

**FACTORS ASSOCIATED WITH INCOMPLETE CHILD  
IMMUNISATION: EVIDENCE FROM LUSAKA DISTRICT**

**By**

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A dissertation submitted in partial fulfilment of the requirement of the degree of  
Master of Public Health in Health promotion and Education.

**The University of Zambia**

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## **DECLARATION**

I, EDDIE KASHINKA declare that this research is my original work and has not been presented for a degree anywhere. This work does not incorporate any published work with any other University. Works drawn from other sources have been acknowledged.

Signed..... Date.....

## **CERTIFICATE OF APPROVAL**

This dissertation of Eddie Kashinka is approved in partial fulfilment of requirement for the award of a Master in Public Health (MPH) degree by the University of Zambia.

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## ABSTRACT

Immunization is one of the most successful public health initiatives. The World Health Organization fact sheet, in 2017 indicates that immunization currently averts an estimated 2 to 3 million deaths every year. However, about 29,000 children worldwide who are under the age of five still die every day, mainly from vaccine preventable diseases. Uptake of vaccines with multiple doses up to the last dose has been a problem. Partial or incomplete immunization against leads to reappearance of childhood vaccine preventable diseases (VPD) and consequently high infant mortality. There is limited data is available to explain the reason behind non-completion of immunisation and, that could support the decision making. This study was aimed at identify factors associated with completion of child immunisation schedule in Lusaka district, Zambia.

The study employed a mixed method design where both quantitative and qualitative methods were used. The quantitative cross section design data will be secondary data which will be obtained from the Gavi Full Country Evaluation (FCE), Household Survey that was conducted in 2014/15 by The University of Zambia. The qualitative approach were Focus group discussions and key informant interviews conducted with mother and health workers respectively.

It was established in this study that mother generally demonstrated that they were aware about vaccines and they knew the benefits of the vaccines. The reasons for incomplete child immunisation include the mothers low levels of education, the negative perceptions such as the fear of side effects of the vaccines, mothers negligence resulting from the mothers laziness or unwillingness to bring the child for immunisation, the bad treatment by the health workers on mothers and various social factors such as mother having to attend to social engagements like funerals and weddings. Economic factors included lack of transport money, mothers having to do some work. Demographically, older mothers were less likely to have children immunisation than younger mothers, further older children were less likely to be fully immunised than younger ones.

All in all, the reasons for incomplete child immunisation found in this study hinge on the mother's education, age, lifestyle and the mothers experiences with immunisation service and the vaccines. Social and economic factors leading to incomplete immunisation are mostly the mothers competing priorities.

**Key words:** Child Health, Child Immunisation, Incomplete Immunisation, Mother and Caregivers

## **DEDICATION**

This work is dedicated to Jesus Christ firstly and then to my wife, and the rest of my family especially my siblings looking up to me, this is to encourage them that one can achieve what they want through prayer and hard work.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

AOD	Adjusted Odds Ratio
BCG	Bacillus Calmete Guerri
CHU	Child Health Unit
CI	Confidence Interval
cMYP	Comprehensive Multi-Year Plan
CSO	Central Statistical Office
DPT	Diphtheria Petussis Tetanus Vaccine
EPI	Expanded Program on Immunisation
FCE	Full Country Evaluation
FDGs	Focus Group Discussions
Gavi	Global Alliance for Vaccine and Immunization
GRZ	Government Republic of Zambia
HFS	Health Facility Survey
HHS	Household Survey
HPV	Human Papilloma Virus
KIIs	Key Informant Interviews
MMR	Measles, Mumps and Rubella
MOH	Ministry of Health

OR	Odds Ratio
PCV	Pneumococcal conjugate vaccine
PIE	Post Introduction Evaluation
RED/C	Reaching Every Child in Every District
RI	Routine Immunisation
Rota	Rota Virus Vaccine
SEAs	Standard Enumeration Areas
TB	Tuberculosis
UNICEF	United Nations Children Emergency Funds
VPDs	Vaccine Preventable Diseases
WHO	World Health Organization
ZDHS	Zambia Demographic Health Survey

## **CHAPTER 1: INTRODUCTION**

### **1.1 Background**

Worldwide about 29,000 children under the age of five die every day, mainly from vaccine preventable causes (Tadesse et al. 2009). A vaccine-preventable disease is an infectious disease for which an effective preventive vaccine exists. The most common and serious vaccine-preventable diseases tracked by the World Health Organization (WHO) are diphtheria, Haemophilus influenza, hepatitis B, measles, meningitis, mumps, pertussis, poliomyelitis, rubella, tetanus, tuberculosis, and yellow fever. The global community and national governments continue to look for novel ways to improve access to and utilisation of immunisation services to reduce vaccine preventable deaths (WHO/UNICEF 2015).

Immunization is one of the most successful public health initiatives. The World Health Organization fact sheet, in 2017 states that immunization currently averts an estimated 2 to 3 million deaths every year. Immunization has economic benefits in that it has the potential to contribute substantially to improving population health and thereby economic growth. Healthy children are more able to participate in education, thus preparing them to become healthy and productive adults. Vaccination can also prevent infectious diseases in adolescents, thus allowing them to continue their development towards a healthy adulthood. Protecting adults against infectious diseases ensures that they can fully contribute to productivity and economic development by avoiding sick leave and lower productivity (WHO 2017).

With 100% immunization, and 100% efficacy of the vaccines, one out of seven deaths among young children could be prevented, mostly in developing country. Recent studies show that scaling up the use of existing vaccines in 72 of the world's poorest countries could save 6.4 million lives and avert \$6.2 billion in treatment costs and \$145 billion in productivity losses between 2011 and 2020 (WHO/UNICEF 2015). For example, a study has shown that the cost to treat a vaccine preventable disease is 30 times more than the cost of the vaccine (Tadesse et al. 2009).

Even though child immunisation against disease has been shown to be one of the most cost-effective health interventions worldwide, through which a number of serious childhood diseases have been successfully prevented or eradicated. Partial or incomplete immunization against vaccine preventable diseases has remained a significant public health problem in the world today (WHO/UNICEF 2015). To realise their potential, antigens (vaccines) must reach all children; yet,



one in five children worldwide still does not have access to basic vaccines. Further, the effectiveness of routine childhood immunization programs relies on multiple factors. Childhood vaccines can only provide lifetime immunity to certain diseases, but for other diseases, additional doses of vaccine are recommended to fully protect the child. Therefore, some vaccines have multiple doses.

Uptake of vaccines with multiple doses up to the last dose has been a problem. Immunisation coverage for multiple doses shows a drop in coverage as the number of doses increases. Furthermore, vaccine preventable diseases (VPD) have been responsible for a significant portion of childhood morbidity and mortality in low-income countries, and have been re-emerging in medium and high income countries (Glatman-Freedman & Nichols 2012). In Nigeria for example, VPDs accounts for 22% mortality and 17% morbidity among children under-five (U5) (Adedire et al. 2013). In Zambia, under 5 children face several problems with respect to their survival as well as development. Beyond the neonatal period, pneumonia, and diarrhoea are among leading contributors to the high under-5 mortality rate (Central Statistics Office, CSO Ministry of Health 2014). However, pneumonia and diarrhoea are vaccine preventable using the PCV and Rota virus vaccines respectively.

Studies have found that some of the factors associated with incomplete immunisation was lack of knowledge and awareness about schedule of vaccines and lack of understanding of the benefits of immunization, lack of education and negative perceptions such as fear of side effects (Tadesse et al, 2009, Russo et al. 2015, Tickner et al. 2006, Tibin et al 2014, Adedokun et al. 2017). Other factors contributing to immunisation dropout include socio-economic factors which hinge on competing priorities against child immunisation. Economic factors include lack of transport money to the facility and mother having to work (Shrestha et al. 2016, Favin et al 2012, Tibin et al. 2014). Demographic factors include birth order where being second to fourth in the family and being fifth and above in the family had a higher likelihood to default than being born first (Negussie et al 2016, Shrestha et al. 2016 Russo et al. 2015). AlConde SA, (2002) and Favin et al. (2012) both explained that attitudes and behaviour of health staff treating mothers in an unfriendly, disrespectful, or even abusive manner are frequently cited as discouraging children's vaccination.

The Zambia Demographics Health Survey (ZDHS) (2013-2014) reports that Infant and under-5 mortality rates in the past five years are 45 and 75 deaths per 1,000 live births, respectively. At

these mortality levels, one in every 22 Zambian children dies before reaching age 1, and one in every 13 does not survive to his or her fifth birthday. In order to address child mortality and other related issues, the Child Health Unit at the Ministry of Health (MoH) launched several child survival interventions like the Expanded Programme on Immunisation (EPI). The EPI program introduced in 1975, currently provides 11 antigens free of charge to children under two years and a possibility of introducing Human Papilloma Virus vaccine (HPV) for the prevention of cervical cancer in girls 15 years and above (GRZ 2014). Routine Immunisation (RI) is a proven tool for reducing morbidity and mortality associated with VPDs. Another intervention adopted was the Reaching Every District (RED) strategy adopted in 2003 as an effective approach targeting the un-reached children and the missed opportunities has been scaled up to all the districts (Ministry of Health 2011).

The Government of Zambia has adopted the WHO guidelines for vaccinating children through the EPI. Children are considered fully immunized when they have received vaccination against tuberculosis Bacillus Calmette–Guérin (BCG), three doses each of diphtheria, pertusis, tetanus/hepatitis b/haemophilus influenza type b (DPT-HepB-HIB), and polio vaccines and a measles vaccines by the age of 12 months. HIB was introduced in 2004 combined with DPT and 2006 HepB was introduced in combination with DPT with HIB (Central Statistics Office, CSO Ministry of Health 2014). The standard measure of vaccination coverage is the percentage of children who have received the requisite number of vaccine doses irrespective of the age at receipt of the vaccine (Luman et al. 2005). To maximise protection against vaccine-preventable diseases, a child should receive all immunizations within recommended intervals (Glauber 2003).

To sum up, there is limited data available in Zambia that has been documented and investigated to explain the reasons behind non-completion of immunisation. Most of the data is around non uptake of immunisation services. This study was therefore aimed at finding out the reasons for non-completion of childhood immunization with children under the age of 5 within Lusaka district. This has brought new insight based on the mixed method approach to explain the factor associated with incomplete child immunisation

## **1.2 Statement of the Problem**

Incomplete or partial immunization coverage against vaccine preventable diseases is a significant public health problem in Zambia and the world over. Incomplete vaccinations leads to reappearance of childhood vaccine preventable diseases (VPD) and high infant mortality. Childhood immunisation in Zambia is not mandatory and is provided free of charge in public health facilities. Thus the cost of vaccinating a child by the parents may not be a barrier. This in itself may serve as an incentive for caregivers to get their children protected from vaccine preventable diseases. However, there is a problem with uptake of these immunisation services. Moreover, immunisation coverage figures record significant drop out rates, and child mortality due to vaccine preventable diseases remains alarming in the country. For example, the ZDHS 2013-14 highlights that coverage of the first dose of the DPT (diphtheria, pertussis, and tetanus) and polio vaccines was relatively high (96 percent each). However, only 86 percent and 78 percent of these children, respectively, went on to receive the third doses of these vaccines, contributing to respective dropout rates of 11 percent and 19 percent between the first and third doses. The findings show that 2 percent of children age 12-23 months did not receive any vaccine at all. The ZDHS (2013-14) further reports that, only 58% of children had received all of the basic vaccinations by age 12 months. Overall, 68 percent of children age 12-23 months were fully immunised by the time of the survey. With respect to specific vaccines, 95 percent of children had received the BCG immunisation, and 85 percent had been immunised against measles.

Moreover, there is an unclear distinction made between the reasons for non-uptake of childhood immunisation services and reason for childhood immunisation dropouts in Zambia. The study will however focus on the latter. There is scanty information available in Zambia to elucidate the factors leading to incomplete immunisation that could be used to support the decision making for interventions in the EPI program. Furthermore, the study will focus on Lusaka district, which is an urban district where access to public health facilities is reasonably within reach. Therefore, uptake of health services including immunisation should be ideally among the highest immunisation coverage district, however that is not the case.

## **1.3 Research questions**

What do mothers know about vaccines and VPD?

What are the perceptions and beliefs that mothers/caregiver have on vaccines?

What are the socio cultural factors associated with child immunisation completion and non-completion?

What are the economic factors associated with child immunisation completion and non-completion?

## **1.4 Objectives**

### **1.4.1 Primary objective**

To identify factors associated with completion and non-completion of child immunisation schedule in Lusaka district, Zambia.

### **1.4.2 Specific objectives**

To determine the prevalence of children not fully immunised.

To determine basic knowledge on vaccines and vaccine preventable diseases among mothers/ care givers

To identify the perceptions and belief of caregivers on vaccines that led to non-completion of the immunisation schedule

To identify the socio-cultural and economic factors associated with non-completion of the immunisation schedule.

## **1.5 Operational definitions**

*Childhood immunisation dropout rate:* in this study is defined as the rate difference between the first and the last dose or the rate difference between the initial vaccine and the last vaccine.

*Fully immunized child:* a child that has received all the vaccines provided by the EPI within the minimum intervals of time as specified by national policy.

*Immunisation/ Vaccination:* this is an act or protecting a child from illness and disease by subjecting them to a vaccine, mostly oral and injectable hence making them immune.

*Vaccine Preventable Diseases (VPD):* these are disease that can be prevented using vaccines

*Mother(s):* Any woman with a child who is under the age of 5 years old.

*Caregiver(s):* Any significant other that usually takes a child who is under the age of 5 years for the under 5 sessions, for example an aunty to the child.

*Child:* is any person aged 5 years and below and is eligible for immunisation.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter reviewed related literature on factors that lead to incomplete childhood immunisation. Literature for this study was sourced from the various internet sources such as Pub med, BMJ open, Elsevier, ScienceDirect, BMC and Google scholar to mention a few. The search strategy combined the terms: childhood immunisation; childhood vaccination; incomplete immunisation; immunisation dropout and a combination childhood vaccines, this was supplemented by searching the biographies of key papers. Also visits were made to the Ministry of Health, Child health unit to obtain any published information on immunisation dropout rates and associated factors. The University of Zambia main library was also visited to check on the available data on childhood immunisation.

The major factors coming out of the literature as leading to incomplete child immunisation included; Mothers or caregivers knowledge of vaccines, Mothers perceptions and experiences of the vaccine, socio-economic factors like competing priorities between work and health, satisfaction with child health services among many other factors. Hence, the literature review chapter in this study has been divided into 3 main themes namely; cognitive factors, socio-economic factors, and service related factors.

### **2.2 Cognitive factors**

Cognitive factors have been identified in the literature search, the factors are more related to the mothers' level of knowledge and awareness of the vaccines or the immunisation service. Cognitive factors also relate to the perception and belief that the mothers hold on these vaccines as well as the immunisation process itself (Regmi, 2014).

#### **2.2.1 Awareness and Knowledge of vaccines**

Mother knowledge of vaccines is one of the themes that came out from the literature review. Mother basic knowledge of vaccines is information that mothers have about the various vaccines provided, the vaccines purpose and timing/schedule of the vaccines. Vaccine knowledge has been acknowledge to affect the decisions by mothers to continue with child immunisation. Knowledge has also been related to awareness among mothers on the various vaccines (Tadesse et al. 2009, Tickner et al. 2006).

