. The pupils will continue with their classes while receiving their vaccines. Children from grade 3 to grade 5 will be approached class by class, according to the direction of the headmaster/mistress. They will receive 3 doses of Vivotif and 2 doses of Dukoral. Vivotif is provided as a blister pack containing 3 capsules. Each blister pack will be labelled with the name of one child and capsules given with water on Monday, Wednesday and Friday of the week chosen for that class. Children who miss one of these days will still take the remaining capsule the following Monday of the following week.

Dukoral will be provided as sachets for mixing with drinking water. These will be given on two school days separated by an interval of two weeks.

### **Benefits and Risks**

These immunizations will give your children protection for at least three years. During 20 years of use of these vaccines worldwide there has only been 0.002 percent occurrence of side effects. These side effects are usually a transient diarrhoea which can be easily be treated with ORS and a simple antibiotic (ciproflaxin), but its very rare indeed.

## **Personal Contact**

If you want to talk to someone about this research study pertaining to unfair treatment or you have any other questions about the study ,or you have experienced any sort of side effect during the study, you can contact the Investigator on 0977 477985. Or the research Ethics committee at the University of Zambia, Lusaka, on Telephone number 0211-961763.

## **Confidentiality**

All the information gathered by the research team will only be used in privacy for the purpose of the study. Your identity will only be known by the research team.

If you have read the document or someone has explained it to, and you agree with the content, please sign or make the right thumb print on the consent form.

**APPENDIX 2**

**CONSENT FORM FOR THE PARENT /GUARDIAN**

**ORAL IMMUNIZATION AGAINST TYPHOID FEVER AND CHOLERA  
IN SCHOOL CHILDREN IN LUSAKA**

I am from the University of Zambia (UNZA). I am carrying out a study on the acceptability of oral immunization against Typhoid fever and cholera in school children in the Lusaka urban.

You are requested to carefully read or have the information sheet read to you before signing this form you are indicating your voluntary willingness to participate in this study. However, you may withdraw from this study at any point without giving any reason and your withdrawal from participation in the study will not affect you in any way. Kindly feel free to contact the under mentioned should you have any questions about this study.

Mrs Esther Mukokomena Masebe, School of medicine, Department of community medicine. Professor K. S. Babbo, School of medicine, Department of community medicine. Dr. Paul Kelly, Department of Surgery, UTH Lusaka.

Declaration

I understand what the study is all about and what is expected of me if I participate in this study.

Interviewee's name

.....

Signature/ Thumb print

.....

Date

.....

Witness's

name.....

Signature.....

.....

Date.....

...

