IMMUNIZATION COVERAGE AND FACTORS ASSOCIATED WITH FAILURE TO COMPLETE CHILDHOOD IMMUNIZATION IN KAWEMPE DIVISION, UGANDA

BATARINGAYA COS KAMANDA

A mini- thesis submitted in partial fulfillment of the requirements for the degree of Masters in Public Health at the School of Public Health, University of the Western Cape

Supervisor: Dr. Brian Van Wyk

Co-Supervisor: Mr. Ehimario Igumbor

March 2010

Abstract

In Uganda, routine immunization coverage for dipthera-pertusis and tetanus (DPT), Measles and poliomyelitis (Polio) in Kampala district for children of ages 12 to 18 months averages 53%. This is well below the targeted score of 80% as per Uganda National Expanded Programme on Immunization (UNEPI) Standards. In Kawempe division, Kampala District, the coverage rate is even lower at 50.3%. The government of Uganda, in collaboration with development partners, has committed to allocate more funds to increase immunization coverage. In Uganda, infants' routine immunization coverage for DPT3, Measles and Polio for children of ages 12 to 18 months in Kawempe division ranges between below and just above average.

There is need therefore to describe demographic (age, sex, level of education, religion) and socio-economic (monthly income, marital status, employment income) characteristics and other risk factors, (mothers' knowledge and negative attitudes towards immunization, place of delivery, community awareness, role of mass media, distance from the health facility and weather conditions) and analyze their association with immunization coverage. Such information would highlight groups that require targeted intervention to improve coverage.

Aim: The aim of the study was to describe immunization coverage for DPT, Polio and Measles among children of ages between 12 to 18 months in Kawempe Division and to investigate factors associated with immunization coverage.

Methods: A cross-sectional survey was conducted in 239 households with children aged between 12-18 months in five villages that were selected through multi-stage cluster sampling. Information on demographic and socio-economic factors and immunization status was obtained from mothers and caretakers. Immunization coverage and analysis of associations between immunization coverage and demographic and socio-economic factors were done.

Results: The immunization coverage levels were 95.8% for DPT (3 doses), 89.5% for Polio (3 doses) and 70.7% for Measles vaccine. For completion of the immunization schedule, it was 80.3% for DPT, 81.7% for Polio and 70.7% for Measles. Marital status and monthly income were significantly associated with completion of Polio and Measles schedules.

Conclusion: Immunization coverage for DPT, Polio and Measles had increased and was higher than previously reported. Households with low income (earning less than UGX I00, 000) and where the parents or guardians were not married there was less urgency for them to take their children to health services to complete immunization schedules**.** These groups should be targeted for outreach visits to complete immunization for children.

Declaration

I, Dr. Bataringaya Cos Kamanda solemnly declare that the information presented in this Mini-thesis is a result of independent study and is original work. Where other peoples' information has been used, permission has been sought and acknowledgement made.

Acknowledgement

I acknowledge Dr. Brian Van Wyk and Mr. Ehimario Igumbor my supervisors for their guidance and useful comments.

I also acknowledge the health workers, local leaders and the entire community who participated in the survey.

I also thank the mothers and caretakers who participated in the study for their cooperation.

List of Acronyms

BASICS	Basic Support for Immunization Child Survival
BCG	Bacille Calmette Guerin
CDC	Centers for Disease Control
DHS	Demographic and Health Surveys
DISH	Delivery of Improved Services for Health
DISHR	Delivery of Improved Services for Health – Report
DPT	Diphtheria Pertussis Tetanus
KDHDR	Kampala District Health Development Report
KDPSA	Kampala District Population Statistical Abstract
MOHDR	Ministry of Health Development Report
OPV	Oral Polio Vaccine
PAHO	Pan American Health Organization
UNEPI	Uganda National Expanded Programme on Immunization
UNICEF	United Nations Children's Fund
UWC	University of Western Cape
WHO	World Health Organization

Keywords

Kawempe division

Uganda

Vaccination coverage

Prevention

Child health

Immunization coverage

Factors associated

Infants

Immunization Cards

DPT, Polio, Measles

Routine Immunization

TABLE OF CONTENT

ABSTRACT I

DECLARATION III

ACKNOWLEDGEMENT IV

LIST OF ACRONYMS V

KEYWORDS VI

TABLE OF CONTENT VII

CHAPTER ONE INTRODUCTION 1

1.1 BACKGROUND 1

1.2 PROBLEM STATEMENT 7

1. 3 STUDY SETTING 7

1.4 AIM 8

1. 5 OBJECTIVES 8

CHAPTER TWO LITERATURE REVIEW 9

2.1 INTRODUCTION 9

2.2 IMMUNIZATION COVERAGE OF DPT, POLIO AND MEASLES 9

2.3 FACTORS ASSOCIATED WITH IMMUNIZATION OF INFANTS LESS THAN ONE YEAR FOR DPT, POLIO AND MEASLES 13

CHAPTER THREE METHODOLOGY 21

3.1 INTRODUCTION 21

3.2 STUDY DESIGN 21

3.3 STUDY POPULATION 21

3.4 SAMPLE SIZE 21

3.5 SAMPLING PROCEDURE 22

3.6 DATA QUALITY CONTROL 23

3.7 GENERALIZABILITY 24

3.8 DATA COLLECTION 24

3.9 DATA MANAGEMENT AND ANALYSIS 25

3.10 LIMITATIONS 27

3.11 ETHICAL CONSIDERATIONS 27

CHAPTER FOUR RESULTS 29

4.1 INTRODUCTION 29

4.3 IMMUNIZATION COVERAGE AMONG CHILDREN AGED 12 TO 18 MONTHS IN KAWEMPE DIVISION 35

4.4 RESPONDENTS' PERCEPTIONS ABOUT FACTORS AFFECTING IMMUNIZATION COVERAGE 37

4.5 THE RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND IMMUNIZATION COVERAGE 38

4.6 THE RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND COMPLETION OF IMMUNIZATION SCHEDULES 51

CHAPTER FIVE DISCUSSION **64**

CHAPTER SIX CONCLUSION AND RECOMMENDATIONS 70

6.1 CONCLUSIONS 70

6.2 RECOMMENDATIONS 70

REFERENCES 71

ANNEXES 81

LIST OF FIGURES

FIG 1: SEX OF THE RESPONDENTS (N=239) 30

FIG 2: MARITAL STATUS OF RESPONDENTS (N=239) 30

FIG 3: LEVELS OF EDUCATION (N=239) 31

FIG 4: MONTHLY INCOME OF RESPONDENTS (N=239)..... 33

FIG 5: PERCENTAGE OF PARENTS WHO TOOK THEIR CHILDREN FOR DPT 35

FIG 6: PERCENTAGE OF PARENTS WHO TOOK THEIR CHILDREN FOR POLIO 36

FIG 7: PERCENTAGE OF PARENTS WHO TOOK THEIR CHILDREN FOR MEASLES 37

LIST OF TABLES

TABLE 1: IMMUNIZATION SCHEDULE FOR DPT, POLIO AND MEASLES IN UGANDA 5

TABLE 2: EMPLOYMENT STATUS (N = 239) 32

TABLE 3: RELIGIOUS AFFILIATION (N=239) 33

TABLE 4: AGE OF RESPONDENTS (N=239) 34

TABLE 5: RESPONDENTS' PERCEPTIONS ON FACTORS AFFECTING IMMUNIZATION COVERAGE 38

TABLE 6: RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND IMMUNIZATION OF CHILDREN AGAINST DPT 39

TABLE 7: RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND IMMUNIZATION OF CHILDREN AGAINST POLIO 43

TABLE 8: RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND IMMUNIZATION OF CHILDREN AGAINST MEASLES 47

TABLE 9: SOCIO-DEMOGRAPHIC FACTORS THAT AFFECT COMPLETION OF DPT IMMUNIZATION SCHEDULE IN KAWEMPE DIVISION 51

TABLE 10: SOCIO-DEMOGRAPHIC FACTORS THAT AFFECT COMPLETION OF POLIO IMMUNIZATION SCHEDULE IN KAWEMPE DIVISION . 55

TABLE 11: SOCIO-DEMOGRAPHIC FACTORS THAT AFFECT COMPLETION OF MEASLES IMMUNIZATION SCHEDULE IN KAWEMPE DIVISION 59

CHAPTER ONE

INTRODUCTION

1.1 Background

Immunization is an effective public health intervention to reduce morbidity and mortality among infants. It is an important means of controlling diseases, and has been considered the most cost-effective health intervention (Centers for Disease Control [CDC], 2006; Kongsvedt 2007; Melgaard 2001; Pan American Health Organization [PAHO], 2002; World Health Organization [WHO] 2005; WHO/United Nations Children's Fund [UNICEF], 2001). Immunization has brought sound health to many children in the world, reduced the agony experienced by parents during child rearing and reduced the mortality rate among children (Ogunlana, 2005; Vallbona, 2003). The use of immunization services however requires acceptability from the target community. This means that for immunization services to be used there must be a clear understanding of the benefits of vaccination among community members, a readiness for providing vaccination by the health services, and interventions to overcome access barriers to immunization services (Cheyne, 1994; Ndiritu, Cowegill, Ismail, Chiphatsi, Kamau & Fegan, 2006; Kidane & Tekie, 2000; Sebahat & Nadi, 2006; Singh & Yadav, 2001).

Increasing immunization coverage for childhood diseases has become an important developmental issue (Delivery of Improved Services for Health [DISH], 2002; WHO, 2002; 1999) and an area that requires more research (Edmunds, Brisson, Melegaro & Gay, 2002; Fairbrother, Hanson, Friedman & Butts, 1999; Guerin, 1998; Grenfell & Anderson, 1989; Hethcote, 1997; Reilly, Marthe & Fries, 1978; Stafford & Aggarwal, 1979; Subramanyam & Sekhar, 1987).

Based on WHO/UNICEF (2008) report, global immunization coverage continues to increase dramatically. Global data shows that infants less than one year of age immunized with DPT, (the three doses of the combined vaccine against diphtheria, pertussis and tetanus) increased from 20% in 1980 to 79% in 2006. The percentage of children immunized with three doses of polio vaccine in 2006 rose from 22% in 1980 to 80%. Global coverage for measles increased from 16% in 1980 to 80% in 2006. However, these increases are still falling short of the 2010 target of 90% set by WHO/UNICEF Global Immunization Vision and Strategy. It is argued that further increases in coverage of DPT, Polio and Measles would save millions of infant lives.