A case control study conducted by Tadesse and others. (2009) titled predictors of defaulting from completion of child immunization in south Ethiopia. The study focused on children in the age group of 9 to 23 months who did not complete the recommended immunization schedule. The study revealed that the knowledge about schedule of vaccines of mothers or immediate caretakers had significant association with completion of immunization. Mothers who knew the schedules of vaccine were 3 times more likely to vaccinate their children fully than a mother who did not know the vaccine schedule. Mothers or immediate caregivers who did not know the benefits of immunization in preventing the occurrence of epidemic were 6.4 times more likely to have defaulter children than mother who knew the benefits. Knowledge about measles and polio vaccines were also significantly associated with completion of child immunization after controlling for the effect of other variables (Tadesse et al. 2009)

Babalola (2011) conducted a survey to compare maternal reasons for non-immunisation and for partial immunisation in northern Nigeria, and determine the link between specific reasons and future intentions to immunise. Babalola acknowledged that lack of knowledge played a strong role in partial childhood immunisation. Further, novelty was also found to be a factor that affected immunisation uptake among caregivers (Babalola 2011). A survey of parental attitudes towards compliance with future vaccinations in the Dutch childhood immunisation programme found that of 283 parent participants, only 43% reported a positive attitude towards the vaccinations and 11% had no intention to comply with any new vaccination (Hak et al. 2005). Distrust of novelty needs to be determined so that parental concerns can be addressed appropriately. Further, in Australia, the main reasons parents gave for their children being incompletely immunised were lack of awareness that booster doses were required and parental indifference (Tickner et al. 2006).

Similarly, Tibin and others (2014) conducted a study on the reasons behind incomplete immunization in South Darfur state, Sudan. Face to face interviews with the parents of 213 children 12-23 months were conducted. It was established in the study that the reasons for non-immunization and incomplete immunization included that lack of information, for example, mothers unaware of need immunization and/or the need to return for 2nd or 3rd dose, mothers fear of side effects and wrong ideas about contraindications (Tibin et al. 2014). In South Australia, lack of information about the varicella vaccine constituted an important barrier to immunisation. Lack

of appropriate information also played an important role in missed or delayed Hib and MMR/measles vaccinations in Italy (Tickner et al. 2006).

Abdulraheem and Onajole (2011) conducted a study on the reasons for incomplete vaccination and factors for missed opportunities among rural Nigerian children. Only 14.1% of these mothers knew that the vaccination against childhood killer diseases should be completed at the age of nine months with the yellow fever and measles vaccines. Less than one-fifth of mothers knew that BCG is being given at birth while only 6% knew that Hepatitis B vaccine could also be given at birth and these mothers were the teachers and other educated staff of the LGA. Immunization was mentioned by 20.1% as a means of prevention against childhood killer diseases. Less than half of the mothers completed routine immunization schedules for their children by the age of 9 months because they knew that the vaccination against childhood killer diseases should be completed at the age of nine months (Abdulraheem & Onajole 2011). However, Adedire and others (2016) found that more than three-quarters of the mothers of children 12 – 23 months had good knowledge on routine immunization.

Tadesse and others (2009) found that mothers or immediate caregivers who did not know the benefits of immunization in preventing the occurrence of epidemic were more likely to have defaulter children than mother who knew the benefits. Mothers who had poor knowledge about the benefit of vaccines were more likely to have defaulter children than mothers who had good knowledge. Similarly, Favin and others (2012) in collaboration with WHO, analysed 126 global literature to identify reasons why eligible children had incomplete or no vaccinations. They found the lack of parental knowledge concerning which children, when, where was among the major reasons for defaulting on immunisation. Further, a high vaccination knowledge score, positive attitudes toward vaccination, good perception of immunization services, and the exposure to information on vaccinations, were all associated with complete vaccination status (Russo et al. 2015).

On the other hand, Bukenya (1998) in Favin and others (2012) found that very low levels of community knowledge and understanding of the ‘scientific’ foundation of immunization in Uganda, but over 90% of parents ‘believe immunization is important, there is good will in the midst of lack of knowledge.’ From a study in Rwanda, Habimana and Bararwandika (1991) concluded that ‘knowledge of vaccination on the part of parents is not an important factor in

vaccination coverage.’ Similarly, Leach and Fairhead (2008) reported that in the Gambia, ‘29% of urban and 48% of rural mothers could not correctly name any VPDs, yet reported national coverage was 90%.’ (Favin et al. 2012)

### **2.2.2 Perceptions and experiences with vaccine**

Childhood immunisation uptake can be motivated by mother or caregiver perceptions of physical risks associated with immunisation. Parental fear has emerged as a major barrier to achieving better immunisation uptake world over. Mother’s perception and experiences are basically what mother view and experience the vaccine to be, thus literature under this subtheme is focused on what mother’s perceived ideas of the vaccine and how it has affected immunisation dropout rates.

Tickner and others (2006) explored factors underlying suboptimal childhood immunisation. They conducted a review of Forty-seven studies that met the inclusion criteria. One reason identified for sub-optimal immunisation was the considerable controversy surrounding the triple vaccination against measles, mumps and rubella (MMR). Emotional factors, including anticipated responsibility and regret have also been found to be associated with their decision to accept MMR or to opt for single-antigen vaccines. Additionally, negative experiences with primary immunisation, coupled with a lack of perceived threat and severity of childhood diseases, may explain why some parents refuse or delay taking their children for later doses within the vaccination programme. (Tickner et al. 2006).

Conversely, a survey of mothers’ attitudes towards MMR vaccination found that fewer mothers of children approaching the second MMR dose (aged 21–35 months) intended to take their children for this injection than did mothers of children approaching the first MMR dose (aged 5–12 months). This means that mother who had experienced first dose immunisation did not want to take their child for the other dose hence leading to immunisation dropouts. The mothers of older infants expressed more negative beliefs about the outcome of having MMR, were more likely to believe it was unsafe and that it rarely protected against disease compared with mothers approaching the first MMR injection (Pareek & Pattison 2000).

Previous studies suggest that vaccination status is influenced by factors related to the child, parental attitude or knowledge, social context of the family. Reasons related to parental attitude or knowledge include lack of knowledge on the role of vaccinations for disease prevention, fear of adverse reaction, belief that vaccination is not beneficial or causes damage, lack of motivation,



mistrust of health care system and social or cultural pressure against vaccinations, Anti-vaccination attitudes could be attributed to ignorance, misinformation, irrationality (Tauil et al. 2016). Further, factors influencing vaccine uptake include vaccine hesitancy, defined as a lack of confidence in the safety and effectiveness of vaccines, and barriers to using available immunization services (Gilbert et al. 2017).

In New Zealand, parental fears and their active decisions not to vaccinate their children are sufficient to enhance immunisation dropout (Petousis-Harris et al., 2005). Elliman and Bedford (2003) and Hilton et al, (2006) as cited by Tickner et al. (2006) argued that parental fears stem from beliefs that combination vaccines place stress on the child's immune system and that increasing the number of combinations increases the likelihood of an adverse reaction, without knowing which component is responsible. Similarly, caretakers with negative perception towards vaccinating sick child were three times likely to have partially immunized children than those with a positive attitude. Development of abscess in the vaccination site of a child was less likely to be a factor for incomplete immunization of the child (Shrestha et al. 2016)

Favin and others (2012) found that parents commonly mention fear of side effects as a reason for not continuing vaccinating their children. In some cases, if an older sibling or acquaintance's child had side effects, parents refused vaccinations for younger children. Furthermore, some literature also reviewed that side effects become an issue when fathers or mothers-in-law become upset and refuse to allow further vaccination which lead to non-completion of child immunisation. Mothers fear some common vaccine side effects, even if they are advised of vaccine side effects. As a result, they may postpone, or not come back for, the next scheduled vaccination when they see common vaccine reactions. Furthermore, there was a marginal significant association ( $p\text{-value} = 0.05$ ) between a mother's perception about vaccine side effects and immunization status of children after adjusting for confounders (Negussie et al. 2016).

Additionally, a study on socio-cultural influences on vaccination-vaccinators perspective, revealed that communities and community leaders play a role in shaping the perception of the people. The people of the community are influenced by community leaders and these leaders. Although mostly positively influencing vaccination, some leader were neither encouraging nor discouraging immunisation (Regmi, 2014). Glatman-Freedman and Nichols (2012) notes that traditional healers often serve as primary health care providers in developing countries and mothers use their services

for paediatric care to various degrees. Traditional medicine may include herbal, spiritual or religious practices. A study done in Haiti found that the use of traditional healers by mothers was negatively associated with the vaccination rates of their children (Glatman-Freedman & Nichols 2012).

To summarise the cognitive factors affecting immunisation, the main issues coming out of the literature relating to the cognitive factors that is mothers awareness and knowledge of vaccine, which has to a greater extent, been found to be a significant factor affecting immunisation completion. However, it has been also reported in the literature, though to a lesser extent, that mother's knowledge of the vaccines did not affect the uptake of immunisation.

Another factor coming out from the review of literature is the perceptions and experiences mother have had with vaccines. Perception and belief emanate from cultures and various experiences (Regmi, 2014). These myths and beliefs about vaccines can be corrected through adequate information dissemination on these vaccines. The beliefs coming out from the literature are more experiential as they are 'physiologically' related to a child, that is the pain a child suffers after receiving a vaccine, or simply put the adverse effects following immunisation. This has greatly negatively impacted on continuation of immunisation. The literature does not clearly bring out the cultural beliefs deterring immunisation completion, this is the identified gap.

### **2.3 Socio-economic factor**

Socio-economic factors have been divide into the social factors and the economic factors affecting immunisation uptake. Socially mothers have a lot of responsibilities in their homes, they have to take care of the family, ensure the chores are conducted within the house and many other responsibilities. These responsibility have put mothers in a position where they have to decide between taking the child to health clinic and looking after their home.

Tadesse and others (2009) found that socio-economic factors were associated with childhood immunisation dropouts. Mothers with a higher monthly income were less likely to have defaulter children than mothers or immediate caretakers lower income. However, it was also found that demographic factors such as family size, age of the mother or immediate care taker, occupational status, ethnicity, religion, parity, and educational status were not associated with childhood immunisation dropouts.

In addition, Favin and others (2012) found that conflicting priorities among mother or caregivers was identified as a factor associated to immunisation dropout rates. It is difficult for poor parents to travel long distances and then wait for hours for vaccination, when they should be working to feed the family that day. In addition, ceremonial event like weddings and funerals in some countries last up to a week and lead mothers to miss vaccination appointments. In many traditional cultures, families refuse to take the baby out for vaccination during a period of post-partum seclusion. Tibin et al. (2014) like Favin et al. (2012) found that the reasons for non-immunization and incomplete immunization included, mother too busy, family problem including illness of mother. Other conflicting priorities mentioned are taking care of sick or other children, not being able to leave other children while traveling to get the younger ones vaccinated. Further, Shrestha and others (2016) also notes that primary caregivers who had conflicting priorities during the days of vaccination were less likely to complete vaccination of their children (Shrestha et al. 2016).

According to Leach (2006), mothers usually forgot about vaccination especially as they had more children. Also, numerous studies have documented service inaccessibility as an important cause of partial or under-vaccination. Studies conducted in Nigeria, Kenya, Liberia and Mozambique claimed distance/access as a problem (Sheldon and Alons, 2003). A Senegal study found that 71% of children completely vaccinated lived less than 10km from the nearest health centre, while in remote villages only 10% of children were completely vaccinated (Favin et al. 2012).

Favin and others (2012) notes a lack of resources/logistics as leading to immunisation dropout rate. Furthermore, Favin and others (2012) note that many studies indicated that vaccine stock-outs and/or cold chain problems caused unavailability of vaccination. Therefore, when parents miss work, travel long distances, wait for long hours, and then are denied service, they are naturally less likely to return for vaccination. Similarly, Tibin et al. (2014) found that the reasons non-immunized and partially immunized children according to mother's report included, place of immunization too far, time of immunization inconvenient, vaccinator absent, vaccine not available.

Socially, some husbands either prohibit their wives from taking children for vaccination or women themselves are not comfortable being attended by unknown men. Several sources mentioned that husbands might refuse permission for vaccination, particularly if the child previously had side effects (Favin et al. 2012).

In summary, the main economic factors coming out from the literature search is the priorities that mothers have to choose, that is between searching for a living to get some food on the table or to take a child to the clinic for immunisation. The literature however does not point out how and if the significant others or spouses support the mothers especially if they have to choose between the two activities. This has put most mothers on a tight position especially if they also have to take care of household chores. This study will aim to also probe on the help received from the significant others or spouses. Especially considering that, currently in Zambia male spouses are encouraged through not making them wait in line, to help bring their children for child health session including immunisation.

There are also social issues coming from the literature, these include the power relations between a mother and a father over what is best for the child. The overall decision is seemingly relying on a father in most conservative nation and mostly in rural Zambia. This can be seen by the husband refusing their wives to take the child to the clinic especially if they will be attended to by a male health worker. These is a cultural concepts that will be explored in this study.

## **2.4 Demographic factors**

Demographic factors are characteristics of the populations studied in the literature reviewed and how these factors have affected immunisation. These factors include mother's age, education, income, family size and also the child's age and sex.

Child birth order was also identified to be a factor that was associated with incomplete immunisation. Negussie and others (2016) looking at factors associated with incomplete childhood immunization in Arbegona district, southern Ethiopia found that child birth order was found to be associated with immunization incompleteness; being second to fourth in the family and being fifth and above in the family had a higher likelihood to default than being born first. In another study, it was found that a child born third or above in order was twice likely to receive partial immunization than the former (Shrestha et al. 2016). Similarly, Children born at health facilities had a higher immunization coverage rate compared with those born at home, as well as children who were the 1st-2nd born in the family compared with those being the 3rd or later born (Russo et al. 2015).

Furthermore, the risk of defaulting their child's vaccine series was higher in younger mothers than older mothers (Negussie et al. 2016). Also, having a mother  $\leq 24$  years- old was a factor associated

with incomplete child immunisation. Children with younger mothers were less likely to be fully immunised (Russo et al. 2015). Adedokun and others (2017) conducted a study titled incomplete childhood immunization in Nigeria: a multilevel analysis of individual and contextual factors. Children of young women (15–24 years) are more likely to be incompletely immunized when compared with children of older women (35 years and above)

Additionally, the level of a mother education is also identified as a factor associated with incomplete child immunisation. The odds of a child not being fully immunized reduced as the level of mothers' education increased. Children of mothers with no education and primary education are more likely to be incompletely immunized compared with children of women with secondary or higher education (Adedokun et al. 2017).

## **2.5 Service related factors**

The services offered by the health facilities contribute to the uptake of immunisation services. These are the service related factors that affect immunisation uptake, these range from the way the staff treat the mothers to waiting time.

Differences in the way the immunisation service is organised may explain why some mothers or caregivers opt not to continue with their child's immunisation.(Tickner et al. 2006). Poor health staff motivation, performance or competence and attitudes affects immunisation uptake (Leach and Fairhead, 2008). AlConde SA, (2002) and Favin et al. (2012) both explained that attitudes and behaviour of health staff treating mothers in an unfriendly, disrespectful, or even abusive manner are frequently cited as discouraging children's vaccination. Health staff reportedly screamed at mothers who forgot the child's card, missed a scheduled vaccination appointment, or had a dirty, poorly dressed, or malnourished child. Mothers felt humiliated and discouraged from returning. Also, lack of availability of vaccine at time of visit as Tadesse et al. (2009) points out that mothers who did not postpone vaccination schedule were times less likely to have defaulter children as compared with mothers who ever postponed vaccination schedule. Nonetheless, length of waiting times before being attended to at the health facility have been cited as factors leading to immunisation drop outs.

Further, bias among professionals has also been highlighted as an area of particular concern among parents considering MMR vaccination and those refusing to have their children immunised. Some parents believe that health education leaflets exaggerate the efficacy of vaccines. It is likely that

issues of trust and parental satisfaction with the amount and quality of information received will be important in determining whether or not parents take their children for all (Tickner et al. 2006). Additionally, Tadesse and other (2009) found mothers who had negative perception towards health institution support were more likely to have defaulter children than mothers with positive attitude.

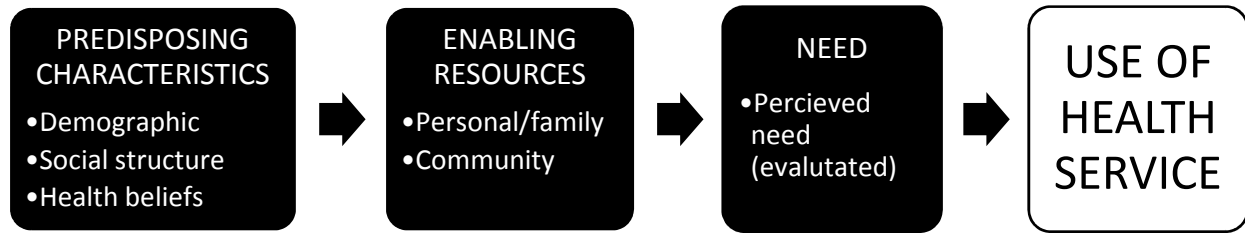
Furthermore, Habimana and Bararwandika (1991) discovered in a study that there were false contraindications that were held by health workers. A major cause of missed opportunities is health workers' refusal to immunize eligible children. Behind this are various fears and false beliefs such as that a sick child should not be vaccinated, that a child should not receive multiple vaccinations on the same visit, that a child over 12 months is 'too old' for measles vaccination, or that underweight children should not be vaccinated.

Finally, Favin et al. (2012) notes that the most literature reviewed documents offered limited findings on reasons for non-vaccination versus incomplete vaccination, this is also prevailing in this study. However, most of the evidence suggests that children having no vaccinations appears to be associated with: difficult access, inconvenient hours, negative beliefs or rumours or misinformation, and minority status; whereas the main reasons for incomplete vaccination which is the focus of the study appear to be: poor treatment/bad experiences, missed opportunities, fears (of side effects, abusive treatment), and lack of understanding of the need to return or when. Furthermore, most of the studies in the literature search employed quantitative methods, this study will however employ a mixed method, and this will help filling in some of the information gaps through the qualitative approach employed in this study. Information relating to social and cultural constructs such as perception and beliefs will benefit better from the qualitative approach.

## **2.6 Conceptual framework**

### **Andersen and Newman Framework of Health Services Utilization**

This research study has adopted Andersen and Newman framework of health services utilization. The purpose of this framework is to discover conditions that either facilitate or impede utilization of a health service. According to Andersen (1968) an individual's access and use of health services is considered to be a function of three characteristics/factors, namely the Predisposing characteristics, Enabling factors and Need factors.



*Figure 1: Graphic presentation of conceptual framework model*

### **2.6.1 Predisposing characteristics**

Predisposing characteristics are the socio-cultural characteristics of individuals that exist prior to utilizing immunisation. This category represents the tendency of individuals to utilize the immunisation services. According to Andersen, an individual is more or less likely to use health services based on demographics, position within the social structure, and beliefs of health services benefits. In this case mother who believe immunisation is a useful measure to protect their children will take up the immunisation service. Social structure like education, occupation, ethnicity, social networks, social interactions, and culture affect the utilisation of the immunisation service.

Andersen also highlighted health beliefs like attitudes, values, and knowledge that people have concerning and towards the health care system will affect the utilisation of the immunisation service. Mothers have a lot of beliefs, myths and misconceptions about vaccines and this has affected its uptake of immunisation services. Further, demographics like age and gender have also been seen to influence immunisation uptake. The predisposing characteristics will information the socio-cultural factors which includes perceptions and beliefs of the study.

### **2.6.2 Enabling Factors**

This category includes resources found within the family and the community, it is more of the logistical aspects of child immunisation services. Family resources comprise economic status, these are the means and know how to access immunisation services, income, health and the location of residence. This can also be how the mother or caregiver gets to the health facility to access these immunisation services. Family factors can also include genetic factors and psychological characteristics especially underlying family beliefs for example Autism as resulting from immunisation. Community resources incorporate access to health care facilities and the availability of health persons for assistance, the waiting time. This also hinges on the satisfaction of with the immunisation services provided. This component of the framework will inform economic status objective.

### **2.6.3 Need Factors**

Need based characteristics is the third category that includes the perception of need for immunisation services, whether individual, social, or clinically evaluated perceptions of need. Perceived needs are basically how people view their own general health and functional state, as well as how they experience symptoms of illness, pain, and worries about their health and whether or not they judge their problems to be of sufficient importance and magnitude to seek professional help. Perceived need for immunisation will better help to understand completion of immunisation as well as adherence to immunisation. Mother knowledge as well as understanding of the purpose of child immunisation has greatly affected its uptake, literature has suggested that mothers lack the necessary knowledge about vaccine to decide on whether or not to complete immunisation.

Finally, the framework bring out aspects of the objectives which will be addressed in this research. For example, predisposing factors like education of mothers will be explained based on this framework, demographic factors like age will also be captured in the framework of this study. Enabling factor like family structures and resources is among the major contributor of immunisation uptake, mothers usually take responsibility of a home and significant others also contribute to the availability of a mother to take the child to health centre. Lastly, the need factors is also paramount to this study, in that mothers need to firstly be aware about these vaccine and after the awareness, mothers should be able to understand the importance of the vaccines. This will in turn result into a necessity of the vaccines hence the need for the vaccine will arise. The need for vaccines will be influenced by the perceptions and beliefs mother hold about these vaccines.



## **CHAPTER 3: METHODOLOGY**

### **3.1 Introduction**

The following section presents the methodological approaches used in the study. The section describes the population in the study, the study site and the data collection and analysis methods involved.

### **3.2 Study Design**

The study employed a concurrent mixed method design where both quantitative and qualitative methods were used. The concurrent mixed method in this particular study ensured completeness of the study, in the sense that this design can bring together a more comprehensive account of the factors associated to incomplete Immunisation.

The quantitative cross section design data was secondary data which was obtained from the Gavi Full Country Evaluation (FCE), Household Survey that was conducted in 2014/15 by The University of Zambia, Department of Economics. The primary objective of the Household survey was to establish baseline household estimates of immunization coverage in Zambia. On the other hand, the qualitative approach was used to explain and understand in depth some of the factors associated with incomplete child Immunisation. The qualitative approach involved collecting data through Focus Group Discussions (FDGs) and Key Informant Interviews (KIIs) to help explain issues that affect immunization uptake. The qualitative approach will be a case study.

### **3.3 Study site**

The Gavi FCE household study, where the quantitative data was drawn from, focused on 26 districts in Zambia. The quantitative approach of this study focused on all the 26 selected districts. On the other hand, the study site for the qualitative approach was Lusaka district, and all the community sites selected in the Gavi FCE household survey. The sites/communities are Kamwala, Mandevu, Mtendere, Matero, and Kanyama. These sites were purposively selected to overlap with the Gavi FCE household survey. This was to give a comprehensive view of Lusaka district.

### **3.4 Study population**

The Gavi full country evaluation household survey study population consisted of mothers/primary caregivers of children aged 0 – 59 months. The respondents were women in the reproductive age

group. This study however, only focused on mothers with children who were aged 12-59 months for the quantitative approach.

Similarly, for the qualitative approach, the study population included mothers/caregiver with children aged 12-59 months, the age bracket 12-59 months was selected because at this age a child is expected to have received all the vaccines on the schedule. Furthermore, these were mothers identified by the community health workers, these mothers were not consistently bring their child for immunisation based on their child under 5 cards.

### **3.5 Sampling and Sample Size**

Cluster sampling within the 26 districts was conducted with clusters defined using the 2010 census Standard Enumeration Areas (SEAs). Approximately seven clusters (SEAs) per district were selected, with seven households per cluster for a total sample size of 1,099 households. Of the 1,099 households sampled, 1,070 completed interviews were received– A response rate of 97%. Households with mothers who have children aged 0 to 59 months from the selected districts was the sampling frame. This study used the whole sample size used in the household survey.

For the qualitative data, Lusaka district was purposively selected as it is part of the sampled districts in the Gavi Full Country Evaluation Household survey conducted. The sample size was all the 5 communities where the household survey was conducted. The 5 communities were selected to overlap with the visited facilities in the household survey. The mothers were purposively sampled to fit the criteria of mothers who were inconsistent with immunisation and with children aged 12-59 months. These mothers were selected because it is expected that by that age a child would have completed the child immunization schedule according to WHO guidelines. The health workers and the community health worker helped to identify these type of mothers using their records and the child's under-five card. Community health workers at the selected health facility were part of the study as well. This is because the community health workers are the ones that are on the ground in the community and know mothers that are inconsistent with immunisation, also because the community health workers are the ones that conduct socio mobilization activities for immunisation. A total number of 5 Focus Group Discussion (FGDs) - 1 from each site was conducted at the facility, 5 Key informant interview were also conducted with the community health workers at each health facility by the researcher.

### 3.6 Data Collection

The Household survey data set was available in excel format, the variables of interest were extracted by dropping out the variables not relevant to the topic under investigation. The data set was then saved into Stata format for analysis. The variables of interest are indicated in the table below and have been identified from the Gavi household survey questionnaire as relating to the study topic. These variable were manipulated to suit the objectives of the topic under investigation. The manipulation of variables involved categorization of continuous variables, variables that also had multiple responses and Likert scales were categorized.

*Table 1: The quantitative variables identified.*

<b>Outcome - Dependent Variable</b>	
<b>Variable name</b>	<b>Variable definition</b>
Fully immunised	Completion of the immunisation Schedule- 0= No 1=Yes
<b>Explanatory- Independent Variables</b>	
<b>Variable name</b>	<b>Variable definition</b>
Mothers Education level	0 = No education 1 = Primary 2 = Secondary 3 = Tertiary
Mothers / caregivers Age	1= Less than 20 2=21-40 3=41-60 4=61 and above
Sex of head of household	0=Male 1=Female
Child sex	Female Male
Child age	0=12-23 1=24-35 2=36-47 3=48-59
Number of children living in the household aged 0-59 months	0=0-4 1=5-8 2=9 or more
Religious affiliation	What is your religion? 1=Catholic 2=Protestant 3=Muslim and others

Knowledge about Vaccines	Mothers know at least one vaccine 0=No 1=Yes
	Mothers know all vaccines 0=No 1=Yes
	Vaccine purpose-To prevent the child from getting a disease 0=No 1=Yes
	Vaccine purpose- To keep the child healthy 0=No 1=Yes
	Vaccine purpose-To cure disease 0=No 1=Yes
	Vaccine purpose-To save the child from paralysis 0=No 1=Yes
	Vaccine purpose-To save the child from death 0=No 1=Yes
Experience with services at health facility	Satisfaction with service 1=Unsatisfied 2=Neutral 3=Satisfied
	Respect received at facility 1=Disrespected 2=Neutral 3=Respected
	Waiting time at the facility 0=Up to 1 hour 1=More than 1 hour
	Rate the facility 1=Bad 2=Moderate 3=Good
	Experienced attempted failed visit to the facility for immunisation last 6months 0=No 1=Yes
	Number of unsuccessful attempts 0= 0-3 1= 4-7
	Did you face any difficulties in vaccinating your child during this last visit 0= No 1= Yes
	When is vaccination offered 0=Only at certain times 1=Always

Form of transportation	Mode of transport to facility 0=Walking 1=Other transport means
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On the other hand, focus group discussion (FGD) and key informant interviews (KIIs) were conducted by the researcher using a FDG topic guide and KII topic guide. A total of 5 FDGs were conducted by the researcher, each FDG had an average of 7 mothers participating. FDGs are a good way to gather together people from similar backgrounds or experiences to discuss a specific topic of interest, in this case the factors associated to incomplete immunization. The FDGs allowed the mothers to agree or disagree with each other about the range of opinion and ideas on immunization, and the inconsistencies and variation that exists in a particular community in terms of immunization beliefs and their experiences and practices. Further, 5 KIIs were conducted with the community health workers. KIIs informed the study also about the factors to incomplete immunization as it involves interviewing of knowledgeable participants who interact with the mothers in this case the health workers. Key informant interviews were conducted with the community health worker who know their communities well, and have the skills to work with the mainstream culture, and provided the information needed on immunization uptake. KIIs and FDGs help explain in depth the factor associated with incomplete child immunisation as given by the health workers and mothers respectively.

### **3.7 Data management and analysis**

The extracted data set was cleaned in excel and exported to Stata version 13 for analysis. The data variables were adjusted to meet the objectives of this research, for example some variables were recategories. Some continuous variables of interest were categorised. Firstly, descriptive statistics were produced to highlight the number of children with incomplete immunisation as well as complete immunisation, the age distributions of the mothers and all the demographic aspects have been presented graphically and table formats. Thereafter, the bivariate logistic regression analysis was run to test for association of the predictor variable with outcome variables considering 95% confidence interval. Lastly backward-stepwise multivariate logistic regression was conducted to measure association of the outcome variable - children fully immunization verses those with incomplete immunization against the predictor variables. This involved running multivariate logistic regression with all the predictor variables and the outcome variable and using elimination

method to remove the variables that were not significant. Some variable were also left out due to the low response rate in the variables as this would affect the results. Finally, the best fit model was reached to explain the factor leading to incomplete child immunisation. Odds ratios are reported with cut off point for significance P value 0.05 at 95% CI.

Thematic analysis was used to analyse the qualitative data. The qualitative data from the FGDs and the KIIs was in the form of field notes and audio recordings.. Immediately after the field visits, the notes were consolidated by transcribing the audio recorded interviews and discussion sessions into a typed word document. Each facility was assigned an alphabetical letter and each mother in the FDG was randomly assigned a number. Community health workers were also assigned numerical unique identifiers. The researcher familiarize themselves with the data so as to identify the emerging themes. Themes were developed with various identification codes which were then pulled out from every typed interview and discussion notes. Quotes have been used to explain the various theme identified in the interview notes. The table below shows the themes, category and codes identified.

*Table 2: Themes identified from the interviews*

Theme	Category	Examples of codes
Reasons for incomplete child immunisation	Mother's knowledge on vaccination <ul style="list-style-type: none"> <li>Naming vaccines</li> <li>Purposes of vaccines</li> </ul>	There is BCG, Rota.... The purpose of the vaccine is to protect the child from disease
	Mother's perception, myths and beliefs of vaccines <ul style="list-style-type: none"> <li>Religious and ethnic beliefs</li> <li>Mistrust on vaccines</li> <li>Olden days growing up was without vaccines</li> <li>Use of tradition medicine</li> </ul>	We are told at church that vaccines are not good.
		Our belief from the leaders in the community say not to use vaccines
		Vaccines can make the child lame
		Vaccine make the child sick
		People in the olden days have survived without vaccines
		Some mothers opt to use tradition medicine in the place of vaccines
	Mother's negligence	Some mothers are lazy
	Mothers lack of understanding the importance of immunisation	Some mothers do not appreciate vaccines because they do not know the importance
	Mother's lifestyle - Alcohol abuse	Mothers have drinking habits that inhibits immunisation completion

	Birth order	Children born after other children within the same family tend to receive less attention with regards to immunisation
	Other competing priorities	Mothers have a social engagement plan on the same day of immunisation
		Mothers have to work
		Mothers travel for funeral or business
	Lack of transport money to facility	Mothers lack of money for transport to get to the facility
	Experiences with immunisation services <ul style="list-style-type: none"> <li>• Child adverse reaction to vaccine</li> <li>• Health worker attitude towards mothers</li> <li>• Time spent waiting for immunization</li> </ul>	Childs has reaction after vaccination such as high temperature, develop body rushes, loss of appetite.
		Health workers shouting, scolding and sending away mothers during immunisation
		Long queue waiting to receive a vaccine
Reasons for completion of immunisation	Care and love for the child	Mothers love their child that why they complete immunisation
	Under-five care as a requirement for school enrolment	Mothers believes that under-five cards are a school requirement for enrolment
	Reinforcement and gifts received by consistent mothers	Mother also hope to be recognised for completing immunization.

### 3.8 Merge of Quantitative and Qualitative data

As indicated above, the study employed a concurrent mixed method design and therefore the quantitative and the qualitative approaches all had an equal significance. Similarly, the quantitative data was aimed to measure the associated factors to immunization incompleteness, using bivariate and multivariate logistic regression and a best fit model established. Thus, the qualitative data from the FDGs and KIIs helped to complete as well as explain some of the factors associated to immunization in-depth. FGDs were used to explore in-depth the meanings of the factors that cannot be explained statistically such as perceptions, beliefs and attitudes, related to incomplete immunization. Key informant interviews helped to explore the research subject in depth by interviewing key people on the ground, that is, the health worker and community health worker. Ultimately, the quantitative and qualitative data result were presented separately with each other according to similar or related themes. Although the discussion section discussed the result simultaneously.