Social Mobilization

Although the current immunization coverage in Africa is 70%, the acceptable minimum coverage of 80% is yet to be reached. According to WHO (2002), some of the major contributing factors to poor coverage are social mobilization and insufficient community participation. Social mobilization of various elements of society for a common developmental goal can overcome long odds and reach goals hitherto thought unattainable in a limited time-frame. Social mobilization, as defined by UNICEF (1993), is a broad scale movement to engage people's participation in achieving a specific development goal through self-reliant efforts. It involves all relevant segments of society: opinion leaders, communities, individuals, religious leaders, decision and policy makers, professional groups, bureaucrats and technocrats, commerce and industry. It is a planned and decentralized process which seeks to facilitate change for development through a range of players engaged in interrelated and complementary efforts. It takes into account the felt needs of the people, embraces the critical principle

of community involvement and seeks to empower individuals and groups for action. Social mobilization entails a continuum of activities within a broad strategic framework. It calls for a journey among partners and results in the successful transformation of development goals into societal action. The societal mobilization strategy calls for partnership with all stakeholders: politicians, government, non-governmental organizations, community groups and families. It is argued that effective social mobilization activities would have a significant impact on the attitudes of people towards embracing the positive values of immunization (Nath, Singh, Awasthi, Bhushan, Kumar & Singh, 2007).

Immunization coverage in Sub-Saharan Africa

A substantial number of studies have documented cases of inadequate immunization coverage and challenges in Sub-Saharan Africa (Bardenheier, Yusuf, Rosenthal, Santoli, Shefer, Cricket, et al., 2004; BASICS 11, 2003; Bates, Fitzgerald, Dittus & Wolinsky, 1994; Bhuiya, Bhuiy & Chowdhury, 1995; Borooah, 2003; Cheyne, 1994; Chhabra et al., 2007; Demographic and Health Survey Report [DHS], 2000; DHS Report, 2005; Kidane & Tekie, 2000; Rafiqul, Mahfuzar & Mosfequr, 2007; Singh & Yadav., 2001; WHO, 1999; 2001; 2002; WHO/UNICEF, 2004). Among the 29 sub-Saharan countries surveyed, full childhood immunization coverage varies widely from only 11% of children of ages 12 to 23 Months in Chad to 78% in Zambia. In some countries, missing the third dose of vaccine in the DPT and Polio series is the reason that complete immunization levels are low. In Uganda for example, fewer than half of the children received the third DPT and Polio vaccines, although over 70% received the first in the series (Uganda Bureau of Statistics [UBOS], 2001).

Inadequacies in immunization coverage relate to a number of factors such as the level of sensitization by health workers and lack of political will by political leaders to mobilize and support immunization services (Waisbord, 2004). Other factors are low parent acceptability in terms of expected benefits, social mobilization of various elements of society for a common developmental goal, insufficient community participation due to lack of awareness, distance from the health facility, place of delivery, migration of families, mothers knowledge and attitudes towards immunization, weather conditions and low literacy levels of the parents (Cheyne, 1994; Ibnouf, Van den Borne & Maarse, 2007; Kidane & Tekie, 2000; Ndiritu et al., 2006; Sebahat & Nadi, 2006; Singh & Yadav, 2001).

Immunization coverage in Uganda

Increased immunization coverage is an important step towards fulfilling the Millennium Development Goals of reducing childhood mortality (Ministry of Finance Planning and Economic Development [MFPED], 2003). The goal of immunizing children against the six childhood immunizable diseases responsible for child mortality and morbidity targeted by Uganda Expanded Programme on Immunization [UNEPI] is indeed a noble one. However, it is not an easy task to achieve.

According to UNEPI (2005), immunization focuses on six common childhood diseases that can be prevented through immunization. These include; diphtheria, pertussis (whooping cough) and tetanus (DPT), Measles, poliomyelitis (polio) and tuberculosis (TB). Full immunization includes three doses of DPT Vaccine, four doses of oral Polio Vaccine, a Measles vaccination and a BCG vaccination. The focus of this study was on DPT, Polio and Measles as childhood immunizable diseases. This is because they are

among the highest causes of death (mortality) and constant sickness (morbidity) among children less than 12 months. They are also highly transmitted (spread easily) among children hence leading to epidemics. Yet, if many are vaccinated, a community may develop herd immunity thus reducing the spread of disease. The vaccine and administration against Polio, DPT and Measles are as indicated in Table 1 below.

Table 1: Immunization Schedule for DPT, Polio and Measles in Uganda

Time of	Vaccine	Disease Vaccinated	How it is applied
At birth	Polio 0	Polio	Mouth drops
At 6 weeks	Polio 1	Polio	Mouth drops
	DPT 1	DPT	Left upper thigh
At 10 weeks	Polio 2	Polio	Mouth drops
	DPT 2	DPT	Left upper thigh
At 14 weeks	Polio 3	Polio	Mouth drops
	DPT 3	DPT	Left upper thigh
At 9 months	Measles	Measles	Left upper arm

Adapted from UNEPI (2005)

Polio vaccine is administered by mouth at birth, at six weeks, 10 weeks and 14 weeks. DPT vaccine is given by injection on the left upper thigh at 6 weeks, 10 weeks and 14 weeks. Measles vaccine is also given by injection on the left upper arm but at 9 months. Various approaches have been applied to understand immunization coverage problems. However, there are acknowledged deficiencies in these approaches. This is clearly demonstrated in Uganda, where despite many immunization campaigns through media, health visits and improved health services management, the coverage rate is still less than 60% (WHO, 2001).

According to the Ministry of Health report on immunization promotion for leaders, the proportion of children who are fully immunized in Uganda has been dropping since 1995; from 47% in 1995 to only 37% in 2001, (MOH, 2002). “Fully immunized” is the term used to describe a child less than 12 months old who received one dose of BCG, one dose of Measles, and three doses of DPT/OPV before his/her first birthday. The report also states that most children (84%) received one dose of immunization and only 37% received all the five doses. The report further indicates that as many as 63% of mothers are not aware when their children need their next immunization doses in order to complete the immunization schedule. A nationwide demographic and health survey conducted in 2006 showed that only 46% of the children (12 to 23 months) had received all the recommended vaccines (UBOS, 2007).

Routine immunization coverage for Polio, DPT and Measles in Kampala district for children of 12 to 18 months averages 53.3%. The division coverage for Nakawa, Makindye, Central, Rubaga and Kawempe divisions being 69.3%, 67.7%, 69.5%, 55.2% and 50.3% respectively for the year 2005 (MOHDR, 2005/7; KDHDR, 2005/7). These coverage rates are all below the target score of 80% as per UNEPI Standards.

The low coverage rate in Kawempe division has been hypothetically attributed to many factors including lack of awareness about repeat visits to achieve complete immunization among parents, high levels of illiteracy and low socio-economic status (poverty level) of residents. It is assumed that illiterate parents have poor knowledge of the availability of different kinds of health services. In addition to hypothesized assumptions, parents with low socio-economic status are from low income households where per capita consumption on health boosting goods and services in children is low.

This study therefore investigated the socio-economic and demographic determines of immunization coverage in Kawempe division.

1.2 Problem Statement

Infant routine immunization coverage for Polio, DPT and Measles among children of 12 to 18 months in Kawempe division for 2005, 2006 and 2007, respectively were: Polio: 47.0%, 40.1% and 52.1%; DPT: 54.4%, 46.0% and 60.0%; and Measles: 50.0%, 56.0%, and 58.7% (Ministry Of Health Development Report [MOHDR], 2005-2007; Kampala District Health Development Report [KDHDR], 2005-2007). These are far below the targeted average percentage of 80%. However, the factors associated with failure to realize full immunization are still unknown. Therefore, this study sought to describe immunization coverage and investigate the factors associated with failure to complete childhood immunization in Kawempe Division.

1. 3 Study Setting

Kawempe Division is a representative of one of the five divisions that make up Kampala District. The division is an urban area and has a population of 241,709, the largest proliferation of slums and low literacy levels (Kampala District Population Statistical Abstract [KDPSA], 2006). Many of the residents in the division are unemployed and difficult to mobilize to participate in community health services like immunization. Kawempe division also has the lowest percentage of immunized children and the highest infant mortality rates in Kampala City (MOHDR 2005-2007; KDHDR 2005-2007).

1.4 Aim

The aim of the study was to describe immunization coverage for polio, DPT and measles in children aged 12 to 18 months, and to analyze factors associated with coverage in Kawempe Division.

1. 5 Objectives

The specific objectives of the study were:

1. To describe the immunization coverage for DPT in children aged 12 to 18 months.
2. To describe the immunization coverage for Polio in children aged 12 to 18 months.
3. To describe the immunization coverage for Measles in children aged 12 to 18 months.
4. To assess which demographic and socio-economic factors are associated with immunization coverage for Polio, DPT and Measles among children aged 12 to 18 months.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature related to immunization coverage of DTP, Polio and Measles, and the factors associated with immunization among the infants as well as the causes of the failure to complete childhood immunization. It also includes literature from text books, journals, periodicals and official reports, with the intention to identify gaps related to immunization coverage and factors associated with immunization coverage.

2.2: Immunization Coverage of DPT, Polio and Measles

Vaccine-preventable diseases are a challenge in most developing countries, especially in sub-Saharan Africa where it accounts for 25% of the deaths in infants (World Bank, 2006). Despite vigorous vaccination campaigns, immunization coverage for Polio, DPT and Measles remains low in many sub-Saharan countries such as Kenya and Zambia (American Red Cross, 2002; 2003; 2004). Uganda is no exception, as infant deaths from immunizable diseases are evident in many parts of the country in the districts of Karamoja, Bundibugyo, Nebbi, Yumbe, Katakwi, Moyo, Kiboga, Kamuli, Mubende, Kalangala, Kaberamaido, Bulisa and Kawempe division (MOHDR, 2006). Infant mortality rate deteriorated in Uganda from 88 deaths per 1,000 live births in 2000 to 90 deaths per 1,000 live births in 2005 (MFPED, 2007). The vast majority of deaths to children were caused by immunizable childhood diseases. Others were as a result of prenatal and early neonatal conditions, malaria, meningitis, pneumonia and HIV/AIDS (MFPED, 2007).

In a study by Chhabra, Nair, Gupta, Sandhir and Kannan (2007) that assessed the immunization coverage of BCG, DPT, OPV and Measles, and factors affecting the coverage in 693 children aged 24 to 47 Months in two urban villages of East Dehli, it was found that the immunization coverage was: 82.7% for BCG, 81.5% for DPT1/OPV1, 76.8% for DPT2/OPV2, 70.7% for DPT3/OPV3 and 65.3% for Measles vaccine. The coverage levels were associated with education of mothers and fathers, father's occupation, residential status and place of delivery. The study used systematic random sampling method to select the respondents where every n^{th} member of the population was sampled. The disadvantage with the method however, was that if the list being sampled had periodic arrangement then the sample collected would not be an accurate representation of the entire population.

In a cross sectional study by Borus (2004) on missed opportunities and immunization coverage of 418 children under two years in the slum areas of Nairobi Kenya, it was found that 80% of the children were immunized against Measles, 96.7% had received BCG, 85% against DPT and 75% against Polio. Overall 84% of the children were fully immunized. The study also revealed that the most frequently reported reasons for child not being fully vaccinated were: vaccine was out of stock (20%), vaccine scheduled not to be given that day (35%), child was sick or under weight (20%), child not yet of age (15%) and syringe out of stock (10%). The author argues that the lower immunization coverage for Polio (75%) compared to DPT (85%) was due to missed opportunities arising from shortage of Polio vaccine that was reported in the period proceeding to and during the survey.

In a cross-sectional survey to describe the immunization coverage in a rural part of north India with a sample of 747 children, it was found out that 94.8 % (708 of 747) eligible children were immunized and had received the required doses of the primary schedule vaccines (Singh 2007). The coverage was (BCG (94.8%), OPV/DPT (91.6%), and Measles (72.6%). Only 39 (5.2%) of the eligible children had not completed immunization schedule for BCG, DPT, Polio and Measles due to temporary or permanent migration of the children or family to the village or went back to the parents' home or divorce or the child was adopted by relative. Much as the results of this study indicate high responses and positive results, the study was conducted in the rural setting of India, a situation that may significantly differ from the Kawempe division which is an urban setting, although there are some clear similarities like frequent temporary or permanent migrations of the children or families which may affect child completion of immunization schedules. Internal migration is also the order of the day in urban areas; hence the same factors could be important in explaining the existing levels of immunization coverage in Kawempe division.

In a cohort study of childhood immunization on 760 newborns in rural Malawi, it was found that at 1 year of age, 91% were vaccinated against Polio, 90% against DPT and 64% against Measles (Vaahtera, Kulmala, Maleta, Cullinan, Salin & Ashorn, 2000). At 2 years of age, the corresponding vaccination coverages were 93%, 93% and 84%, respectively. The study further revealed that low coverage was associated with living in villages with no access to mobile vaccination teams, and birth at home.

A study to identify factors influencing urban and rural immunization coverage in 220 households with children 12-13 months of age in a rural district of Ethiopia revealed

that higher community awareness was associated with effective community mobilization for immunization (Kidane & Tekie, 2000). Furthermore, the study found that immunization coverage for DPT, Polio and Measles in these areas were 97.3% for DPT1/OPV1, 92.7% for DPT3/OPV3 and 75.5% respectively and the reason for this high coverage was that mothers were literate. The WHO multi-stage cluster sampling method with stratification was used. The method does not allow selection of households from the sampling frame, but instructs the interviewer to follow a random procedure in the field, resulting in a cluster of households being selected within the community. This procedure is open to conscious or unconscious bias of the interviewer, and does not lead to a sample selected with known probability. The method also includes all the eligible children in the household in the sample. There is also an element of stratification which introduces the element of extensive sampling frame, which is necessary in stratified sampling, significant attributes that can be subjectively selected thus increasing costs (due to extra time and manpower).

A prospective study by Anah, Etuk and Udo (2006) on eliminating a missed opportunity as one of the barriers to immunization in 919 children aged 5 years and below in Calabar South-Eastern Nigeria, showed that 60.9% of the children whose immunization status was ascertained were fully immunized, while 26.6% were partially immunized and 12.5% had no form of immunization. The study further revealed that immunization coverage for BCG was 65.7%,OPV0 65.7%, DPT1/OPV1 64.1%, DPT2/OPV2 62.7%, DPT3/OPV3 62.4% and 61.3% for Measles. Reasons for missing scheduled immunization were: child being ill at the time of immunization, ignorance about repeat visits, change of residence and fever following previous immunization. This was a hospital based study which used immunization cards and immunization history method.

It involved cross-checking immunization history and immunization cards at each visit and following the respondents forward in time. A follow-up study had the disadvantages of time and cost considerations. The study, having taken a long time in cross-checking immunization history and immunization cards, most likely obtained results that were not accurate and hence to a great extent unreliable.

In a study by Nuwaha, Mulindwa, Kabwongyera & Balenzi (2001) on attendance at National Immunization days and routine immunization involving 48 mothers and fathers in Bushenyi District, Uganda, it was found that immunization coverage was 95% for BCG, 82% for DPT, 81% for Polio and 77% for Measles.

The study revealed that the coverage was due to knowledge of immunization, attitudinal beliefs and social influence of the mothers and fathers. The mothers and fathers believed that routine immunization were well intentioned and meant to eradicate childhood diseases. In terms of social influence, the study revealed that while it was the woman who decides the issue of routine immunization, the man was regarded as the one who makes the very important decision not to immunize in exceptional situation when immunization strengthens disease. The authors recommend the involvement of men and women in health education/promotion activities for immunization.

2.3 Factors Associated with Immunization of Infants less than One Year for DPT, Polio and Measles

A study carried out by Cheyne (1994) on immunization in urban areas in China revealed that poor uptake of immunization in urban areas was associated with lack of mother's awareness about repeat visits to achieve complete immunization rather than overall vaccine awareness. This led to failure by mothers to make repeat visits to complete

immunization. The study suggested that the community's concerns about immunization should be addressed through involvement of decision- makers like fathers and mothers in-law. Furthermore, anti-vaccine rumors such as pathogenicity of a vaccine and propaganda of vaccines weakening their children which were encountered in the community, affected immunization coverage attained. Most illiterate mothers as well as their husbands have negative attitudes towards vaccination and believe that vaccines have got side effects on the health of their children. Negative perceptions about vaccination and anti-vaccine rumors in some communities affect the level of immunization coverage. Mis-information about the side effects of vaccine during illness and false contraindications also affect the level of immunization coverage. This study was therefore carried out to establish whether similar situations existed in Kawempe Division as it is also an urban setting which is multi-ethnic with varying socio-cultural and education background.

In a related study, a representative sample of 221 respondents was used in investigating the reasons for non-vaccination and the effects of socio-demographic factors on vaccinations in a district of Istanbul, Turkey, (Sebahat & Nadi 2006). This study revealed that distance from the health centre and internal migration from less developed parts to more developed parts of the country, were significantly related to the level of immunization coverage. The study also revealed that immunization coverage was associated with educational level of the father and the mother. Children whose mothers' education level was at least primary school were more likely to be fully immunized than those whose mothers had no education. The study used the '30x7' cluster sampling, a method recommended by WHO as a rapid and economic method used in assessment of vaccine coverage. Using this method, communities are selected with probability proportional to size according to the most recent census data, but these data can be

inaccurate and outdated, particularly with respect to fast-growing urban areas like Istanbul. This will often mean that such areas, which may have the poorest access to health care, will be under-represented in the sample, and overall estimate of vaccine coverage will be biased upwards. It is most likely that such results may have some inaccuracies thus creating a situation of unreliability, even though the data was collected from an urban setting like Kawempe Division.

In another study on child immunization coverage in 700 households in the slum areas of Rajshahi City Corporation Bangladesh, it was found that full immunization was higher (92.3%) in the higher ages (24+ months) than the age 12-23 months (89.5%) (Rafiqul, Mahfuzar & Mosfequr, 2007). The high coverage in the higher ages of 24+ months was attributed to demographic and socio-economic factors such as mother's education, husband occupation and family's monthly income. The study found that the place of delivery and exposure to mass media had highly significant effects on child immunization. In other words, the mothers who were exposed to any mass media were more likely to have their children immunized compared to the mothers who were not exposed to any mass media. Furthermore, mothers who delivered at health institutions such as hospitals and clinics were more likely to have their children given the Polio 0 vaccine on delivery than those who delivered at home.

In a study by Nath et al. (2007) on determinants of immunization coverage in 510 children aged 12-23 months in urban slums of Lucknow district, India, it was reported that only 44% of the children were fully immunized. Incomplete immunization and unimmunized status of the children were associated with low socio-economic status which constrained the poor parents to take their children for repeated visits to complete

immunization schedules, higher birth orders which are associated with low child care with a mentality that high numbers act as insurance for those that may die, home delivery and Muslim religion which limit access to immunization centres. The study used WHO 30-cluster sampling method which was similar to the study by Sebahat and Nadi (2006). Again, the method used did not select households from a sampling frame, but instructs the interviewer to follow a random procedure in a cluster of households being selected within the community. This procedure is open to conscious or unconscious bias of the interviewer, and does not lead to a sample selected with known probability. In case of non-response, one simply goes to select the next households, leading to bias if non – responders differ systematically from those who did not participate. Only the first household in each cluster is selected and every eligible subject in the household is included in the sample. Such a methodology definitely remains questionable in the scientific research, and the accuracy of the findings remains questionable, though they can not be wholly discarded because of its homogeneity with Kawempe Division in terms of having slum areas.

In another study by Singh and Yadav (2001) on childhood immunization of 6300 children in urban slums of India, it was found that slum dwellers did not demand immunization services. Demand immunization services require acceptability, clear understanding of the benefits, no fear of vaccines, specific knowledge of the vaccine doses, motivation to avail services and overcoming barriers for seeking immunization. The authors argue that slum dwellers were unable to demand for services owing to weak community organization and low collective confidence, which is known to increase utilization of health services in public institutions. This is possibly related to the observed low utilization of health services including immunization services. This study

also used WHO 30- cluster survey method with modification similar to the one used in a study by Kidane and Takie (2000). Although the method is a modified one, still it does not select households from a sampling frame, but instructs the interviewer to follow a random procedure in the field, resulting in a cluster of households being selected within the community. It also includes all the eligible children in the household in the sample and only the first household in each cluster is randomly selected.