### **3.9 Ethical consideration and consent**

#### **Potential risks to participants**

The risk to participants from taking part in the FGDs or KIIs of the study was minimal. Potential harm include anxiety, stress, fatigue result from research possible from among mothers who have not completed their children's immunisation schedules.

#### **Potential intrusion on privacy**

There was little to no intrusion of privacy on the mothers and the community health workers. Child immunisation may not be a sensitive matter that can affects ones privacy. The possible privacy intrusion situation is where mothers are uncomfortable with revealing their children's immunisation status. Revealing of a child's immunisation was emphasised in the discussions. Mothers were hesitant to speak about the health care worker attitude towards them. Some mothers were also hesitant to review their age. However, the mothers were assured that this was purely confidential and anything they said will be kept with utmost privacy and nothing will identify who said what.

#### **Confidentiality of respondent's information**

A high level of confidentiality was strictly adhered to in handling the data from the study. Names of individual respondents were not captured but mothers were assigned unique identifiers. Unique identification (ID) numbers were assigned to each respondent, and these IDs have been used in the analysis. Anonymity was maintained. The naming convention used was such that the first sight visited was labelled A, the second B and so on. Mothers where assigned numbers.

#### **Approvals- Informed consent procedures**

The protocol to the report and the informed consent documents were be submitted to UNZABREC for ethical clearance, the study was approved by UNZABREC. Permission to use the quantitative Household data was obtained from the Principal investigator of the Gavi full country evaluation project, the permission was also granted. Permission to visit health facilities was be sought and granted by the Ministry of Health, through the Nation Health Research Authority. At facility level permission was also sought from the in charge of these health facilities, the permission here was also granted.

Before conducting the FDGs or KIIs, consent was sought from the mothers and the health worker present at the facilities. The informed consent sheet and information sheets containing all of the information the respondent needed to make an informed decision about whether or not to



participate in the study were made available to the participant. The informed consent was translated in the appropriate language that the participant's understand which was mostly English, Nyanja and Bemba. If a study participant was unable to read or write, their fingerprint was substitute for a signature.

**Potential benefits to participants**

There were no potential direct benefits to the study participants. The study participant only received a snack in form of biscuits and a drink/water each during the FDGs and KIIs. The results coming out of the study shall be shared with the Ministry of Health, the Health facilities interviewed as well as other interested parties, and this study may potentially benefit the Ministry of Health and health facilities as it will inform them on the factors associated to non-completion of child immunisation.

## CHAPTER 4: QUANTITATIVE RESULTS

### 4.1 Introduction

The following section presents the results from the analysed secondary data from Gavi FCE household survey data that have been analysed using Stata.

### 4.2 Demographic Factors

Table 3 below shows the demographic distribution of the respondents in the frequency and percent column. From the table, the majority of the mothers interviewed were aged 21-40 years old (68.4%). Only 4 mothers who were below the age of 20 years. The sex of the head of the house is also presented below, more than half (58.6%) of the households were headed by males, and 41.5% households were female headed. Child sex was split into almost half were the males were 51.8% and females were 48.2%. The age of the children ranged from 12 months to 59 months, with 26.1% aged 12-23 months, 26.4% aged 24-35 months, 24.6% aged 48-59 months and 22.9% aged 36-47 months old. The number of children living in the household is presented in the table below, the majority of the number of children from 0-4 children living in the household represented by 69.5%. The number of children 5-8 were 28.3% while only 9 or more children lived in 2.1% of the household represented. The majority of the mothers interviewed had primary school level education (44.9%) while 37.4% had attained secondary level education and only 3.1% had attained tertiary level education, the rest 14.6% stated they had no education at all. Most of the respondents interviewed were Protestants with 73.3% while 16.7% were catholic and 9.9% were Muslims and other religions.

The table 3 below also shows bivariate logistic regression model of demographic factor against the outcome variable fully immunised in the column crude odds ratios (OR), with P value and confidence intervals (CI). Only child age, mother's level of education and religion were significant as shown in bold. From the table, mother's level of education category secondary education was significant with p value less than 0.05 at 95% confidence interval. This means that mothers who attained secondary level education were 2.4 times more likely to have their children fully immunised than mother who had no education at all (OR 2.4, 95%CI, 1.14-5.05). Religion also attained significance with the category protestants. Protestant mothers were 2 more times likely to have their children fully immunised than catholic mothers (OR 1.74, 95% CI 1.09-2.74). Furthermore, child age was also significant, as the age of the child increases. Children who were

aged 36-47 months old were 51% less likely to be fully immunised than children aged 12-23 months old ( $P<0.05$ , OR 0.49, 95% CI, 0.25-0.95). Further, children aged 48-59 months old were 61% less likely to be fully immunised than children aged 12-23 months old (OR 0.39, 95% CI 0.23-0.67)

*Table 3; Demographic factors associated with incomplete immunisation*

Predictor variable	Category	Freq.	Percent	Crude OR	P value	CI
<b>Mothers age (yrs.)</b> ( <i>n=785</i> )	≤ 20	4	0.51	1		
	21-40	537	68.41	1.3	0.798	(0.18-9.48)
	41-60	197	25.1	0.74	0.768	(0.09-5.59)
	≥ 61	47	5.99	0.33	0.306	(0.40-2.77)
<b>Head household sex</b> ( <i>n=1047</i> )	Female	434	41.45	1		
	Male	613	58.55	1.03	0.893	(0.69-1.53)
<b>Child sex</b> ( <i>n=1047</i> )	Female	542	51.77	1		
	Male	505	48.23	0.83	0.268	(0.59-1.15)
<b>Child age (mnths)</b> ( <i>n=1047</i> )	12-23	273	26.07	1		
	24-35	276	26.36	0.69	0.274	(0.35-1.35)
	36-47	240	22.92	<b>0.49</b>	<b>0.036</b>	<b>(0.25-0.95)</b>
	48-59	258	24.64	<b>0.39</b>	<b>0.001</b>	<b>(0.23-0.67)</b>
<b>Education level</b> ( <i>n=1047</i> )	No education	153	14.61	1		
	Primary (1-7)	470	44.89	1.89	0.071	(0.95-3.77)
	Secondary (8-12)	392	37.44	<b>2.4</b>	<b>0.021</b>	<b>(1.14-5.05)</b>
	Tertiary	32	3.06	2.52	0.083	(0.88-7.21)
<b>No. of children</b> ( <i>n=942</i> )	0-4	655	69.53	1		
	5-8	267	28.34	0.84	0.567	(0.48-1.50)
	9 or more	20	2.12	0.59	0.462	(0.14-2.43)
<b>Religion</b> ( <i>n=1016</i> )	Catholic	170	16.73	1		
	Protestants	745	73.33	<b>1.74</b>	<b>0.019</b>	<b>(1.09-2.74)</b>
	Muslim and others	101	9.94	1.47	0.289	(0.71-3.02)

### 4.3 Knowledge levels on immunisation

Table 4 below shows the mother's level of knowledge around immunisation. The majority of the mothers knew at least one type of vaccine was represented by 98.5% while only 1.5% did not know any vaccine. Further, mothers who knew all the vaccines were 48.2% and 51.8% stated they did not know all the vaccines. The purpose of vaccine to prevent disease was affirmed by 86.3% of mothers while 13.7% declined that as a purpose of vaccination. The purpose of vaccination was to save the child from death was declined by 96.2% while 3.8% of the mothers indicated that the purpose of vaccination was to save their child from death. The purpose of vaccine to keep child health was affirmed by 24.1% and 75.9% declined that as a purpose for vaccination. Curing disease as a purpose for vaccination was declined by 90.9% while 9.1% affirmed. The purpose saving child from paralysis was declined by 94.8% while 5.2% of the mothers affirmed that as a purpose. The table also shows the bivariate logistic regression of mother's knowledge on immunisation against full immunisation. None of the variables were significant at 95% CI.

*Table 4: Knowledge factors associated with incomplete immunisation*

Predictor variable	Category	Freq.	Percent	Crude OR	P value	CI
<b>Mothers know at least one vaccine (n=1017)</b>	No	15	1.47	1		
	Yes	1002	98.53	0.84	0.804	(0.19-3.48)
<b>Mothers know all vaccines (n=1017)</b>	No	527	51.82	1		
	Yes	490	48.18	0.7	0.164	(0.43-1.15)
<b>Vaccine purpose - prevent the child from getting a disease (n=1017)</b>	No	139	13.67	1		
	Yes	878	86.33	1.11	0.722	(0.62-1.98)
<b>Vaccine purpose - save the child from paralysis (n=1017)</b>	No	978	96.17	1		
	Yes	39	3.83	1.12	0.822	(0.42-2.98)
<b>Vaccine purpose - cure disease (n=1017)</b>	No	925	90.95	1		
	Yes	92	9.05	0.61	0.13	(0.33-1.15)
<b>Vaccine purpose - keep the child healthy (n=1017)</b>	No	772	75.91	1		
	Yes	245	24.09	1.29	0.425	(0.69-2.41)
	No	964	94.79	1		

<b>Vaccine purpose - save the child from death (<i>n</i>=1017)</b>	Yes	53	5.21	0.87	0.861	(0.17-4.21)
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#### 4.4 Experience with immunisation

Table 5 below shows the various experiences mothers have with the immunisation services. Most mothers (81.5%) indicated they were satisfied with the treatment received, while 7% were not satisfied and 11.5% were neither satisfied nor unsatisfied. However, 64.3% of the mother felt they were treated with respect at facility and 11% felt disrespected. Only 24.7% felt neither respected nor disrespected. Waiting time at the facility of up to an hour was reported by 57.4% of the mothers while 42.6% reported to have been at the facility for more than an hour. Mothers were asked to rate the facility, and 54.5% rated the facility as good, 17.4% indicated it was bad and 28.1% rated the facility moderate. 73.9% of mothers indicated they experienced attempted failed visit to the facility for immunisation last 6months and 26.1% did not have this experience. 91.2% of mothers indicated they had made 0-3 unsuccessful attempts while 8.8% had made 4-7 unsuccessful attempts to have their child immunised. 75.5% indicated they did not face any difficult during last vaccination and 24.5% indicated they had faced difficulties. Walking was the major means of transport mothers used to go the facility as represented by 88.9% while 11.1% used other means of transport. Immunisation was reported to be offered only on certain times by 66.7% of the mothers and 33.3% reported that immunisation was always offered.

Table 5 below also shows a binary logistic regression between the variable on the experiences with immunisation service that mothers have had against fully immunised. The variable ‘vaccination offered’ was significant. Mother who had vaccination always offered at their facilities were 35% less likely to have their children fully immunised than mothers who had immunisation at their facilities only offered at certain times (OR 0.63, 95% CI 0.45-0.93). The variable ‘transport means’ to the facility was significant as shown in bold in table 5 below. Mothers who had other means of transport to get to the facility were 43% less likely to have their children fully immunised than mothers who walked to the facility (OR 0.57, 95% CI 0.35-0.94).

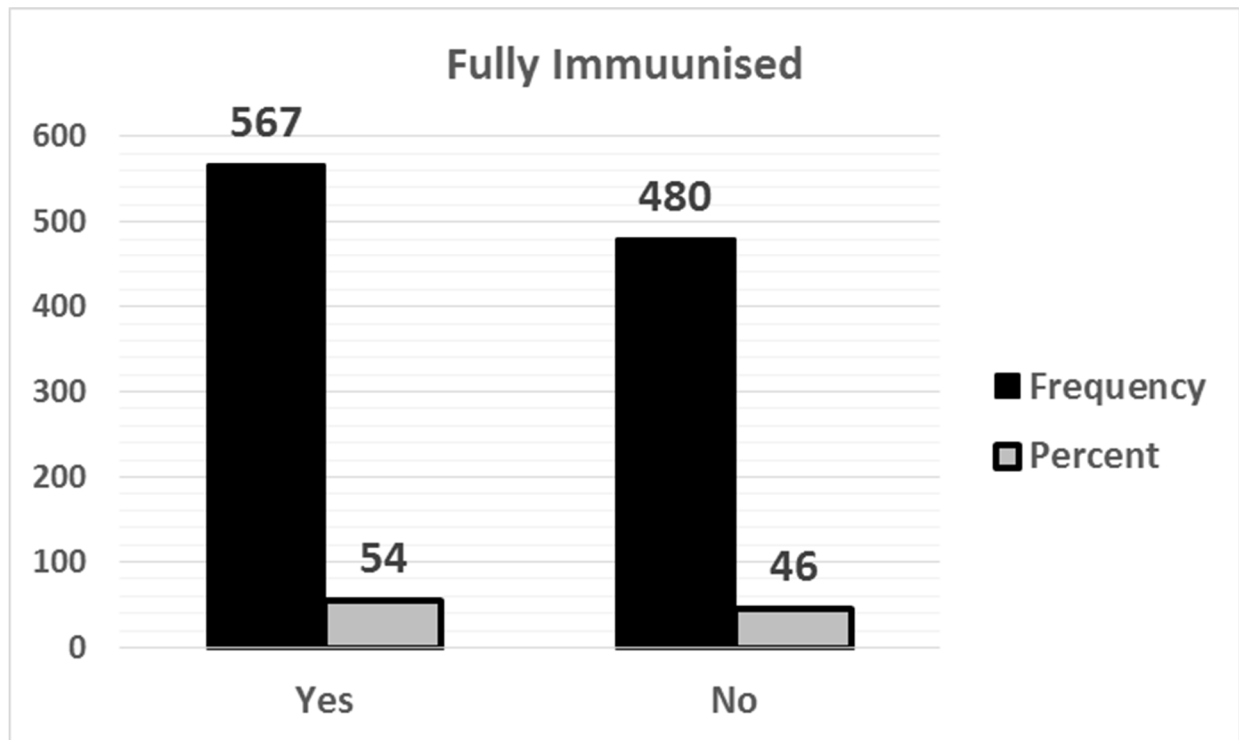
Table 5: Immunisation service experience factors associated with incomplete immunisation

Predictor variable	Category	Freq.	Percent	Crude OR	P value	CI
<b>Satisfaction with service (n=966)</b>	Unsatisfied	68	7.04	1		
	Neutral	111	11.49	0.51	0.243	(0.17-1.57)
	Satisfied	787	81.47	0.75	0.481	(0.32-1.51)
<b>Respect received at facility (n=966)</b>	Disrespected	106	10.97	1		
	Neutral	239	24.74	1.005	0.988	(0.51-1.97)
	Respected	621	64.29	1.4	0.339	(0.72-2.57)
<b>Waiting time at the facility (n=411)</b>	Up to 1 hour	236	57.42	1		
	More than 1 hour	175	42.58	0.86	0.67	(0.42-1.73)
<b>Unsuccessful attempts (n=251)</b>	0-3	229	91.24	1		
	4-7	22	8.76	0.3	0.268	(0.04-2.53)
<b>Vaccination offered (n=918)</b>	Only at certain times	612	66.67	1		
	Always	306	33.33	<b>0.65</b>	<b>0.018</b>	<b>(0.45-0.93)</b>
<b>Rate the facility (n=959)</b>	Bad	167	17.41	1		
	Moderate	269	28.05	1.62	0.095	(0.92-2.85)
	Good	523	54.54	1.38	0.27	(0.78-2.45)
<b>Experienced attempted failed visits to the facility (n=1029)</b>	No	760	73.86	1		
	Yes	269	26.14	0.99	0.945	(0.71-1.37)
<b>Face difficult during last vaccination (n=416)</b>	No	314	75.48	1		
	Yes	102	24.52	1.17	0.626	(0.62-2.20)
<b>Transport means (n=966)</b>	Walking	859	88.92	1		
	Other means	107	11.08	<b>0.57</b>	<b>0.027</b>	<b>(0.35-0.94)</b>

#### 4.6 Immunisation coverage

Figure 2 above show the immunisation coverage according to WHO guidelines of full immunisation. 54% of children aged 12-59 months were fully immunised while 46% of children aged 12-59 months were not fully immunised.