In Uganda, a cross-sectional descriptive study by Odiit and Amuge (2003) on comparison of vaccination status of children born in health units and those born at home of 486 children under five years in Jinja town, Eastern Uganda, it was found that 68% of the children were up to-date with their vaccines.

The study revealed that a child born in a health unit was more likely to be up to-date with their vaccination compared to a child born at home. Being born at home was found to be a risk factor for incomplete or non vaccination. Continuation of vaccination was similarly observed to be poor in children born at home and those born in health centres. The authors recommend training by community Health workers of TBAs and the participation of TBAs and parish development committees in routine immunization coverage.

In a cross-sectional survey on factors influencing immunization coverage among 410 children under five years of age in Khartoum State Sudan, Ibnouf, Van den Borne and Maarse (2007) found that children in urban and rural areas differed significantly in their reported vaccination coverage and their receipt of each vaccine. In urban areas, accessibility to immunization centers is high compared to rural areas where amidst the few centers immunization is schedule based. The study also confirmed that vaccination coverage increased with an increase in the age of the children and the education level of

the mother. Furthermore, the study found that the mothers' knowledge of and attitude to vaccination showed a strong relationship with the vaccination status of their children. This study used a similar method as applied by Chabra et al. (2007). Equally, a sample collected may not be an accurate representation of the entire population if the list being sampled had periodic arrangement.

In a study on health infrastructure and immunization coverage of 43,416 children aged 2-35 months residing in rural India, it was found that the availability of health infrastructure significantly improved immunization coverage for non Polio vaccines (Datar, Mukherji, & Sood, 2005). The study further revealed that larger and better-equipped facilities such as hospitals and health centres had bigger effects on immunization coverage. The findings of this study suggest that the nature of health infrastructure: hospitals and health centres play an important role in increasing immunization coverage. Much as the results of this study could not depict a similar situation in Kawempe division, it is evident however that this was an urban dwelling which is synonymous to Kawempe Division which houses big health institutions like Mulago hospital and others as indicated above, which could make a good comparison for the study, hence explaining how health facilities can be a factor associated with immunization coverage.

In Kenya, a cluster survey with sample size of 204 children aged 9-23 months was carried out by Ndiritu et al. (2006). This study investigated immunization coverage and risk factors for failure to immunize children below one year for DPT. The study revealed that immunization coverage declined with increasing distance from the vaccination clinics. The study also showed that immunization coverage was more strongly associated with annual patterns of rainfall.

A WHO 30-cluster sampling method together with simple random sampling method was used in the study. The WHO 30-cluster sampling method again does not select households from a sampling frame. Simple random sampling which requires a population listing was applied and each chosen subject was located and questioned. Certain significant attributes may also be under or over represented.

In a cross-sectional descriptive study of 408 care takers with children aged 12-23 months by Tugumisirize, Tumwine and Mworoza (2002) on missed opportunities and caretaker constraints to childhood vaccination in Kiyeyi, a rural area in Eastern Uganda, it was established that complete vaccination coverage was 44.6%. Reasons for non-completion of vaccination were: caretaker not being bothered, being busy or ill, and feared health workers. Other reasons were: not knowing immunization schedule, low level of formal education, fear of vaccine side effects and perceived contraindications to vaccinations. Although the results of this study which was conducted in rural Uganda cannot be confirmed to be relevant to Kawempe division which is urban setting, relevance can be found in the low level of education of the caretakers and their being busy. Kawempe division has a high level of illiteracy and unemployment (MFPED, 2003). The same factors therefore, could be important in explaining factors associated with immunization coverage in Kawempe division.

A participatory study of 114 participants to assess the impact of decentralization of health services in Ntungamo District in Western Uganda by Baluka (2003) revealed that routine immunization coverage in infants below one year for Polio, DPT, Measles and BCG was high, averaging 80% since 2000. The study found that the community members hailed the decentralization of services as instrumental in improving

accessibility to health services. Much as the findings of this study which was conducted in rural district of Uganda cannot be relevant to Kawempe division which is urban, relevance can be found in the existence of decentralized health services. Hence the existence of decentralized health services could be important in explaining factors associated with immunization coverage in Kawempe division.

In summary, much as the literature reveals several factors affecting immunization coverage in children aged 12 to 18 months, the main demographic and socio-economic factors associated with vaccine coverage are: distance from health centre facility, family migrations, place of delivery, the role of the mass media, availability of health infrastructure or facilities, mother's education, age, knowledge, attitudes, weather conditions, decentralized health services and community awareness.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Chapter three presents the methodology that was used which included the source of data, study population, population sample, sampling techniques, instrument quality control, data collection, data analysis, limitations of the study and ethical considerations.

3.2 Study design

The study used primary source of data due to the fact that secondary data with variables under study in Kawempe Division was not available. A descriptive, cross-sectional research design was conducted to describe the immunization coverage for Polio, DPT and Measles among children of 12 to 18 months. The descriptive design was preferred because it provides further insights into the research problem by unfolding the variables of interest, estimating, predicting and examining associative relationships**.**

3.3 Study Population

The study population comprised of 18,344 households in Kawempe Division, Uganda (KDPSA, 2006). It is estimated that about 8% (1,468) of households had children in the age group of 12-18 months (KDPSA, 2006).

3.4 Sample Size

A sample of 225 households was calculated using Epi Info Statcalc and applying the following parameters: a 95% level of confidence (5% margin of error); and prevalence of 53% according UNEPI (2005). To cater for non-responses to some of the questions, a 7.5% over-sampling was applied to give the stated value of 241 households. In the actual study, 239 respondents were successfully interviewed and the response rate was 99.2%. During the study, parents from 22 households were absent. However, since there

was over sampling (by 7.5%), this challenge was overcome. Therefore, a sample of 239, which is greater than the minimum sample size calculated (225), was realized.

3.5 Sampling Procedure

In an effort to minimize data collection costs and to ensure precision, the study used a multi-stage sampling technique at the first stage cluster sampling technique was applied to obtain the enumeration unit. At the second stage, simple random sampling was used to select five (5) administrative units (parishes) from 19 administrative units (parishes) that constituted the selected cluster (Kawempe division). This was done by writing the names of the parishes on pieces of papers and placing them in a tin. The researcher shook the tin until the papers were mixed up before selecting the five, one by one without replacement. From each of the five (5) selected administrative units [parishes], again simple random sampling was used to select one village (cluster) from 12 villages on average in each parish. Again, the researcher went through the same process that was used to select the parishes. Thus a total of five (5) villages were selected. The study finally used systematic sampling to select households from the five (5) selected villages. First, with the help of Local Council one [LC 1] leaders, the research team established the number of households that had children aged between 12-18 months. Secondly, the total number of households in each village was divided by the respective samples for each of the villages to calculate the intervals that were used when selecting the households. Thereafter, every fifth household that had children between 12-18 months was selected.

At the household level, the mother was selected as the respondent. The father or caretaker was used only if the mother was unavailable and this was the case in 7 households. This selection affected the results in such a way that 232 (97.1%) of the

respondents were mothers and only 7 (2.9%) of the respondents were fathers or caretakers.

3.6 Data Quality Control

3.6.1 Validity

According to Amin (2005), validity is defined as the ability to produce findings that are in agreement with theoretical or conceptual values; in other words, to produce accurate results and to measure what is supposed to be measured. In this study, scientific research methods were applied to design the data collection tool as well as the selection of the samples. Using critically assessed instruments, scientific sampling techniques were followed to minimize information bias. The selection targeted women and care takers staying with children aged between 12-18 months. This is because it is such women/care takers that would give unbiased information about the immunization of their children who were supposed to have completed immunization schedules for DPT, Polio and Measles within a period of one year (12 months) after birth. Selecting respondents without children in this group (12-18 months) would lead to giving of incorrect data. Seven male respondents become part of the sample after failing to tress the responsible women he could give information pertaining to the immunization status of their children. However, the 7 male respondents selected for the interview out of 239 respondents were too few to bias the information presented in this study.

3.6.2 Reliability

According to Amin (2005), reliability is defined as the level of internal consistency or stability of the measuring device over time. An instrument will be reliable if it produces the same results whenever it is repeatedly used to measure trait or concept from the same respondents even by other researchers.

3.6.3 Procedures

Guidelines of the WHO and UNEPI Operational Framework were used to provide standards for effective immunization. Conciseness was critically considered in formulating questions to enhance clarity. To ensure reliability, the instruments were edited and pre-tested on 50 respondents from households who were not part of the study in the study area. In addition, they were given to two professors from the School of Public Health, Makerere University to ascertain their validity and find out whether they were suitable for collecting information that would answer the questions in the study. The questionnaire was then pilot-tested on 50 respondents of the un-sampled number of the study population. After piloting the tools, they were reviewed to ensure that they captured reliable information and modified to improve clarity before undertaking the main study. The reviewed and modified tools were then used by the thoroughly trained Research Assistant to collect data. Supervision of all interviewers was undertaken during data collection to avoid inaccurate recording of responses.

3.7 Generalizability

The results of this study are generalizable to all households in Kawempe division, Kampala District in Uganda. Inference beyond this cannot be assumed.

3.8 Data Collection

3.8.1 House hold interviews

Data was collected using interviewer-administered questionnaires due to the fact that illiteracy rate stands at 31% among women in Uganda (UDHS 2006). Therefore to put into consideration of respondents who could neither read nor write interviewer-administered questionnaires were used. The questionnaire was developed according to the research question and the objectives of the study. It consisted of 36 questions, with

11 questions on background information, 7 questions on immunization coverage and 18 questions on factors influencing immunization coverage (Annex I). The questionnaire included close-ended questions set in a yes/no format. Following consultation from experts, the questionnaire was translated into Luganda a language that is ably understood by over 95% of the residents in Kawempe Division (UBOS 2006). In an effort to meet the deadline, Research Assistants were trained for a consecutive period of three days to interpret the questions in English and Luganda as well as the data collection procedures. The thoroughly trained Research Assistants administered the questionnaire in approximately 40 minutes each. Child vaccination status was determined through inspection of the child's immunization card by the study interview. Information on demographic and socio-economic factors was obtained from self-identified and reporting by the mother and caretaker.