*Figure 2: Immunisation coverage for children aged 12-59 months*



#### 4.7 Multivariate analysis of the factors associated with incomplete child immunisation

The table 6 below shows the multivariate logistic regression of the factors associated with incomplete child immunisation after adjusting for the following variables; Respect received at the facility, Attempted failed visit to facility in the last 6 months, Number of unsuccessful attempt to have child immunised, Waiting time at facility, Faced difficulty during last vaccination session, Vaccine purpose-prevent disease and Vaccine purpose- save child from paralysis. The columns frequency, percent and crude OR have been added from the bivariate analysis. The columns adjusted OR (AOR), P value and CI are from the multivariate analysis.

Table 6 below shows that mother's age was significant with 2 age groups categories. Mothers who were aged between 41-60 years old were 88% less likely to have their children immunised than mothers who were less than 20 years old (AOR 0.12, 95%, CI 0.02-0.66). Also, mothers who were 61 and above were 91% less likely to have their children immunised than mothers who were aged less than 20 years (AOR 0.09, 95% CI 0.01-0.56). Child age retained its significant at both bivariate and multivariate analysis. Children who were aged 36-47 months old were 56% less likely to be fully immunised than children aged 12-23 months old (AOR 0.44, 95% CI, 0.24-0.82). Children aged 48-59 months were 61% less likely to be fully immunised than children aged 12-23 months (AOR 0.39, 95% CI, 0.15-0.47). Furthermore, male headed households were 2 times more likely to be fully immunised than female headed households (AOR 2.3, 95% CI, 1.15-4.79). Mother's level of education also retained significance in the education category secondary level. Mothers who had attained secondary level education were 3 times more likely to have their children fully immunised than mothers who had no education (AOR 3.3, 95% CI, 1.46-7.34). Further, mothers who had attained tertiary level education were 16 times more likely to have their child fully immunised than mothers who had no education (AOR 16.1, 95% CI, 2.84-91.39). Knowledge plays a role in immunisation uptake could be negative or positive, mother who knew all the vaccine were 45% less like to have their children fully immunised than mother who indicated they did not know all the vaccine (AOR 0.55, 95% CI, 0.33-0.93).

Satisfaction with the immunisation service received was significant with 2 categories. Mothers who were neither satisfied nor unsatisfied with the immunisation service were 75% less likely to have their children fully immunised than mothers who were unsatisfied with the immunisation service received (AOR 0.25, 95% CI, 0.07-0.86). Mother who were satisfied were 67% less like to have their children fully immunised than mothers who unsatisfied (AOR 0.33, 95% CI, 0.12-0.90). Facility vaccination times also retained significance at bivariate and multivariate logistic regression. Mother who stated that their facility always offered vaccination at any day were 47% less likely to have their child fully immunised than mothers who indicated that vaccination was done only at certain times (AOR 0.53, 95% CI, 0.32-0.87). Transport means to get to the facility for immunisation was also significant at both level of analysis. Mothers who used other means to



get to the facility were 74% less likely to have their child fully immunised than mothers who walked to the facility (OR 0.26, 95%CI, 0.09-0.73).

*Table 6: Multivariate logistic regression of factors associated with incomplete immunisation*

Predictor variable	Category	Freq.	Percent	Crude OR	Adjusted OR	P value	CI
<b>Mothers/caregiver age (yrs.) (n=785)</b>	≤ 20	4	0.51	1	1		
	21-40	537	68.41	1.3	0.21	0.059*	(0.04-1.06)
	41-60	197	25.1	0.74	<b>0.12</b>	<b>0.015</b>	<b>(0.02-0.66)</b>
	≥ 61	47	5.99	0.33	<b>0.09</b>	<b>0.010</b>	<b>(0.01-0.56)</b>
<b>Child age (months) (n=1047)</b>	12-23	273	26.07	1	1		
	24-35	276	26.36	0.69	0.57	0.122	(0.28-1.17)
	36-47	240	22.92	<b>0.49</b>	<b>0.44</b>	<b>0.010</b>	<b>(0.24-0.82)</b>
	48-59	258	24.64	<b>0.39</b>	<b>0.27</b>	<b>&lt;0.001</b>	<b>(0.15-0.47)</b>
<b>Head household sex (n=1047)</b>	Female	434	41.45	1	1		
	Male	613	58.55	1.03	<b>2.34</b>	<b>0.020</b>	<b>(1.15-4.79)</b>
<b>Child sex (n=1047)</b>	Female	542	51.77	1	1		
	Male	505	48.23	0.83	1.2	0.424	(0.76-1.91)
<b>Number of children (n=942)</b>	0-4	655	69.53	1	1		
	5-7	267	28.34	0.84	1.33	0.397	(0.68-2.60)
	9 or more	20	2.12	0.59	4.2	0.064*	(0.92-19.18)
<b>Education level (n=1047)</b>	No education	153	14.61	1	1		
	Primary (1-7)	470	44.89	1.89	1.62	0.187	(0.79-3.35)
	Secondary (8-12)	392	37.44	<b>2.4</b>	<b>3.27</b>	<b>0.004</b>	<b>(1.46-7.34)</b>
	Tertiary	32	3.06	<b>2.5</b>	<b>16.12</b>	<b>0.002</b>	<b>(2.84-91.39)</b>
<b>Religion (n=1016)</b>	Catholic	170	16.73	1	1		
	Protestants	745	73.33	<b>1.74</b>	<b>1.72</b>	<b>0.058*</b>	<b>(0.98-3.03)</b>
	Muslims/others	101	9.94	1.47	0.7	0.372	(0.32-1.53)
<b>Mothers know at least one vaccine (n=1017)</b>	No	15	1.47	1	1		
	Yes	1002	98.53	0.84	2.02	0.364	(0.44-9.31)
<b>Mothers know all vaccines (n=1017)</b>	No	527	51.82	1	1		
	Yes	490	48.18	0.7	<b>0.55</b>	<b>0.027</b>	<b>(0.33-0.93)</b>

<b>Vaccine purpose - cure disease (n=1017)</b>	No	925	90.95	1	1		
	Yes	92	9.05	0.61	0.67	0.401	(0.26-1.72)
<b>Vaccine purpose - save the child from death (n=1017)</b>	No	964	94.79	1	1		
	Yes	53	5.21	0.87	0.36	0.202	(0.08-1.73)
<b>Vaccine purpose - keep the child healthy (n=1017)</b>	No	772	75.91	1	1		
	Yes	245	24.09	1.29	0.66	0.109	(0.39-1.10)
<b>Satisfaction with service (n=966)</b>	Unsatisfied	68	7.04	1	1		
	Neutral	111	11.49	0.51	<b>0.25</b>	<b>0.029</b>	<b>(0.07-0.86)</b>
	Satisfied	787	81.47	0.75	<b>0.33</b>	<b>0.030</b>	<b>(0.12-0.90)</b>
<b>Rate the facility (n=959)</b>	Bad	167	17.41	1	1		
	Moderate	269	28.05	1.62	1.65	0.133	(0.86-3.20)
	Good	523	54.54	1.38	1.27	0.439	(0.69-2.31)
<b>Vaccination offered (n=918)</b>	Only at certain times	612	66.67	1	1		
	Always	306	33.33	<b>0.65</b>	<b>0.53</b>	<b>0.013</b>	<b>(0.32-0.87)</b>
<b>Transport means (n=966)</b>	Walking	859	88.92	1	1		
	Other means	107	11.08	<b>0.57</b>	<b>0.26</b>	<b>0.011</b>	<b>(0.09-0.73)</b>

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*\*borderline significance at 95% CI*

## **CHAPTER 5: QUALITATIVE RESULTS**

### **5.1 Introduction**

The following are the results gathered from the FDGs and the KIIs on some of the factors that are associated with incomplete child immunisation. A total number of 5 FDGs and KIIs was conducted with the mothers and the community health workers respectively. The mothers were aged between 20 and 40 years old. All the mothers that participated in the study have had at least 2 children, because they could have experienced the immunisation program and some of the reason for incomplete immunisation. The community health workers were between aged 30 to 60 years old and all were female. Thematic analysis was used to analysis the qualitative data. The following were the themes identified.

### **5.2 Reasons for incomplete child immunisation**

There are various reason for incomplete child immunisation that were stated by the mothers and the community health workers interviewed. Most of the reasons given are ranged from knowing and understanding the benefits of immunisation. Other reason were the mothers and health worker attitudes towards the immunisation, the perception and beliefs on immunisation, experiences with immunisation. The following are the reason for incomplete child immunisation as stated by the mothers and health workers.

### **5.3 Mother's knowledge on vaccination**

Knowledge on immunisation has been reported from the literature reviewed to contribute immunisation uptake. In Zambia, health education for mothers is generally given at the health facilities from pregnancy (antenatal) to under five (post natal) clinics. Topics discussed during these clinics range from general hygiene of a mother and their child, nutrition and child immunisation. Mothers exhibited very little knowledge on the particular vaccines, they knew vaccines more generally than particularly.

#### **5.3.1 Naming vaccines**

From the FDGs conducted, mothers showed little knowledge about the names of the vaccines. When asked to list some of the vaccines they knew, very few mothers could mention the vaccines their children receive. The mothers called vaccines as 'injections', in their in local language the mothers called the vaccines as 'ma nyeleti'. This term referred to all vaccines regardless of them

being injectable and non-injectable. The term vaccines seemed to be foreign to the mothers that were interviewed. When asked to name the vaccines, one mother stated the following;

*We don't know the names of the injections [vaccines], we only know them as injections [vaccines].... (Mother of 4, 33yrs., FDG5)*

However, most mothers were knowledgeable about where on their babies' body the vaccines are supposed to be given. The mothers would say, there are two (2) injections for the thighs, one (1) on the arm and another on the shoulder and also one that was given orally in the mouth. They also seemed fairly knowledgeable about when their child should receive the vaccine. Mothers would say there is one vaccine given at 6 weeks. It is important to note that basic knowledge of the vaccines such as naming of the vaccines does not translate into immunisation uptake. This subtheme was aimed to understand what mothers know about vaccines.

### **5.3.2 Purposes of vaccines**

The knowing and understanding the purpose of a vaccine is an imperative factor that can enhance the continued uptake of vaccines. Despite not being able to name the vaccines, mothers could indicate generally the purpose of the vaccines although not accurate about disease the vaccines can prevent. One mother stated that:

*They protect children from diseases. The one that you get on the arm protects from HIV, and there are others for Malaria, Measles. (Mother of 4, 30 yrs., FDG1)*

However, any form of injection administered at the clinic seemed to be understood by mother to mean a preventive measure on any disease. Hence, they knew injections (ma nyeleti as known in local language) more for prevention but could not distinguish the types of vaccines ('injections') and its purpose.

On the other hand, a community health worker was of the view that mothers actually knew about the vaccines based on the fact that they teach them about vaccines beginning from antenatal clinics up until under five clinic.

*In my own understanding, I feel mothers are knowledgeable of the benefits that come with their child being vaccinated. A few of them maybe unaware of the*

*benefits, however, the larger majority is aware. For instance, mothers are aware of the injections that their child should receive on which part of the child's body, one on each thigh and one on the shoulder. They just understand that one is given oral and another injectable..... (Community health worker, KII1)*

This however can be a misguided judgement by the community health worker because when mothers are taught in the health education session at the clinic is not indicative of understanding by the mothers.

#### **5.4 Mother's perception, myths and beliefs of vaccines**

Mothers had diverse views of vaccine and seeking health service. Different ethnic groups have different cultural belief. Some of these beliefs have been passed on from generation to generation. These beliefs have affected the uptake of health care services that include immunisation service.

##### **5.4.1 Religious and ethnic beliefs**

There are a lot of belief in the communities around the vaccines and their purpose. Mothers in different communities have been indoctrinated with these beliefs and myths and this has affected immunisation uptake. One community health worker highlighted an ethnic group that does not believe in immunisation.

*.....When we look at the hosanna groups such as the Zulus, they believed in prayer and didn't bring their children for immunization. For them when a child is born they would give the child tattoos [called nembo in local language]. (community health worker, KII3).*

Others highlighted that prayer was the most important thing to do, immunisation was not thought to bring protection on a child but prayers. Another community health work talked about how people in the community replaced vaccination with prayers:

*Some do not believe in vaccines; they depend solely on prayer because this is what they are taught at church, their churches refuse them to do that. They tell them that they (preachers) have had children and none of them has received vaccines but they are still ok and health. They say for us we don't get vaccines*

*even when a child is born no matter what. These are church who are called Apostles, those with bold heads.... (Community health worker, KI12)*

Mothers from the FDGs had indicated that a child will get well and protected from any harm through prayers. A mother also narrated what they had heard about the vaccines in their communities. She added that:

*Others say it isn't good because it is believed to be demonic. This is part of the belief [ni mwambo zabo]. They start first by praying for the child by the pastor and they believe that a child should grow without these vaccines or any medication. (Mother of 6, 36 yrs., FDG3)*

However, things have been changing with regards to the uptake of immunisation services, this can be attributed to increased knowledge and awareness of the community regarding the benefits of vaccination, there has been substantial change in the perception of people of all religions.

#### **5.4.2 Mistrust on vaccines**

Despite the existing scientific evidence indicating that vaccines are safe and effective, many mothers still remain sceptical. Mistrust of the vaccines has been an important aspect that has been affecting the uptake of immunisation. The interviews and FDGs revealed some mistrust issues with the vaccines that the communities have. Mistrust have been on the purpose and intention of the vaccines. Some mothers in the communities think the vaccine is not what they health workers say it is. One mother stated that:

*Some [mothers] say that the vaccine that is given on the leg, may cause children to have problems with their legs, some [children] develop swollen feet and other problems. Mothers say these vaccines increase the body temperature of the child. (Mother of 5, 40 yrs., FDG3)*

Mistrust on vaccines may have developed because of some of the experiences that mothers have could not have been clarified. The Measles vaccine which is given at 9 and 18 months was thought to be harmful to the child. A mother narrated some issues on mistrust she has heard from fellow mothers:

*Some mothers talk about Measles, they refuse to have their child injected with the measles (vaccine). Some say that, the child gets many diseases when you inject them with measles. Some believe that these vaccines are not good because sometimes when child is injected their body temperature rises and they also develop diarrhoea, some children develop sores all over the body. (Mother of 3, 24yrs., FDG4)*

#### **5.4.3 A past without vaccines**

From the FDGs conducted, mothers were of the view that they survived the olden times with less vaccines. They argued that they grew up healthy without the vaccines. Indeed, the olden days was with less conventional medicine used especially the vaccine. With globalisation and advancement in science and technology we have seen introductions of new vaccines to the EPI program over the years. This has resulted in an increase in the number of vaccines offered. A mother wondered by stating:

*For me on the issue of vaccines, I would say others take advantage to say that what about in the olden days, how did they used to live? That why others don't pay attention in bring their children or even completing the vaccines. People in the olden days would not have their child vaccinated and some would even give birth at home but still the baby would grow. This is why some mothers don't bring their children because they say no to these vaccines, and ask what about people in the olden days. (Mother of 5, 40 yrs., FDG3)*

A community health worker also added an experience on the mothers wondering and questioning the vaccines, they compared growing up now to the olden days. The community health worker narrated:

*Some say that in the olden day's children survived without vaccines.....(Community health worker, KI12)*

#### **5.4.4 Use of tradition medicine**

Furthermore, mother have used traditional medicines as a replacement to the conventional medicine. This is mainly because of some of the side effects the vaccine will have on the child which the traditional medicine has been said not to have. Traditional medicines in form of roots

and leaves have been said to be given to children, unlike bring the children to the clinic for immunisation. One mother said:

*Others [mothers] don't know so much about the clinic, they prefer to use traditional medicine instead of bringing the child for vaccination. When there child is sick, they look for traditional medicine They do not know that the clinic is more effective as compared to traditional medicine, with traditional medicines one may not be entirely sure about what is causing the child to be unwell, they will just give a child herbs. They use traditional medicines like tembusha [aloe vera], mileza and so on. Mileza is given when a child gets sick diarrhoea (Mother of 4, 31 yrs., FDG2)*

### **5.5 Mother's negligence**

Mother's negligence was highlighted in the majority of the interviews and focus group discussions conducted. When asked what the major reasons for incomplete child immunisation a community health worker stated that:

*..... For some [mothers] they are just lazy, they are born lazy. There are mothers whose child is born, and they would only have the child get BCG and forget about the rest of the vaccines. (Community health worker, KII5)*

A community health worker added that:

*[It is] Laziness! Mothers will not bring the child because they are lazy. Some mothers who are Lazy to bring their children for immunisation don't really understand the importance of vaccines what they protect against. (Community health worker, KII1)*

Some mother were also of the same view stating that mothers were just lazy. A mother from focus group discussion added:

*It's just laziness of other mothers. I hear others say that it is not important. (Mother of 6, 36 yrs., FDG1)*



A community health work also added that the mother are actually aware about these vaccine and that their children should be immunised. Also, mothers have been followed up to their home to just get their children immunisation. She indicated that mothers deliberately chose not to complete immunisation. She stated that:

*Mothers are Lazy because they are given full education at ANC [Antenatal clinics] and they know the benefits, we also follow them at their homes and even in the market places, so they have no excuses. They chose the outreach points themselves..... (Community health worker, KII1).*

Mothers have highlighted that some mothers deliberately miss immunisation because they believed that forgetting completely was not possible. A mother thought that missing immunisation was intentionally done, she said:

*Sometime mothers forget to have their child vaccinated, but sometime it is done on purpose because forgetting completely is not possible, that just means the mother did not want the child vaccinated. (Mother of 3, 24 yrs., FDG3)*

One mother narrated about what happened to her neighbour's child because the mother was being negligent. She said:

*Some mothers are just negligent. Vaccines are really important because these day there are a lot of diseases. Children these days are even dying of diarrhoea. For example, my neighbour's child died from diarrhoea after having it for a week because the mother was busy postponing taking the child to the clinic, she was saying let me just finish washing after an elderly woman talked to her about the state of the child. When the child was taken to the clinic after she had finished washing, it was already too late and the child died. (Mother of 4, 25 yrs., FDG4)*

## **5.6 Mothers lack of education**

Understand the importance of a health service remains important to enhancing the uptake of that service. Mother's level education can ease the understanding of the importance of the vaccines.

The lack of education was said to be a contributing factor to mothers dropping out their children's immunisation schedule. One mother stated that:

*For me it is a must that I should bring my child for immunisation, I don't get tired. Others don't understand the importance of a clinic. For some it is because they haven't been to school and so they don't see the importance of a child's needs like vaccinations. (Mother of 2, 23 yrs., FDG1)*

Similarly, community health workers were of the same view. They felt education contributed to appreciation and understanding of the importance of the vaccines. A community health worker stated that:

*I think it is just the education part of it.....Those who have been to school are usually the ones that are aware. The educated ones will pay attention to the information given by health workers and they will assimilate and appreciate it. (community health worker, KII4)*

### **5.7 Mother's lifestyle - Alcohol abuse**

The mother's lifestyle has been reported by the respondents to have an impact of the uptake on the immunisation services. Particularly, alcohol abuse was cited as a challenge by the mother and the health workers. Mothers have been reported to spend time in drinking place and talking alcohol, because of this, the mothers do not bring their children for immunisation. Mothers ended up too being to drunk to bring their child for immunisation. A community health worker highlighted:

*For younger mothers [bakashana] mostly the problem is beer drinking because some mothers start drinking beer very early in the morning they don't even have the time to bring their children for immunization. Sometimes mothers can start [immunisation] well but just stop along the way, they don't even go up to nine months because of the drinking. It is bad sometimes because some mothers would even go drinking with their child in these drinking places which open early in the morning. (Community health worker, KII5)*

Similarly, mothers was also of the view that some fellow mothers drunk alcohol at the expense of bring the child for immunisation. A mother narrated that:

*Other mothers like to go in bars to drink alcohol and so they don't have time to bring their child, early in the morning they start to drink and what time do they bring their child for immunisation. They get home when they are drunk and they don't have the time now to even bring the child for immunisation. (Mother of 4, 25 yrs., FDG3)*

## **5.8 Birth order**

Birth order affects uptake of vaccines. From the focus group discussion and the interview, it can be observed that there is a level of reluctance to have a child immunised with the more number of children a woman has. From the KIIs and FDGs conducted, women who had many children were reported to be reluctant to continue with immunisation especially when the older children were looking healthy even after she had missed a vaccine on the child. A community health worker stated:

*Sometimes when a mother has many children, the younger ones are not taken for immunisation because they look at the older children who they have and have not finished their immunisation schedule and are just fine, I have witnessed this myself on a mother who had four children. She just stopped like that. Others have only had their children receive BCG only because it is given at birth. (Community health worker, KII1)*

However, even first time mothers were reported to discontinue immunisation based on the health of the child. Healthy looking children who are seen playing and are not experiencing any illness were likely not to continue immunisation. A mother stated:

*The other reason mothers don't complete [immunisation] is because some children don't show any sign of sickness, they just grow healthy..... So that's the reason some mothers decide not to continue bring their children for immunisation. (Mother of 3, 24 yrs., FDG4)*

Similarly, another mother added that:

*A human being is difficult, when the child seems to be looking healthy and fine the mothers become reluctant to complete the child's vaccination. When child*

*is not well mothers do continue with the immunization [because they have to go to the clinic]. Mothers are difficult, when they see their child just walking and playing fine, they say that the child is just fine and forget about immunization.*  
(Mother of 4, 31 yrs., FDG2)

### **5.10 Other competing priorities**

Mothers are also involved in a lot of other activities, could be social activities as well as economic activities. Economic activities such as having a job or doing a business has been reported by the respondents to be the major competing priority that has led to mother not completing their childrens' immunisation schedule. Mothers and community health workers have cited being busy with work and coupled with the lack of a significant other to bring the child for immunisation as the major reasons for immunisation drop outs. One mother said this:

*For others it is because they are busy, they are usually out of town and when they don't have someone to leave the child with so that they could take them to complete their immunisation. (Mother of 1, 22 yrs., FDG1)*

Furthermore, mothers also stated that it was difficult to continue immunisation when they are usually doing business. Mothers referred doing business to mean being a trader or marketeer, mostly the selling vegetables and fruits, cloths. A mother added:

*Some mothers are busy doing business and that's why they don't continue bringing their children. They feel their business will slow down if they bring their children for under-five clinics. (Mother of 6, 36 yrs., FGD1)*

A community health worker also indicated that sometimes working mothers have a challenge with completing immunisation. They stated this:

*Yes there are those who work and it becomes a challenge when they have no one to bring their child here and it happens that they don't continue, this happens, they would receive the first and second dose of a vaccines and not continue because their mother has to go to work and there is no one to help bring the child. (Community health worker, KII4).*

Another community health work gave a particular example about a mother who dropped out:

*I have a lady who told me that she has always been busy and it is a challenge for her to come to the clinic. That has been a challenge especially when you look at the occupation part of it. There are business women who travels to South Africa and stay there for about a month or so and so they miss the vaccine....*  
(Community health worker, KII5)

Mothers also added that sometimes they have had made programs or engagements on what to do on a particular day and it becomes difficult to just forgo that program in order to take the child for immunisation, some of the engagements mentioned are doing piece work and attending funerals. One mother stated:

*Sometimes I am busy on the day I am supposed to bring my child for immunisation. I would have a piece work engagement somewhere and so I go.*  
(Mother of 4, 30 yrs., FDG1)

Furthermore, a community health worker added that attending funerals especially out of town are sometimes a cause for incomplete child immunisation. Attending to funerals is an important aspect of the Zambia's collective culture. She stated:

*There are also other things that can affect the completion of the immunisation schedule, sometimes they would tell you I went for a funeral and that's the reason I missed this one. Or maybe this child is been looked after by the grandmother.* (Community health worker, KII3)

Moreover, the mothers interviewed indicated that sometimes they also have church programs to attend to and miss taking the child for an immunisation appointment. Mothers also testified about opting to go for prayers and church meeting than to bring their child for immunisation. A mother during a focus group discussion said:

*We do sometimes have to decide [and] say I cannot forget my God because of these injections [vaccines], God will help my child and I go to church and forget.*  
(Mother of 3, 28 yrs., FDG4)

### **5.11 Lack of transport money to facility**

The lack of transport was also mentioned by the health workers as a challenges. However, mothers said they mostly walked to the facility for immunisation and had no problem with that. They also added that there are outreach posts within their communities where immunisation could be accessed. The reasons for incomplete child immunisation were attributed to economic factors such as lack of finances, specifically transport money to go to the clinic. A community health worker highlighted this:

*I have seen a lot of women missing vaccines. For instance, someone is supposed to receive maybe DPT 3months 3weeks, when you ask the mother why they missed they would say they....., had no transport and so on. (Community health worker, KII5)*

Another community health worker also emphasised that transport to the facility was a challenge especially when the child was just few weeks old.

*Economic factors are also a challenge, if someone is not financially stable they may be unable to take their child for vaccination because of lack of transport money. If there is no transport, a mother can fail to continue. (Community health worker, KII4)*

### **5.12 Experiences with immunisation services**

Mothers have expressed various concerns about the experiences they have had with the health workers and the immunisation service in general. Community health workers have also noted that some of the issues raised by the mothers are true and have implications on the uptake of the immunisation services. Further, mothers have also acknowledged that some mothers create some of the problems for themselves even though it does not justify how the health workers treat them. Experiences with vaccines have also been a concern that impacts on the uptake of the immunisation services.

#### **5.12.1 Child adverse reaction to vaccine**

Mothers reported some perceived side effects of vaccines that have led to incomplete child immunisation. Mothers have stated that there were certain instances where other mothers were hesitant to have their children immunised stating their child would cry or the child is ill. Mothers

also stated that the pain a child would go through after getting vaccines caused the mothers not to return. A mother stated:

*When vaccine is too painful or when the vaccine causes increase in body temperature of the child the mother may decide to stop bringing the child for immunisation. (Mother of 3, 23 yrs., FDG3)*

Mothers also indicated that the child would get ill after having received the vaccines. This caused the child to stay up all night crying and mothers would equally have to stay up all night to nurse the child. A mother narrated:

*Another reason that cause mothers not to continue with vaccines is when the child get an injection and gets ill, so some mothers decide to hold back stating that I cannot stay up all night even today because the child got ill last time and so I don't take them for the next doses..... (Mother of 2, 23 yrs., FGD2)*

Similarly, a mother added:

*Others would complain about the injections saying that the body temperature increased and we couldn't sleep in the night because the baby was crying and so next month I am not taking my child. (Mother of 4, 25 yrs., FDG4)*

A community health worker also added:

*In certain instances mothers will decide not to bring their child for immunisation because of pain and increase in body temperature from the last vaccine the child received and there are a lot like that. (Community health worker, KII1).*

Further, mothers have superstitions about the vaccines and health worker attending to them at the facility. Some superstitious mothers discontinue immunisation because they suspect that the nurse attending to them is involved in some rituals. This was worsened when one of the mothers just lost a child at the facility. A mother narrated what she heard in the community:

*Also, when the child gets sick [develops high body temperatures] after the child has been vaccinated. Others [mothers] attribute that to Satanism, they say the*

*one injecting [nurse] has got 'very bad hand' and was a Satanist and I will not return there as a result they will not complete. This is bad when a fellow mother loses a child (Mother of 2, 35 yrs., FDG4).*

A community health worker also highlighted some of the experiences that have led to mothers having superstitions resulting in withdraw from immunisation. One community health worker narrated;

*.... when the child's body temperature increases the mother would say that nurse has 'bad hands' and that discourages them to come for the other doses. (Community health worker, KII4)*

### **5.12.2 Health worker attitude towards mothers**

The service that the mothers receive at the facility has been reported to contribute to immunisation completion. Bad treatment has resulted as in drop out of immunisation especially by mother who are said to be short tempered and cannot stand the harsh treatment. Scolding and shouting at the mothers has been reported by the mothers and health workers as a reason for incomplete child immunisation. A community health worker expressed concern about the treatment:

*The manner in which the health care team handles these people [mother] in important. For instance, the way a mother is received by health care givers may affect the completion. The reception they receive will determine whether or not they will come back. For instance when someone comes to the clinic and instead of welcoming them you shout at them and don't give them the respect they deserve. Some of these people have got offices as well. In as much as they came here as our client they have a life beyond just receiving vaccines and other things. If those women are not properly handled probably they may be discouraged to come for the subsequent doses. (Community health worker, KII2)*

Mothers have reported to have experienced the bad treatment., they have stated that nurses are sometime harsh and this has discouraged some mothers not to continue immunisation. A mother stated:



*Nurse get annoyed and shout at us, especially for those that are not consistent with bringing their children here. Others who are short tempered just quit immunisation.... (Mother of 4, 33yrs., FDG5)*

Similarly, mothers some mothers are sent away for various reasons, some could be not coming for immunisation on an appointment date, while others could be sent away to come back on a specific date for immunisation to avoid vaccine wastage. Some of these mothers that are sent back home never come back, and this has led to incomplete child immunisation. Another mother stated:

*In most cases nurse will shout if a mother doesn't bring the child on the date that they are supposed to and in most cases the mother is sent back and assigned another date. They would say that you have done that on purpose. They chase you away so that next time you should be much more serious when you come and bring the child on that specific day you are given...(Mother of 4, 30yrs., FDG1)*

To avoid wastage of vaccines when opened especially vaccines with multiple dose vials, health workers sometimes send mothers away to come back on a later date. This has negatively affect continued uptake of immunisation. Another mother also added:

*Like for BCG we were told to come the following day when we are a few here, they tell us the BCG would expire when opened. Other mothers end up giving up....(Mother of 4, 36 yrs., FDG5)*

In the same line, a community health worker stated that sending mothers back home when they came to the facility could affect immunisation completion. A community health worker narrated that:

*We vaccinate everyday expect for BCG which is done on a Friday. When a mother comes any other day for BCG, we tell them to come back on Friday. This is a factor [leading to incomplete immunisation] as well because if someone comes on a Tuesday for example and they have used up the only transport*

*money they had. Surely, it will be difficult for them to come back. (Community health worker, KII5)*

### **5.12.3 Time spent waiting for immunisation**

Time spent at the facility was also identified as a challenge leading to immunisation drop outs. Mothers indicated that they spent a lot of time waiting for their children to be vaccinated, although the mother acknowledged that they were too many to be attended to by the limited health work force, they said, they spend a lot of time waiting. A mother narrates how much time she spends at the clinic:

*We start our day early for vaccination as early as 7 hours [in the morning] up to somewhere 15 hours [in the afternoon] at the clinic. (Mother of 2, 23 yrs., FDG1)*

Another mother also added:

*Time spent on the queue can contribute to dropout as some mothers decide to give up. Some mothers decide to stay away because too much time is spent waiting. Others who can afford decide to take their children to private clinics because less time is spent waiting. Some of us can't afford... (Mother of 4, 31 yrs., FDG2).*

Time spent at the facility has been stated to contribute to immunisation drop out. All the facility visited are high volume facilities which means that there are a lot of clients that are attended to by the health workers at the facility. This can contribute to the time that mothers spend at the facility. Community health workers have also acknowledged time is a contributing factor. One community health worker stated:

*Even time frame is also a factor; you can't keep someone for long hours just waiting for a vaccine. If really the time frame is reduced, they [mothers] can be encouraged to come. (Community health worker, KII1)*

Also tied to time are vaccine stock, Mothers indicated that vaccine stocks running out when they are already in a queue discouraged them to complete immunisation, especially when they have been waiting a long time just to have their child receive the vaccine. A mother also added:

*This thing of medicine finishing when we are in a queue is a problem. We have to walk and sometimes run from on outreach post to another in the hot sun so that we can be the first on the other post. Also these same outreach post start late, immunisation start at 12 hours. So by the time we are coming from here maybe around 15hours is when the will go in the posts to start vaccination. (Mother of 3, 28 yrs., FDG1).*

Further, a mother from a FGD said:

*...Sometimes medicines [vaccines] finishes while I am on the queue, when this happens, I am told to return the next day but I already have a program for the next day and so I feel lazy to continue, I just let it be. (Mother of 3, 23 yrs., FDG3).*

### **5.13 Reasons for completion of immunisation**

When concluding the interview and discussions, Mothers and community health worker were asked what could be some of the possible reasons mothers complete their child's immunisation. According to the mothers and community health workers, the reasons for complete child immunisation are based on love and care the mother had for their child. Mother have also thought an under five card where child immunisation was indicated was a requirement for school enrolment. Mother also stated that they fear the consequences of missing a vaccine.