Since the study population was large, using the questionnaire was advantageous, in that respondents were easily interviewed by 4 well trained Research Assistants. Secondly, given that the questionnaire was interviewer administered, it enhanced the response rate and saved time and money for emailing and collecting the questionnaires.

3.9 Data Management and Analysis

3.9.1 Data Management

Data processing included the following steps: sorting, categorization, coding, entry, cleaning and validation. Data was appropriately recorded and edited to ensure accuracy and consistency. Coded data was entered using Epi Info and later transported to SPSS for cleaning and analysis.

3.9.2 Data Analysis

Data was analysed at three levels using statistical package for social scientists version 13. The levels of analysis included univariate and bivariate analyses.

3.9.2.1 Univariate Analysis

At this level of analysis, frequency tables and descriptive statistics were constructed to indicate the background characteristics of respondents. The variables of interest included; sex, marital status, highest level of education, employment status, monthly income, Religion and age.

3.9.2.2 Bivariate Analysis

Pearson chi-square test was appropriate for this study because all variables were categorical. Statistical significance of the association between the dependent variable (immunization coverage) and the independent variable (socio-demographic factors) are interpreted using the Pearson chi-square test with the significant level fixed at 95%.

3.9.2.3 Interpretation of results

The test explains the level of association using p-Value, the level of significance which is the probability of rejecting or accepting the hypothesis being tested. It was fixed at 0.05 and if the p-value is greater than 0.05, then the statistical relationship between the dependant and independent variable under study is not significant. Else, if the p-value is equal or less than 0.05, then there is a significant statistical relationship between the two variables in that a change in one makes the other change. The general formulae of the Chi-square used is

$$X^2 = \sum_{i=1}^{r} \sum_{j=1}^{k} \frac{\left(O_{ij} - E_{ij}\right)^2}{E_{ij}}$$

Where;

j= 1, 2, ……., k

i = 1, 2 …r

O_{ij} = Observed frequency.

E_{ij} = Expected frequency.

k = Number of categories of the dependent variable.

r = Number of categories of the independent variables.

3.10 Limitations

Limitations to this study included language barrier since Kawempe division is an urban centre with a collection of different tribes and nationalities. To solve this problem, questionnaires were translated into the most popular local language (Luganda) of the respondents.

3.11 Ethical Considerations

In conducting this study, the researcher took care not to infringe on ethical and legal issues. Ethical approval was obtained from the Ethics committee of the Ministry of Health in Kampala. This permission in the form of official letters (Annex VI) was taken to the Local Government council leaders in the localities. The respondents were adequately informed using the participant's information sheet about all the relevant aspects of the study, including its aim, interview procedures, anticipated benefits and potential hazards before the main data collecting team arrived. The interviewers outlined the scope of the interview and its approximate length prior to the start of the interview.

The respondents were informed that participation in the study was entirely voluntary. They were also informed that they had the right to do the interview, to abstain from participation and to terminate their participation at anytime, whenever they wanted. In this case, the respondents did not become subjects of the study unless they provided informed consent as stated on the consent form. The consent forms were signed by the

respondents who agreed to participate in the study with no pressure or inducements of any kind being applied to encourage them to become subjects of the study. The respondents were also informed that the interviews would be conducted in privacy. Caution was maintained to ensure that the identity of respondents from whom the information was obtained would be kept strictly confidential and would be referred to their words, pseudonyms or invented names which they had chosen. They were also assured that at the end of the study, any information that revealed the identity of individuals who were subjects of the study would be destroyed. No information, revealing the identity of any participant was included in the final report or in any other communication prepared in the course of the study, unless the participant concerned had consented in writing to its inclusion beforehand.

Adherence to strict confidentiality and safeguards was therefore ensured. Careful measures were taken for the safety to all collected data and stored in the computer database that was accessible only to the student and the supervisor and was password protected.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents findings of this study in five major parts namely: background characteristics of respondents, immunization coverage in Kawempe Division, parents' perceptions about factors affecting immunization coverage and the relationship between socio-demographic variables and immunization coverage.

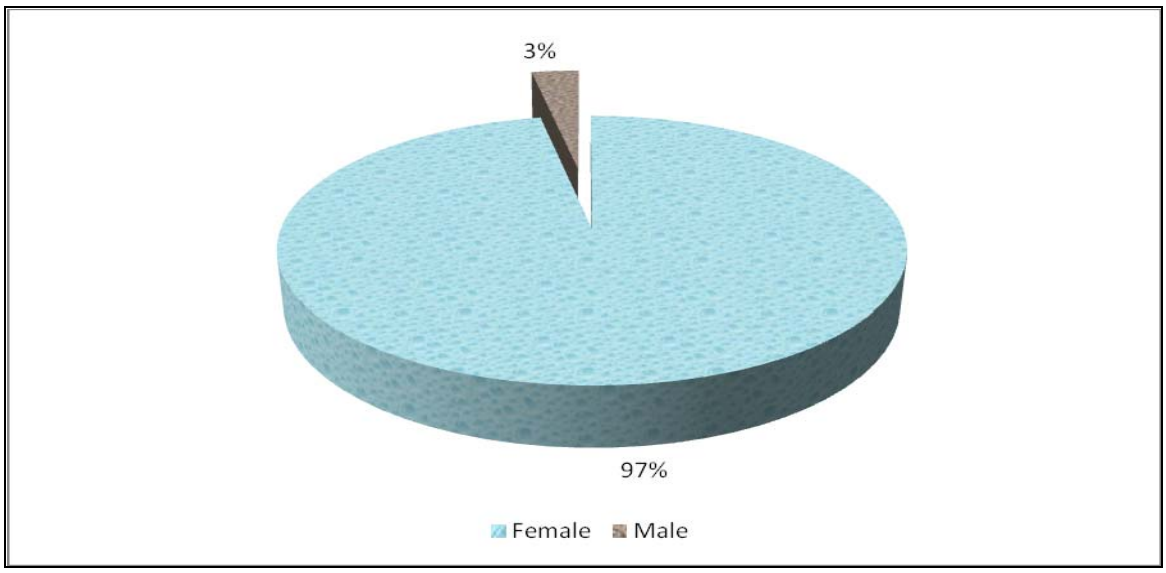
4.2 Background Characteristics of Respondents

This sub-section explains the background characteristics of the 239 respondents interviewed. The background characteristics include; sex, age, income, marital status, highest level of education, employment status and religion.

4.2.1 Sex of respondents

Sex of respondents affects immunization perceptions where females are more likely to ensure that their children are immunized than their counterparts. Figure 1 shows the percentage distribution of respondents by sex. Results from the survey indicate that majority of the respondents were female, accounting for 97.1% of the total number of respondents (Fig. 1).

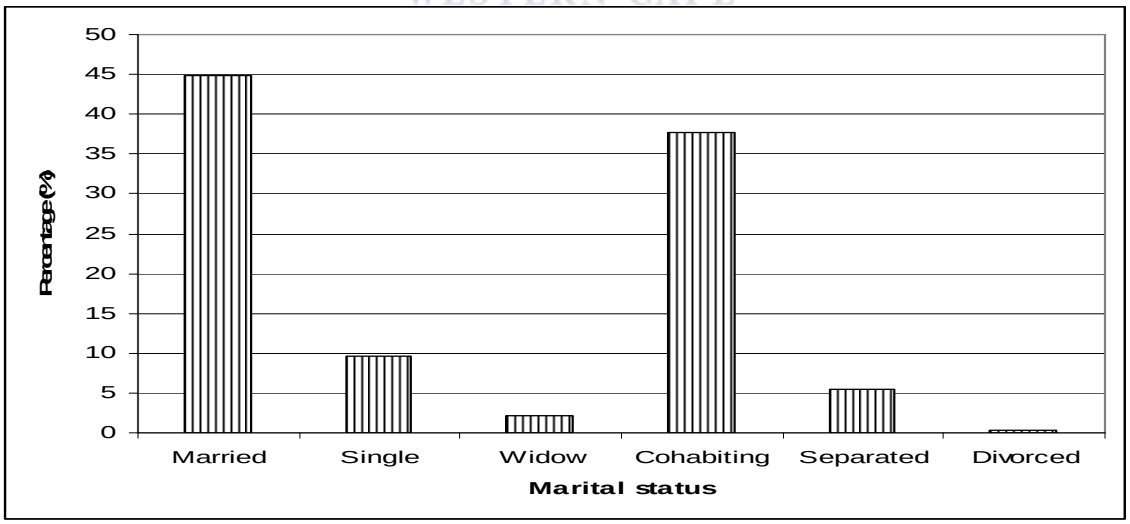
Fig 1: Sex of the Respondents (n=239)



4.2.2. Marital Status

Figure 2 below shows that 44.8% of the respondents were married, 37.7% were cohabiting, 9.6% were single parents, 5.4% had separated, 2.1% were widowed and 0.4% divorced.

Fig 2: Marital Status of Respondents (n=239)

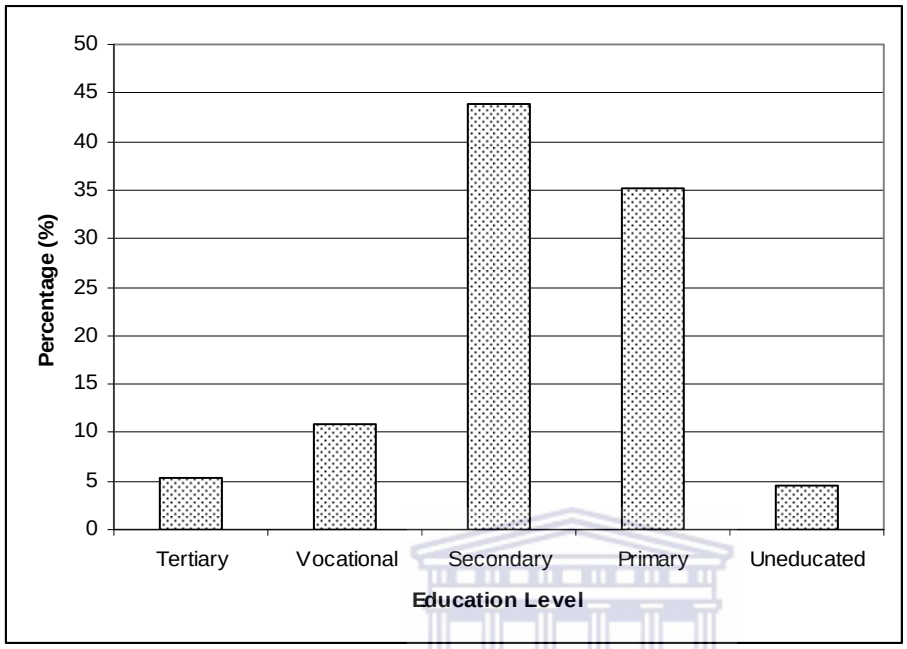


4.2.3. Highest Level of Education

Out of a total of 239 respondents, only 43.9% of the respondents had completed secondary level education, 35.1% had completed primary level education, 10.9% had

vocational training, 5.4% had completed tertiary institutions, and 4.6% had not obtained any formal education, (Figure 3).

Fig 3: Levels of Education (n=239)



4.2.4. Employment Status

The employment status has an effect on immunization related issues particularly on the side of the woman. Table 2 shows the percentage distribution of respondents in different categories of their employment.

Table 2: Employment Status (n = 239)

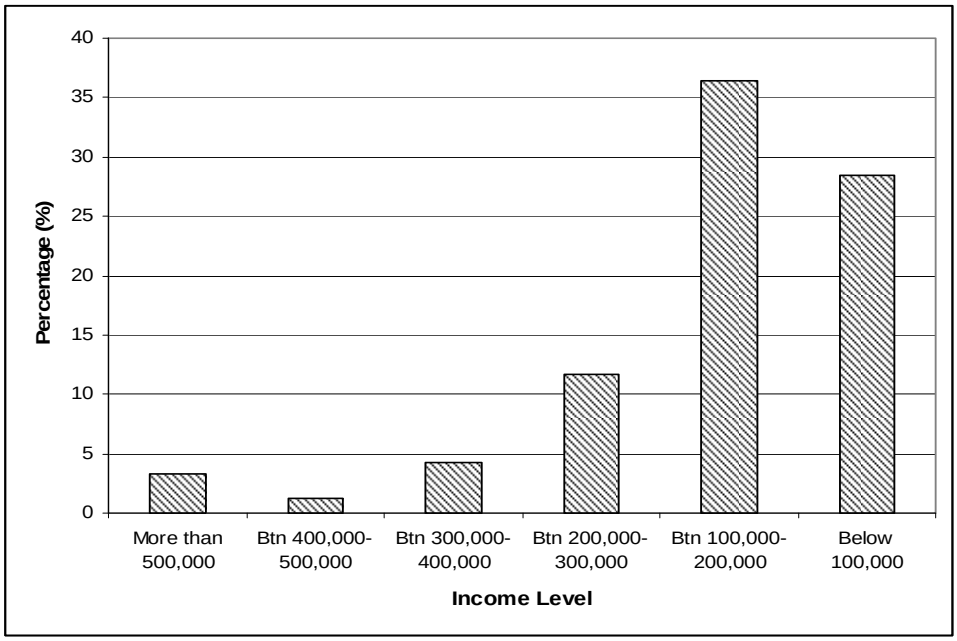
Employment status	Number (N)	Percentage (%)
Working (full-time)	64	26.8
Working (part-time)	34	14.2
Unemployed	121	50.6
Retired	2	0.8
Student	5	2.1
Self employed	3	1.3
Total	**239**	**100**

It was revealed that most of the respondents (50.6%) were unemployed. Respondents working full time contributed 26.8%, 14.2% were part-time workers, 2.1% were students, 1.3% were self-employed and 0.8% had retired from formal employment. It is not surprising that the employed only formed 47.5% due to low education levels.

4.2.5. Monthly Income

Figure 4 below shows that 36.4% of the respondents earned a monthly income between UGX 100,000 and 200,000, 28.5% earned less that UGX 100,000, 11.7% earned more than UGX 200,000 but less than UGX 300,000, 4.2% earned an income of between UGX 400,000 and 500,000 while 3.3% earned more than UGX 500,000 per month.

Fig 4: Monthly Income of Respondents (n=239)



4.2.6. Religious Affiliation

Table 3 below shows that 67% of the respondents were Christians, 29.3% were Muslims, 2.9% belonged to other religions and 0.8% were unaffiliated to any religion.

Table 3: Religious Affiliation (n=239)

Religious affiliation	**No. of Respondents**	**Percentage %**
Christians	161	67%
Pagans/Traditionalists	2	0.8%
Muslim	70	29.3%
Other religions	6	2.9%
Total	**239**	**100%**

4.2.7. Age of Respondents

Age of respondents is a very important demographic fact in affecting immunization coverage. There is likelihood for age to be associated with experience pertaining to immunization. The age distribution of respondents is presented in Table 2 below;

Table 4: Age of Respondents (n=239)

Age Group	No. of Respondents	Percentage (%)
15-19	29	12.1
20-24	74	31.0
25-29	67	28.0
30-34	39	16.3
35-39	19	7.9
40+	11	4.6
Total	**239**	**100.0**

Table 4 shows that 31% of the respondents were aged between twenty and twenty-four, 28% were aged between twenty-five and twenty-nine, 16.3% were between thirty and thirty-four years, 12.1% were aged between fifteen and nineteen, 7.9% were between thirty-five and thirty-nine years and 4.6% were above the age of forty.

4.3 Immunization Coverage among children aged 12 to 18 months in Kawempe Division

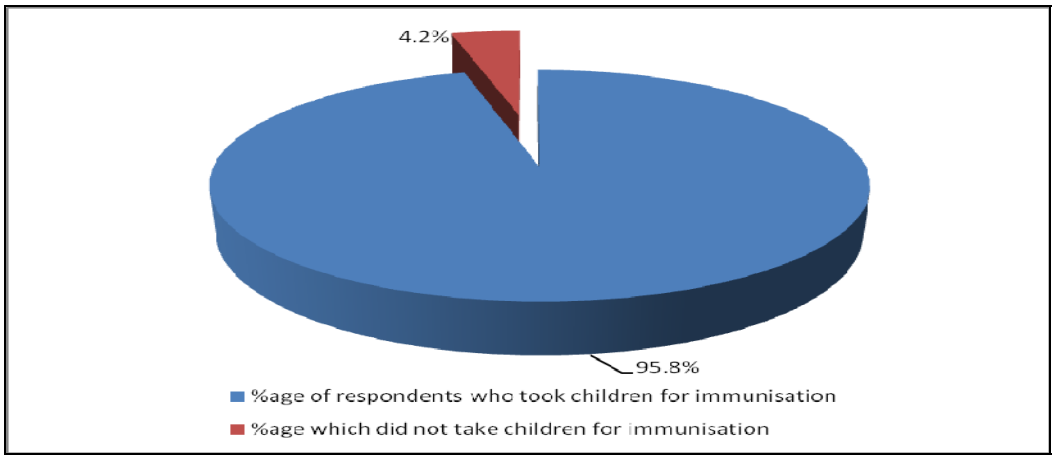
Among the specific objectives of the study was to describe the immunization coverage in Kawempe Division for Polio, DPT and measles in children aged 12 to 18 months.

Presentation of immunization cards was one of the criteria used to justify whether the respondents had immunized their children. Out of 239 respondents, 225 (94.1%) of the respondents presented immunization cards of their children during the study, while 14 (5.9%) of the respondents did not present immunization cards of their children because they were not available during the survey.

4.3.1 Immunization coverage for DPT in children aged 12 to 18 months

Respondents were asked to indicate whether they had taken their children for DPT immunization. In addition, respondents that had taken their children for immunization were also asked if they completed its schedule. The responses obtained are presented in the figure 5 below:

Fig 5: Percentage of Parents who took their Children for DPT



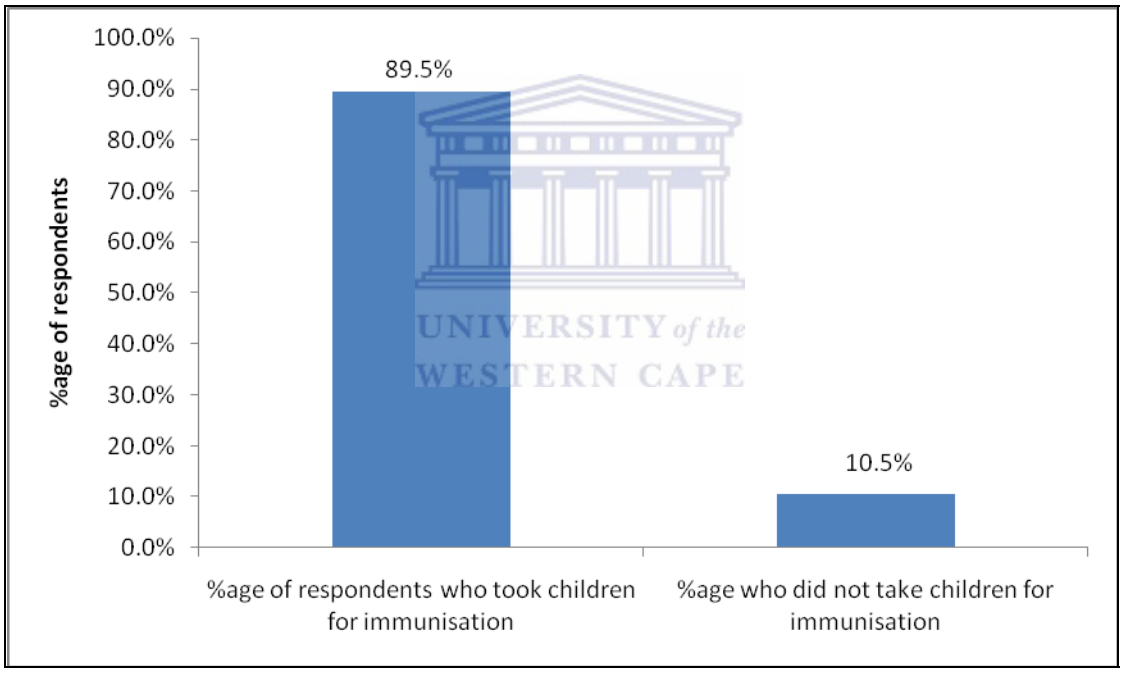
Results from the survey show that out of the 239 respondents, 229 (95.8%) had taken their children for DPT. The study further revealed that out of the 229 parents who had

taken their children for the DPT vaccine, 184 (80.3%) had completed the immunization schedule.