#### *Care and love for the child*

Community health worker and mothers were of the view that mothers mostly completed immunisation because they love and cared for their children. A community health worker explained about how mothers showed they cared for their child, she said that:

*They [mothers] complete because of love for the child, they want their child to be strong and healthy. As a parent you should care for your children. (Community health worker, KI15)*

A mother also added that how they felt bringing their child for immunisation was because they cared and loved their child. She stated this:

*The reason we complete immunisation is because we look at the health of the child. A mothers want to know the health of their child and how they are growing up. (Mother of 2, 26 yrs., FDG3)*

The community health worker also added that, some women out there have responsible husbands who bring their children for immunisation. Male involvement is encouraged in all the facilities and some husbands take their children or remind their wives to bring their children for immunisation. A community health worker pointed out:

*Others have responsible husbands who keep reminding their wives to bring the children here. We follow them in the communities and tell them that a man can bring the child for under five and we are happy when that happens, we have a lot of men that bring their children here when the wife does not. (Community health worker, KII4)*

#### *Under-five card as a requirement for school enrolment*

Mothers from the interview have indicated that, a complete under-five child's card is a requirement to be enrolled into a public (government) school at grade one. Further, a community health worker also indicated that mothers have been told this so as to encourage them to continue with immunisation. One community health stated that:

*Usually they are told that the under-five card will be needed for someone to enrol into grade one. So sometimes they feel that if they don't finish the immunization the child won't start grade one.... (Community health worker, KII1)*

Similarly, mothers also thought that an under five card was a requirement for first grade school enrolment. They thought the under-five card needed to show completed immunisation appointments and also other growth monitoring aspects such as health. A mother from an FDG stated that:

*[The] Under-five card is needed for child to be enrolled into grade one....  
(Mother of 3, 25 yrs., FDG1)*

#### *Reinforcement and gifts received by consistent mothers*

Gifts and praises that mothers receive after completion of immunisation has been reported by the community health workers and mothers, as having an impact on the completion of the immunisation schedule. Community health workers have stated that mothers are encouraged when reinforced. One community health worker stated:

*Others finish all the vaccines and we give them some gifts such as mosquito nets. And when others [mothers] see that they also work towards finishing hoping to receive a gift. (Community health worker, KII4)*

Mothers were also encouraged by the praise and encouragements they received from the health workers and community health workers. They stated that it was rewarding to be recognised by the health workers on your completion of immunisation. One mother who stated that:

*....When you come to the clinic and your child has received all the vaccines and you show them [health workers] the under-five card, they [health workers] feel good and encourage you. (Mother of 2, 29 yrs., FGD4)*

Furthermore, negative reinforcement has been noted to encourage mothers to continue bringing their children for immunisation. Mothers stated that they are afraid of not being attended to as a result of the child's poor immunisation. A mother stated:

*There are times when a child gets sick and the child has not been receiving any vaccines, so when you come here at the clinic and you asked what vaccines the child has received and the under-five card. The nurse will tell you that they will not give you any medication for your child because the child has not received any vaccines. (Mother of 4, 30 yrs., FDG1).*

## **CHAPTER 6: DISCUSSION**

### **6.1 Introduction**

The sections presented in this chapter have been identified to be common ideas from the themes in the qualitative data and variables quantitative data result. The following are the reasons why mothers do not complete immunisation of their children.

### **6.2 Mother's knowledge on vaccination**

Knowledge remains an important aspect of utilization of a service. Mothers basic knowledge of vaccines is information that mothers have about the various vaccines provided, the vaccines basic purpose and schedules, and generally the diseases for which they prevent. Andersen's conceptual framework highlighted that the knowledge that people have concerning and towards the health care system will affect the utilisation of the health service. From the results shown in the quantitative results section, of the majority of mothers indicated they knew at least one type of vaccine while only a few indicated they did not know any vaccine. Further, less than half of the mothers stated they knew all vaccine. The purpose of vaccine to prevent disease was affirmed by the majority of mothers.

The qualitative results similarly shows that, only a few mothers could be able to name any vaccines they knew. Most mother in the FDGs in this study indicated that they did not know the particular vaccines by name, they generally referred to vaccines as 'injection. The results suggest that mothers are more generally knowledgeable about the vaccines. They do appreciate that vaccines have a purpose in prevent child illness, which remains cardinal to the immunisation program.

Similarly, Leach and Fairhead (2008) reported that in the Gambia, less than half of urban and rural mothers could not correctly name any vaccine preventable diseases (VPDs). Abdulraheem and Onajole (2011) found that very few mothers knew that BCG is being given at birth while only a few mothers knew that Hepatitis B vaccine could also be given at birth. However, Favin and others. (2012) found that very low levels of community knowledge and understanding of the 'scientific' foundation of immunization in Uganda, although almost all of parents in that community believed that immunization was important. Favin further notes that there is good will in the midst of lack of knowledge. From a study in Rwanda, Habimana and Bararwandika (1991) concluded that 'knowledge of vaccination on the part of parents is not an important factor in vaccination coverage

This shows that there is generally low level of knowledge on immunisation despite being aware of immunisation. Mother indicated to know vaccines more generally, this meant they were aware about the vaccines that were currently being offered under the EPI program. Naming the vaccines and the specific diseases for which they prevent was technical for the mothers to respond. However, knowing the benefits of the vaccines was reported to be understood by the mothers. Furthermore, this study found that mothers who knew all the vaccines were found to be less likely to have their child fully immunised than mothers who did not know the vaccine. This could further suggest that the level of ‘scientific’ knowledge does not necessary result in increased immunisation uptake.

Additionally, Education also remains an important aspect to immunisation. Andersen in the conceptual framework also highlighted social structure like education, occupation, culture and many other structures can affect the utilisation of a health service. Mothers and community health workers indicated that some mothers do not seem to understand the benefits of immunisation because they lack education and this has leads to less appreciation for immunisation. The quantitative results similarly show that mothers who had attained tertiary and secondary level education were more likely to have their children fully immunised than mothers who had no education. Similarly, other studies have also shown that the education of the mothers is associated with incomplete child immunisation. For example, children of mothers with no education and primary education are more likely to have their children incompletely immunized compared with children of women with secondary or higher education (Adedokun et al. 2017).. This suggests that education can improve and ease understanding of various issues relation to health, more particularly immunisation. This can result in uptake of the immunisation service.

### **6.3 Mother’s perception, myths and beliefs of vaccines**

Perception and belief have been one of the obstacles to health service utilisation. According to Andersen, an individual is more or less likely to use health services based on the beliefs of health services benefits. Health beliefs according to Andersen are predisposing characteristics to health service uptake. Shrestha and others (2016) notes that caregivers with negative perception towards vaccinating sick child were more likely to have partially immunized children than those with a positive attitude. Religion was the only variable captured in the quantitative data set that could be used to explain some beliefs.

Mothers religion was found to be borderline significant were the protestant were more likely to be fully immunised than catholic. According to the interview, mothers have been influenced by religion and ethnic group on immunisation uptake. Some religions have been said to stop mothers from coming for immunisation stating that prayer is the most important. Some mothers have also attested that they have on some occasion not brought a child for immunisation because they had to go and pray. Others mothers reported that some fellow mothers felt that the vaccines were demonic. Further, there are also similar belief by some ethnic groups that are somewhat religious. In one area where the FDGs were done, there is a particular ethnic group that believes that children can survive without vaccines or any medication. Similarly, Tauli and others (2016) notes that immunisation uptake has been negatively affected by belief such vaccination not beneficial or causes damage. However, Regmi (2014) argued that some community leaders have positively influenced the uptake of child immunisation.

Further, some mothers have over the years remained sceptical about vaccines. Although not statistically significant, the purpose of vaccine to keep child health was only affirmed by a quarter of the mothers. This indicates the level of mistrusts that mothers have. This can be because of some of the experiences mothers have had with vaccines, especially the reactions children normally have from the vaccines. There is a lot of mistrust belt around the Measles vaccine, most mothers felt that the Measles vaccine was not safe and could make the child lame. A possible explanation to this is that vaccine is given at a time when all the vaccines have been received and all the adverse effects have been felt and some time has passed and these effects are now felt anew.

Similar studies have shown that mothers who had experienced bad experiences with immunisation did not want to take their child for the other dose hence leading to immunisation dropouts. The mothers of older infants expressed more negative beliefs about the outcome of having MMR, were more likely to believe it was unsafe and that it rarely protected against disease compared with mothers approaching the first MMR injection (Tickner et al. 2006). Furthermore, Favin et al. (2012) found that parents commonly mention fear of side effects as a reason for not continuing vaccinating their children. In some cases, if an older sibling or acquaintance's child had side effects, parents refused vaccinations for younger children. Further, factors influencing vaccine uptake include vaccine hesitancy, defined as a lack of confidence in the safety and effectiveness of vaccines (Gilbert et al. 2017).



Furthermore, mothers from the FDGs conducted seemed to question the use of immunisation based on the basis that people in the olden days survived without immunisation and they still alive and health. This kind of belief system has been said to discourage some mothers to bring their children for immunisation. This is also true for older mothers or caregivers reported in the quantitative analysis. Older mothers were less like to have their children immunised than younger mothers. The older mothers can be said in this case to be mothers from the olden days. This entails that younger mother are more likely to have their children immunised. There is a similar pattern of older mothers or caregivers not to immunise their children, this can be possibly explained by the belief that people in the olden days were not immunised. The interviews on the other hand suggest that younger mothers are the problematic with child immunisation completion

Nevertheless, studies have shown that children born from younger mothers are less likely to be fully immunised than those born from older mothers (Russo et al 2015, Adedokun et al 2017). Nonetheless, Negussie and others (2016) found that younger mothers were at a high risk of defaulting on their child's immunizations than older mothers. It is well recognized that age plays an important role in womens' utilization of health services and maternal age may sometimes serve as a proxy for accumulated knowledge of health care services. Negussie and others further argued that age may be a factor, which may have a positive influence on accepting the full immunization of children. This may be due to older mothers having more knowledge about health care services and valuing the full immunization of their children more than younger mothers.

However, this line of thought can however be disagreed with based on the current study. This is because, older mothers can be equally said to have more of folk medicine and traditional or olden day's experiences and dependence on traditional aspect of bring up a child, therefore could be discourage to complete immunisation. Further, younger mothers can be said to be lacking experiences on traditional or folk medicines and so they opt for conventional medicines.

Furthermore, mothers have been reported to replace vaccine for traditional medicine, this usually happens when a child has some side effects after receiving immunisation. Some mothers have therefore quit immunisation and relied on tradition medicines for every illness or problem, they believe that the medicine has very little side effects compared to the vaccines. Similarly, Glatman-Freedman and Nichols (2012) have highlighted that the use of traditional healers by mothers was negatively associated with the vaccination rates of their children.

Additionally, the side effect that children have after receiving immunisation seem to be one of the major causes of the perceptions and beliefs that lead to immunisation dropout. This can possibly suggest that there is a lapse in communication between the health worker and the mothers on the side effects. Health workers can be said to be reluctant to inform the mothers about these adverse events following immunisation so as not to discourage the mothers. If mothers were very well aware about the side effects, this could not be a factor. The vaccines side effects for some mothers can be discouraging especially where the child gets very ill. On the contrary, Shrestha and others (2016) notes that the development of abscess in the vaccination site of a child was less likely to be a factor for incomplete immunization of the child.

#### **6.4 Mother's negligence**

The major cause of immunisation dropout according to the mother and health workers from the interviews conducted in this study is negligence of the mothers. The negligence here refers to the mother's laziness or unwillingness to take the child for immunisation despite having the relevant information about immunisation. Almost all FDGs and KIIs noted that mothers were lazy to bring their children for immunisation.. Community health worker indicated that there are a lot of efforts to have every child immunised, there is outreach that is within the communities, to take immunisation at the mothers 'door step' and there is socio-mobilisation activities just to reach the mothers. The quantitative results also offers a possible validation to the unwillingness or laziness of mothers as the reason for incomplete immunisation.

Firstly, mothers who stated that their facility always offered vaccination were less likely to have their child fully immunised than mothers who indicated that vaccination was done only at certain times. This is one possible explanation to confirm the mothers laziness as those who have immunisation always offered could be expected to have their children fully immunised compared to those who have immunisation only offered at certain times.

Secondly, community health workers indicated that mothers knew about vaccines from the qualitative interviews. The quantitative analysis of the result section shows that mother who knew all the vaccine were less like to have their children fully immunised than mother who indicated they did not know all the vaccine. This can possibly further qualify the reason, that mothers are lazy to complete their child's immunisation despite knowing about vaccines.

Lastly, mothers who were neither satisfied nor unsatisfied with the immunisation service were less likely to have their children fully immunised than mothers who were unsatisfied with the immunisation service received. Further, mother who were satisfied were less like to have their children fully immunised than mothers who unsatisfied. This, could further confirm that mother's laziness to immunisation their child was a major contributor to immunisation drop out. Mothers can be said to be satisfied because the service at the facility was good.

Therefore, the expectation is that mothers who are aware about immunisation, and satisfied with immunisation services, and have immunisation always offered at their facility to have their children fully immunised. However, that is not the case. Mother's negligence, which in this case is the mother's laziness could be the possible explanation for incomplete child immunisation.

Mothers' lifestyle has also been noted in the qualitative interviews. The younger mothers have been reported to taking alcohol at the expense of bring the child for immunisation. This is another aspect of negligence. Mothers reported that some fellow mothers drink a lot of alcohol and start early in the morning. The community health workers also noted this as a challenge.

However, some husbands were said to be responsible and encouraged their wives to bring their children for immunisation, and in some situations bring the child to the facility for immunisation. Further confirming mothers negligence was that male headed households were more likely to be fully immunised than female headed households. It is important to note here, that there are other factors here that can be said to affect the female headed households, considering that the female has to provide for all the needs of the household.

Furthermore negligence was linked to birth order. Mothers were reported to be lazy to bring their children for immunisation based on their experience with their other children. Birth order was highlighted as a factor that leads to incomplete child immunisation. Although the number of children a mother had was not statistically significant, mothers reported that fellow mothers who had more children say four children and may not have completed immunisation for the older 3 children were also reported not to complete immunisation for the others younger children. This is because when the mother does not notice any illness or health problems with her older children who have not completed immunisation, this indicates to the mothers that immunisation was not important because the other older children look health and are just fine. Similarly, a case control study conducted in Ethiopia, child birth order was found to be associated with immunization

incompletion; being second to fourth in the family and being fifth and above in the family had a higher likelihood to default than being born first (Negussie et al. 2016).

However, mothers were reported to have not continued immunisation even with just one child because as soon as the child grows and is looking health and can play on their own. Mothers become relaxed and reluctant, and do not continue with immunisation. Mothers further reported that only when a child frequently gets ill and needs medical attention. The mothers go to the facility frequently and the child would receive immunisation and sometimes in such a case complete the immunisation schedule. It was found that older children were less likely to be fully immunised than younger children. Younger children are more likely to be immunised because mothers are said to be much more prudent with the health of the child in their early years of life. However, immediately a child grows to have some strength to play and does not need that much attention, mother become reluctant to have the child immunised.