4.3.2 Immunization coverage for Polio in children aged 12 to 18 months

Respondents were asked to indicate whether they had taken their children for Polio immunization. In addition, respondents that had taken their children for immunization were also asked if they completed its schedule. The responses obtained are presented in the figure 6 below:

Fig 6: Percentage of Parents who took their Children for Polio



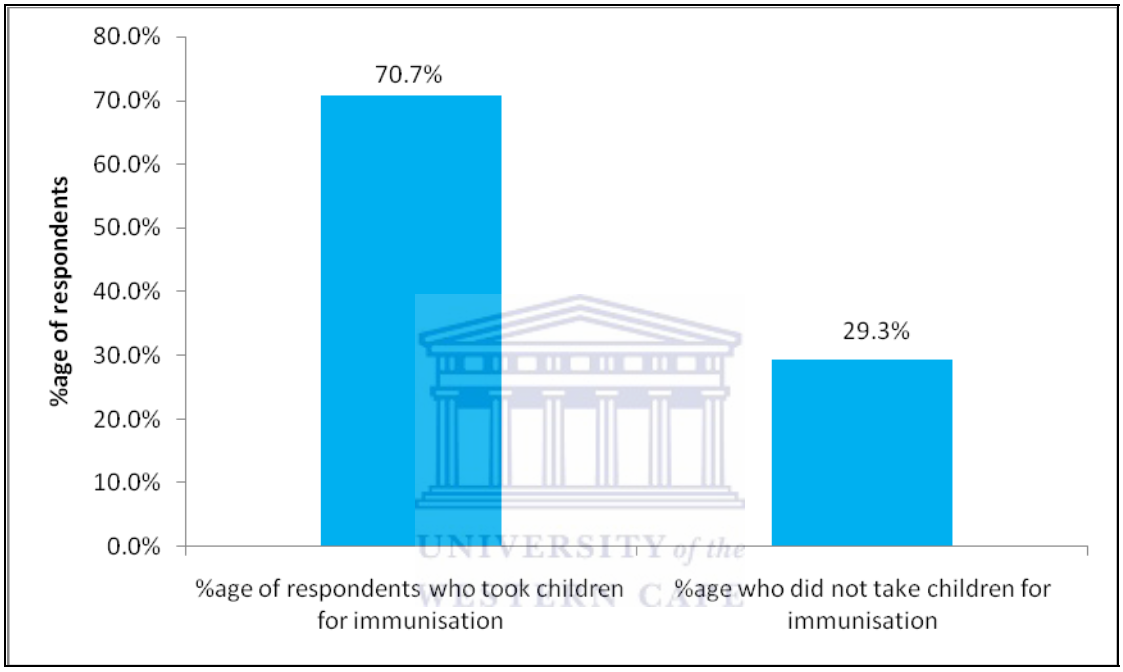
Results from the survey show that out of the 239 respondents, 214 (89.5%) had taken their children for Polio.

The study further revealed that out of 214 (89.5%) parents who took their children for Polio immunization, 175 (81.7%) completed the immunization schedule.

4.3.3 Immunization coverage for Measles in children aged 12 to 18 months

Respondents were asked to indicate whether they had taken their children for measles immunization. In addition, respondents that had taken their children for immunization were also asked if they completed its schedule. The responses obtained are presented in the figure 7 below:

Fig 7: Percentage of Parents who took their Children for measles



Results from the survey show that out of the 239 respondents, 169 (70.7%) had taken their children for measles vaccination. The study further revealed that all the 169 (70.7%) parents who took their children for immunization automatically completed the immunization schedule.

4.4 Respondents' Perceptions about Factors Affecting Immunization Coverage

Perceptions of individuals on immunization coverage vary. During the study, respondents were asked to indicate their perceptions to a list of factors affecting

immunization coverage in Kawempe Division. They were asked to indicate whether they believed such factors were affecting immunization coverage. The findings on respondent's perceptions are presented in Table 4 below.

Table 5: Respondents' perceptions on factors affecting immunization coverage

Respondents' perceptions	Yes
The attitude of mothers is important in enhancing utilization of immunization services.	236 (98.7%)
Community awareness is important in promoting immunization services.	227 (95%)
Availability of health facilities enhances immunization services	222 (92.5%)
Availability of immunization equipment enhances use of immunization services	222 (92.5%)
Mothers knowledge on immunization activities enhances the use of immunization services	221 (92.5%)
Place of delivery enhances the utilization of immunization services	216 (90.4%)
Short distance to immunization centers encourages mothers to take children to	206 (86.2%)
Decentralization of health services (bringing health services nearer to the people) is essential in enhancing utilization of immunization services.	197 (82.4%)
Migration of families (change of residence of families) affect utilization of immunization services	153 (64%)
The use of mass media (radio, television and news papers) is a strong tool for promotion of immunization utilization of immunization services.	150 (62.8%)
The level of education of the mother is important in enhancing utilization of immunization services.	140 (58.6%)
The age of the mother is important in enhancing utilization of immunization services.	133 (55.6%)
Community health workers play a role in enhancing delivery of services	127 (53.1%)
Marital status of mothers is important in enhancing utilization of immunization services.	106 (44.4%)
Political goodwill of the local leaders to mobilize and support immunization enhances delivery of immunization services.	93 (38.9%)
Anti-vaccine rumors (propaganda against vaccine) affect use of immunization services	88 (36.8%)
Bad weather conditions affect the utilization of immunization services	65 (27.2%)
The use of mobile vaccination teams enhances utilization of immunization services	51 (21.3%)

4.5 The Relationship between Socio-Demographic Factors and Immunization Coverage

In this section, the relationships between socio-demographic factors and immunization coverage were examined using the Chi-Square test statistics. It was found out that relationship between immunization coverage and socio-demographic factors vary by marital status, level of education, employment status, monthly income, religion and age

of the mother. Objective four of the study was aimed at assessing the relationship between demographic and socio-economic factors with immunization coverage for polio, DPT and Measles. The relationship between socio-demographic factors and immunization of children against DPT is presented in Table 6 below.

Table 6: Socio-demographic factors and immunization of last child against DPT

	Immunized		**Not immunized**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**
Marital Status						
Married	101	44%	6	60%	107	45%
Single	23	10%	0	0%	23	10%
Widow/Widower	5	2%	0	0%	5	2%
Cohabiting	86	38%	4	40%	90	38%
Separated	13	6%	0	0%	13	5%
Divorced	1	0%	0	0%	1	0%
Total	229	100%	10	100%	239	100%
Pearson Chi-Square =2.390**, df =5, p** =0.793						
Level of education						
Tertiary/post tertiary	13	6%	0	0%	13	5%
vocational	26	11%	0	0%	26	11%
secondary	98	43%	7	70%	105	44%
primary	81	35%	3	30%	84	35%
No education	11	5%	0	0%	11	5%
Grand Total	229	100%	10	100%	239	100%
Pearson Chi-Square =3.876, df =4, p =0.423						
Employment Status						
Working Full Time	65	29%	3	30%	65	29%
Working Part-Time	32	14%	2	20%	34	14%
Unemployed	116	51%	5	50%	121	51%
Looking For Employment	6	3%	0	0%	6	3%
Retired	2	1%	0	0%	2	1%
Student	5	2%	0	0%	5	2%
Self Employed	3	1%	0	0%	3	1%
Grand Total	229	100%	10	100%	239	100%
Pearson Chi-Square=1.159, df =7, P =0.992						
Monthly income						
More Than 500,000	8	3%	0	0%	8	3%
500,000-400,000	3	1%	0	0%	3	1%
400,000-300,000	10	4%	0	0%	10	4%
300,000-200,000	28	12%	0	0%	28	12%
200,000-100,000	81	35%	6	60%	87	36%

	Immunized		Not immunized		Total	
	n	%	n	%	n	%
Less than 100,000	99	43%	4	40%	103	43%
Grand Total	229	100%	10	100%	239	100%
Pearson Chi-Square =5.754, df =6, p =0.451						
Religion	**Fred**	**%**	**Fred**	**%**	**Fred**	**%**
Catholic	52	23%	0	0%	52	22%
Protestant	82	36%	2	20%	77	32%
Adventist	6	3%	0	0%	6	3%
Muslim	64	28%	6	60%	70	29%
Pagan	2	1%	0	0%	2	1%
Born Again Christian	15	7%	0	0%	15	6%
Pentecostal	8	3%	2	20%	10	4%
Grand Total	229	100%	10	100%	239	100%
Pearson Chi-Square =13.665, df =7, p =0.057						
Age group						
15-19	26	11%	3	30%	29	12%
20-24	71	31%	3	30%	74	31%
25-29	65	28%	2	20%	67	28%
30-34	38	17%	1	10%	39	16%
35-39	18	8%	1	10%	19	8%
40+	11	5%	0	0%	11	5%
Grand Total	229	100%	10	100%	239	100%
Pearson Chi-Square =23.024, df =31, p =0.848						

Note significant: *P <0.05

4.5.1 Immunization of children against DPT by marital status

Marital status was stratified into six categories with married respondents contributing the highest percentage (45%) followed by those cohabiting (38%). 10% of the respondents were single, 2% widow/widower and 5% separated/divorced. With exception of 6 and 4 respondents in the married and cohabiting category, the rest of the respondents had taken their children for immunization against DPT. The chi-square test statistics (□2=2.390, df= 5, P= 0.793) showed that there is no significant association between immunization of children against DPT and marital status of the respondents.

4.5.2 Immunization of children against DPT by level of education

Tertiary/post tertiary, vocational (post-secondary), secondary, primary and no education were the five categories earmarked for education level. Out of 299 respondents that had taken their children for immunization, 60% had attended at least secondary education while 35% had attended primary education. 10 respondents did not take their children for immunization against DPT of which 7 and 3 had attended secondary and primary education respectively. The chi-square test statistics (χ^2=3.876, df = 4, P= 0.423) showed no significant relationship between immunization of a child against DPT and education level.