### **6.5 Experiences with the immunisation service**

Experiences with the immunisation service here refers to the treatment that mothers received at the health facility and also the time spent waiting for immunisation. Health care worker attitude remains important in ensuring that mothers come back for immunisation. AlConde SA, (2002) and Favin et al. (2012) both explained that attitudes and behaviour of health staff treating mothers in an unfriendly, disrespectful, or even abusive manner are frequently cited as discouraging children's vaccination. Health staff reportedly screamed at mothers who forgot the child's card, missed a scheduled vaccination appointment, or had a dirty, poorly dressed, or malnourished child. Mothers felt humiliated and discouraged from returning (Favin et al. 2012).

This is true for this study, mothers complained about how some health workers would scold mothers and sometimes send the mothers away. Health workers also indicated that the treatment given to mothers here does affect immunisation uptake because if mother are shouted at, some do not actually return for immunisation. Despite that, the quantitative results showing that over 80% of the mothers were satisfied with the service. With over half indicating that they felt respected when at the facility. Although, mothers who were satisfied were less likely to have their child fully immunised.

Time spent waiting for immunisation has been reported to be one of the factors that was reported to cause incomplete immunisation. Mothers reported that they spent up to 8 hours to complete

under five activities including immunisation. Although, quantitative data shows that almost half of the mothers said they had waited up to over an hour at the facility. Community health workers have also acknowledged that sometimes the time they keep mothers at the facility can affect immunisation because mothers also have other programs to attend to other than immunisation and this could discourage their continued uptake of immunisation. This can be said to be true because of the persistent human resource shortage in the ministry of health. Similarly, Tadesse and others (2009) notes mothers who did not postpone vaccination schedule were less likely to have defaulter children as compared with mothers who ever postponed vaccination schedule. Tadesse further notes that lengthy waiting times before being attended to at the health facility have been cited as factors leading to immunisation drop outs.

## **6.6 Socio-economic factors**

There are several socio-economic factors highlighted in this study, that relate to immunisation dropouts. Some social factors include attending to family gatherings like funerals, weddings or even visiting and taking care of a sick relative, sometime this involves travelling. Economic factors hinge on finances, for example mothers having to work. Sometimes mothers have situations where they are engaged in periodic jobs called ‘piece work’ and it becomes very difficult to turn down the offer because these are usually once off work. These competing priorities make it difficult for mothers to complete child immunisation especially when there is no significant other to help the mothers.

Similarly, Tibin and others (2014) found that the reasons for non-immunization and incomplete immunization included, Mother too busy, Family problem including illness of mother and other conflicting priorities such as taking care of sick or other children, not being able to leave older children while traveling to get the younger ones vaccinated, and mothers’ illness. In addition, Favin and others (2012) also found that conflicting priorities among mother or care givers was identified as a factor associated to immunisation dropout rates. Economically, Favin and others argue that it is difficult for poor parents to travel long distances and then wait for hours for vaccination, when they should be working to feed the family that day. In addition, ceremonial event like weddings and funerals in some countries last up to a week and lead mothers to miss vaccination appointments.

Furthermore, the mothers and community health workers reported a lack of transport money as a factor associated with incomplete immunisation. Statistically, the quantitative results show that the majority of mothers walk while the rest use other means of transport. Further, mothers that used others means of transport were less likely to have their child fully immunised than those that walked to the facility. This further confirms lack of transport money to get to the facility especially for those that used public transport, or taxis is associated to incomplete immunisation. This suggest that those that did not have transport money and could not walk to the facility, did not bring the child for immunisation. Further, mothers who were sent back to return another day for immunisation and used up all their transport money were not likely to return or continue immunisation.

## **6.7 Conclusion**

In summary, the study has established the following as the factors that contribute to incomplete child immunisation;

The lack of basic knowledge of immunisation that mothers have in this study was found to be reason for incomplete child immunisation. The knowledge in this case refers to mothers being aware about the schedules for immunisation and generally what disease can be prevented by the vaccines. Similarly, studies have shown that knowing the benefits, the schedule of immunisation was associated with complete immunisation. The lack of formal education contributes negatively to immunisation uptake, meaning that uneducated mothers are more likely to default child immunisation. Education can be said to ease the understanding and appreciation of immunisation.

Mother's negative perception and beliefs were also found to contribute to incomplete child immunisation. Perceptions of immunisation are mostly around the side effects a vaccine could have on a child such as high body temperature, and body pains. These experiences have resulted in a build-up of negative perceptions resulting in defaulting by the mothers. Further, beliefs on immunisation are mostly religious and cultural. Mothers have been discouraged to continue immunisation by their religious leaders and advised to solely depend on prayers and not to rely on conventional medicines including vaccines. Vaccines have also been reported to be demonic. This has equally impacted on immunisation dropout among mothers. These perceptions and belief can be corrected through intensive socio-mobilisation activities.

Additionally, negligence that mothers have on immunisation has been said to overwhelmingly affect the continued immunisation uptake negatively. Mothers were reported to not complete child immunisation for no particular reason, but because they felt lazy and were unwilling to take their child for immunisation. Further, mothers reported they were satisfied with the immunisation service, and were aware about the vaccines and had vaccination always offered but they would default child immunisation. This can be attributed to the laziness of the mothers because provided these conditions, these mothers are expected to have their children fully immunised.

The bad treatment mothers received from the health workers contributes to incomplete immunisation. Some mothers were scolded or shouted at for missing or coming late for immunisation and in the worst case scenario sent back home. This kind of treatment by the health work on the mothers discourage mothers from continuing with immunisation. Studies have also shown this as a factor that contributes to immunisation dropout among mother. Further, waiting time for immunisation was indicated to be too much for mothers and discouraged others to continue child immunisation. Health workers need to consider alternative means to encourage the wanted behaviour.

There are various socio economic factors that have been reported to negatively affect immunisation. Socially mothers do not come for immunisation because they have other social engagements to attend to such as funerals and weddings.. Further, mothers reported that they had economic engagements or opportunities which lead them to miss immunisation, these include part time work, or their daily businesses at the market selling stuff such as vegetable, fruits, or even groceries. Others economic reasons include the lack of transport money to get to the facility. These factors are basically competing priority that a mother needs to attend to beside attending to the child's needs such as immunisation.

## **6.8 Limitations of the study**

The main limitation is the using of secondary data which quantitative data set from the Gavi FCE household survey, which was intended for a different research purpose. Therefore, some variables that could have benefited this study are not present. Also, the researcher has no control over the secondary data that was collected. Another limitation of the study was during the data collection. The researchers is of the opposite sex with the mothers and so certain socio-cultural issue might not be brought out because of these disparities.

The participants had busy schedules and so in order not to disrupt the operations at the facility, the researcher had to wait for mothers who had just received immunisation to come for the FDG and also the community health workers were equally busy attending to client and the researcher had to wait to until the community health worker was free.

Lastly, this study only focused on the demand side of immunisation, however, the factors associated with incomplete child immunisation go beyond the demand side but also the supply side. Despite, explaining the demand side factors, the supply side factors also remain important in understanding the factors associated with incomplete child immunisation.

## **6.9 Policy implications**

There is an information gap existing between the community health workers and the mothers especially around the side effect of the vaccine. This can be attributed to the fact that socio-mobilisation activities are only conducted during a vaccine launch or introduction. Therefore, a deliberate policy around having frequent socio-mobilisation activities and not only during vaccine launches should be considered. There is need to consider redesigning or restructuring the messaging. Also, health workers who are mostly the educators about immunisations should undergo trainings and not the usual debriefing they have.

A policy around reinforcement in form of praise of mothers for completing immunisation which does not have any financial underpin like gift as so it should be encouraged. Health workers should introduce possibly a list of best performing mothers and award them with recognition if possible even with items such as mosquito nets. Nonetheless, health workers treatment towards mothers should be receptive regardless of their consistency with immunisation. Health workers in this case should focus on encouraging the wanted behaviour rather than punishing the unwanted behaviour.

Also the other reason is that some husbands are responsible as they remind their wives to bring their children for immunisation or bring the child themselves. This can be attributed to the male policy involvement in mother and child health activities such as antenatal and under-five sessions. This policy can be said to be working well based on this study finding. This policy can be said to encourage to have more males also supporting immunisation. Immunisation programs interventions such as socio mobilisation should include male involvement as part of their messaging.



Due to the short staffing in the health forces, health workers undeniably have been constrained and overwhelmed with the number of clients they attend to, which has resulted in frustration by some health workers which has further resulted in shouting and scolding to mothers who are inconsistent with immunisation. There is need for a large work forces to handle this matter. It is worth noting that the government should also continue with the public health nurse program underway to help support the health worker force.

#### **6.10 Recommendations**

In order to address the problem of negligence and negative perceptions and belief, the ministry of health should consider intensifying socio-mobilisation messages around adverse effects of vaccines on children. This can possibly make mothers more aware of the potential side effects of vaccines and enhance appreciation and understanding for child immunisation.

Health workers should consider using reinforcement such as gifts, rewards, and praise rather than punishment like scolding and shouting to encourage the wanted behaviour of improved immunisation uptake.

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## APPENDICES

### Appendix 1 - Focus Group Discussion Tool

#### Instructions

Participants should read through, understand and sign the consent form provided before they participate in the interview. Remember to probe and get concrete examples. Let the informant speak at length and make sure that you use this only as a true guide in the interview process, and not as a list of questions to be covered one after the other.

**There are no right or wrong answers in this discussion. Please feel free to be open and share your point of view. It is very important that we hear your opinion.**

#### Discussion Points

What do mothers know about vaccines and VPD?

- Probe on what vaccines they know what their use
- Probe on what VPD they Know
- Probe on the source of information

What are the perception and beliefs that mothers have on vaccines?

- Probe on religious and cultural beliefs
- Probe on experiences with vaccines (injectable)

What are the factors child immunisation completion?

- Probe on social and cultural factors non-completion
- Probe on family chores
- Probe on availability of significant others

What are the economic factors associated child immunisation completion?

- Probe on economic factors non-completion
- Probe on occupation

What factors are associated with completion of child immunisation schedule?

## Appendix 2- Key informant interview guide

### Instructions

Participants should read through, understand and sign the consent form provided before they participate in the interview. Remember to probe and get concrete examples. Let the informant speak at length and make sure that you use this only as a true guide in the interview process, and not as a list of questions to be covered one after the other.

**There are no right or wrong answers in this interview. Please feel free to be open and share your point of view. It is very important that we hear your opinion.**

### Discussion Points

What do mothers know about vaccines and VPD?

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What are the factors child immunisation completion?

- Probe on social and cultural factors non-completion
- Probe on family chores
- Probe on availability of significant others

What are the economic factors associated child immunisation completion?

- Probe on economic factors non-completion
- Probe on occupation

What factors are associated with completion of child immunisation schedule?

**THE UNIVERSITY OF ZAMBIA**

**SCHOOL OF MEDICINE**

**DEPARTMENT OF PUBLIC HEALTH**

**TITLE OF RESEARCH: FACTORS ASSOCIATED WITH INCOMPLETE CHILD IMMUNIZATION: EVIDENCE FROM LUSAKA DISTRICT.**

**PURPOSE OF THE STUDY:**

My name is Eddie Kashinka. I am a student at the University of Zambia under the school of medicine with the department of public health. I am currently pursuing a Master of Public Health, specializing in Health Promotion and Education. As part of the requirements for the awarding of this master's degree, I am conducting a research titled factors associated with incomplete child immunization: evidence from Lusaka district.

The main purpose of this study will be to explore the factors associated to completion as well as non-completion of the childhood immunization schedule in Lusaka district. The study will also aim to:

- To determine the prevalence of children not fully immunized.
- To determine basic knowledge on vaccines and vaccine preventable diseases among mothers/ care givers
- To identify the perceptions and belief of caregivers on vaccines that are associated with non-completion of the immunisation schedule
- To identify the socio-cultural and economic factors associated with non-completion of the immunisation schedule.

**DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT:**

This study will involve conducting key informant interviews (KIIs) and focus group discussions (FGDs). These methods will be applied to selected participants in Lusaka districts. KIIs are one-on-one interviews using an unstructured questionnaire (open ended questionnaire). The KII should last no more than 1 hour. The questions, which will be asked will stem from the study topic given above.

The FGDs are intended to collect factual information from caregivers/mothers on the immunization uptake and the issues involved. This will be an in-depth, interactive discussion involving 4 to 10 participants and is expected to last approximately 1 1/2 hours.

I am inviting you to participate in the study. Mothers/caregivers will participate in the FGDs while facility health worker will participate in the KII. If you agree to participate, you will be expected to contribute to the discussion on immunization programs in your facility or locality.

**CONFIDENTIALITY:**

The information you provide in this study will be treated with utmost confidentiality and access to identifiable information collected will be restricted to me, the researcher. All opinions you provide will be kept confidential and we will only report results in a way that will not directly identify you.

**VOLUNTARY PARTICIPATION AND WITHDRAWAL:**

Your participation in this study is completely voluntary. If you do not want to participate or wish to withdraw from the study, you can do so at any time during the study without any penalty, loss of benefits, or services you would otherwise receive. You do not have to answer any questions which you feel are too personal or intrusive or if you feel that you cannot continue, please feel free to stop. That is, if you choose to participate, you will not be obliged to respond to all questions.

**RISKS AND BENEFITS:**

The study presents minimal risk to you and to other members of your organization or household. As described, all participation is voluntary and all participant information will remain confidential. Although we are taking down your name, no names or other identifying details will be published with the research findings. As a respondent, you will remain completely anonymous. The findings from the study will be used to help in better planning on immunization policies and programs for the benefit of all Zambians.

**CONTACTS FOR QUESTIONS**

For more information or if you are unhappy or if you have a complaint concerning the manner in which this research is conducted, you may contact the following:

Eddie Kashinka

C/O University of Zambia

School of Public Health,

Department of Health Promotion.

Mobile: +260 979 09 22 66,

Email: eddiekashinka@yahoo.com

Call or contact the University of Zambia Biomedical Research Ethics Committee office for any ethical queries. The Ethics Committee contact information is:

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**THE UNIVERSITY OF ZAMBIA**  
**SCHOOL OF PUBLIC HEALTH**  
**DEPARTMENT OF HEALTH PROMOTION**

**TITLE OF RESEARCH: FACTORS ASSOCIATED WITH INCOMPLETE CHILD  
IMMUNIZATION: EVIDENCE FROM LUSAKA DISTRICT**

**REFERENCE TO PARTICIPANT INFORMATION SHEET:**

1. Make sure that you read the Information Sheet carefully, or that it has been explained to you to your satisfaction.
2. Your permission is required if tape or audio recording is being used.
3. Your participation in this research is entirely voluntary, i.e. you do not have to participate if you do not wish to.
4. Refusal to take part will involve no penalty or loss of services to which you are otherwise entitled.
5. If you decide to take part, you are still free to withdraw at any time without penalty or loss of services and without giving a reason for your withdrawal.
6. You may choose not to answer particular questions that are asked in the study. If there is anything that you would prefer not to discuss, please feel free to say so.
7. The information collected in this interview will be kept strictly confidential.
8. If you choose to participate in this research study, your signed consent is required below before I proceed with the interview with you.

**VOLUNTARY CONSENT**

I have read (or have had explained to me) the information about this research as contained in the Participant Information Sheet. I have had the opportunity to ask questions about it and any questions I have asked have been answered to my satisfaction.

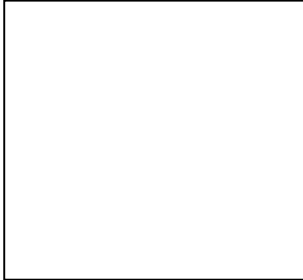
I now consent voluntarily to be a participant in this project and understand that I have the right to end the interview at any time, and to choose not to answer particular questions that are asked in the study.

My signature below says that I am willing to participate in this research:

Participant's name: .....

Participant's signature: .....Consent Date: .....

Participant to mark a "left thumb impression" in this box below if unable to provide a signature.



Signature of Researcher: .....Date.....