4.5.3 Immunization of children against DPT by employment status

Out of 229 respondents that took their children for immunization against DPT, 44% were employed (Full time employment 29%, part time employment 14% and self employed 1%) while 54% were not employed. 10 respondents did not take their children for immunization against DPT of which 5 respondents were not employed. The chi-square test (χ^2=1.159, df = 7, P= 0.992. indicated that their was no significant relationship between immunization of children against DPT with employment status. This implies that employment status was not a significant contributor in determining immunization coverage against DPT in Kawempe Division.

4.5.4 Immunization of children against DPT by monthly income

The categories of income comprised of respondents earning more than 500,000 (3%), 400,000-500,000 (1%), 300,000-400,000 (4%), 200,000-300,000 (12%), 100,000-200,000 (36%) and below 100,000 (43%). The chi-square test statistics showed that the

level of significance of the relationship between immunization of a child and monthly income varied by immunizable disease. The chi-square test (χ^2= 5.754, df= 6, P= 0.451) indicated that their was no significant relationship between immunization of children against DPT with monthly income.

4.5.5 Immunization of children against DPT by religion

A total of 229 respondents took their children for immunization of which 36% were protestants, 28% Moslems, 23% Catholics, 7% born again Christians, 3% Adventist, 3% Pentecostal and 1% pagans. A total of 10 respondents did not take their children for immunization of which 6 were Moslems, 2 Protestants and 2 Pentecostal. The chi-square test statistics (χ^2=13.665, df= 7, P= 0.057) indicated that there was no significant relationship between immunization of children against DPT.

4.5.6 Immunization of child by age of the mother

A total of 229 respondents had taken their children for immunization against DPT out of which 41% were in the age group 15-24 years, 45% 25-34 and 13% were 35 years and above. The chi-square test (χ^2=23.024, df= 31, P= 0.848) revealed that age of mothers does not affect immunization of a children against DPT.

The relationship between socio-demographic factors and immunization of children against Polio is presented in Table 7 below;

Table 7: Relationship between socio-demographic factors and immunization of children against Polio

	Immunized		**Not Immunized**		**Total**	
	n	%	n	%	n	%
Marital Status						
Married	97	45%	10	40%	107	45%
Single	22	10%	1	4%	23	10%
Widow/Widower	5	2%	0	0%	5	2%
Cohabiting	77	36%	13	52%	90	38%
Separated	12	6%	1	4%	13	5%
Divorced	1	0%	0	0%	1	0%
Grand Total	**214**	**100%**	**25**	**100%**	**239**	**100%**
Pearson Chi-Square: = 3.392, **df =5, p=0.640**						
Level of Education						
Tertiary/Post Tertiary	13	6%	0	0%	13	5%
Vocational (Post-	25	12%	1	4%	26	11%
Secondary	94	44%	11	44%	105	44%
Primary	73	34%	11	44%	84	35%
No Education	9	4%	2	8%	11	5%
Grand Total	**214**	**100%**	**25**	**100%**	**239**	**100%**
Pearson Chi-Square: = 4.056, **df =4, p=0.398**						
Employment Status						
Working Full Time	59	28%	5	20%	64	27%
Working Part-Time	31	14%	3	12%	34	14%
Unemployed	105	49%	16	64%	121	51%
Looking For	5	2%	1	4%	6	3%
Retired	2	1%	0	0%	2	1%
Student	9	4%	0	0%	9	4%
Self Employed	3	1%	0	0%	3	1%
Grand Total	**214**	**100%**	**25**	**100%**	**239**	**100%**

Pearson Chi-Square: = 3.445, **df =7, p=0.841**						
Monthly Income						
More Than 500,000	8	4%	0	0%	8	3%
500,000-400,000	3	1%	0	0%	3	1%
400,000-300,000	10	5%	0	0%	10	4%
300,000-200,000	26	12%	2	8%	28	12%
200,000-100,000	78	36%	9	36%	87	36%
Less Than 100,000	89	42%	12	48%	101	42%
Grand Total	**214**	**100%**	**25**	**100%**	**239**	**100%**
Pearson Chi-Square: = 7.375, **df =6, p =0.288**						
Religion						
Catholic	46	21%	6	24%	52	22%
Protestant	72	34%	5	20%	77	32%
Adventist	6	3%	0	0%	6	3%
Muslim	61	29%	9	36%	70	29%
Pagan	9	4%	0	0%	9	4%
Born again Christian	13	6%	2	8%	15	6%
Pentecostal	7	3%	3	12%	10	4%
Grand Total	**214**	**100%**	**25**	**100%**	**239**	**100%**
Pearson Chi-Square: = 7.748, **df =7, p=0.366**						
Age of respondents						
15-19	26	12%	3	12%	29	12%
20-24	64	30%	10	40%	74	31%
25-29	60	28%	7	28%	67	28%
30-34	37	17%	2	8%	39	16%
35-39	17	8%	2	8%	19	8%
40+	10	5%	1	4%	11	5%
Grand Total	214	100%	25	100%	239	100%
Pearson Chi-Square: = 1.943, **df =5, p =0.857**						

*Note significant: *P <0.05*

4.5.7 Immunization of children against Polio by marital status

Married respondents contributed the highest percentage (45%) of respondents that took their children for immunization against measles followed by those cohabiting (36%). The percentage share of the other sub-categories that took children for immunization was 10% for the singles, 2% for widow/widower and 6% for separated/divorced The chi-square test statistics (χ^2=3.392, df= 5, P= 0.640) showed that there is no significant association between immunization of children against Polio and marital status of the respondents.

4.5.8 Immunization of children against Polio by level of education

Tertiary/post tertiary, vocational (post-secondary), secondary, primary and no education were the five categories earmarked for education level. Out of 214 respondents that had taken their children for immunization, 62% had attended at least secondary education while 34% had attended primary education. 25 respondents did not take their children for immunization against Polio of which 22 had attended secondary and primary education. The chi-square test statistics showed no significant relationship between immunization of a child and education level. The chi-square test (χ^2=4.056, df= 4, P= 0.398) indicated that there is no significant relationship between education level and immunization of a children against Polio.

4.5.9 Immunization of children against Polio by employment status

Out of 214 respondents that took their children for immunization against Polio, 43% were employed (Full time employment 28%, part time employment 14% and self employed 1%) while 51% were not employed. 25 respondents did not take their children for immunization against Polio of which 17 respondents were not employed. The chi-square test (χ^2=43.445, df= 7, P= 0.841) indicated that their was no significant relationship between immunization of children against Polio with employment status. This implies that employment status was not a significant contributor in determining immunization coverage against Polio in Kawempe Division.

4.5.10 Immunization of children against Polio by monthly income

The categories of income comprised of respondents earning more than 500,000 (3%), 400,000-500,000 (1%), 300,000-400,000 (4%), 200,000-300,000 (12%), 100,000-200,000 (36%) and below 100,000 (42%). The chi-square test statistics showed that the

level of significance of the relationship between immunization of a child and monthly income varied by immunizable disease. The chi-square test (X^2=7.375, df= 6, P= 0.288) indicated that their was no significant relationship between immunization of children against Polio with monthly income.

4.5.11 Immunization of children against Polio by religion

A total of 214 respondents took their children for immunization of which 34% were protestants, 29% Moslems, 21% Catholics, 6% born again Christians, 3% Adventist, 3% Pentecostal and 4% pagans. A total of 25 respondents did not take their children for immunization of which 9 were Moslems, 6 Catholics, 5 Protestants and 3 Pentecostal. The chi-square test statistics (χ^2=7.748, df= 7, P= 0.355) indicated that there was no significant relationship between immunization of children against Polio.

4.5.12 Immunization of children against Polio by age of the mother

A total of 229 respondents had taken their children for immunization against Polio out of which 42% were in the age group 15-24 years, 45% 25-34 years and 13% were 35 years and above. Majority of respondents that had not taken their children to be immunized against polio were in the age group 20-24. The chi-square test (χ^2= 30.322, df= 31, P= 0.501) revealed that age of mothers does not affect immunization of a children against Polio. The relationship between socio-demographic factors and immunization of children against Measles is presented in Table 8 below:

Table 8: Relationship between socio-demographic factors and immunization of children against Measles

Marital Status	**Immunized**		**Not immunized**		**Total**	
	n	%	n	%	n	%
Married	90	53%	17	24%	107	45%
Single	19	11%	4	6%	23	10%
Widow/Widower	4	2%	1	1%	5	2%
Cohabiting	45	27%	45	64%	90	38%
Separated	10	6%	3	4%	13	5%
Divorced	1	1%	0	0%	1	0%
Grand Total	169	100%	70	100%	239	100%
Pearson Chi-Square = 30.356, **df =5, p** =0.000 **						
Level of Education						
Tertiary/post tertiary	12	7%	1	1%	13	5%
vocational (post-	20	12%	6	9%	26	11%
secondary	65	38%	40	57%	105	44%
primary	63	37%	21	30%	84	35%
No education	9	5%	2	3%	11	5%
Grand Total	169	100%	70	100%	239	100%
Pearson Chi-Square: = 8.745, **df =4, p** =0.068						
Employment Status						
Working Full Time	51	30%	13	19%	64	27%
Working Part-Time	23	14%	11	16%	34	14%
Unemployed	79	47%	42	60%	121	51%
Looking For Employment	3	2%	3	4%	6	3%
Retired	2	1%	0	0%	2	1%
Student	8	5%	1	1%	9	4%
Self Employed	3	2%	0	0%	3	1%
Grand Total	169	100%	70	100%	239	100%
Pearson Chi-Square: = 9.54, **df =7, p**=0.216						
Monthly Income						
More than 500,000	8	5%	0	0%	8	3%
500,000-400,000	2	1%	1	1%	3	1%
400,000-300,000	10	6%	0	0%	10	4%
300,000-200,000	21	12%	7	10%	28	12%
200,000-100,000	64	38%	23	33%	87	36%
Less than 100,000	64	38%	39	56%	103	43%
Grand Total	169	100%	70	100%	239	100%
Pearson Chi-Square: = 25.958, **df =6, p**=0.000**						
Religion						
Catholic	38	22%	14	20%	52	22%
Protestant	53	31%	24	34%	77	32%
Adventist	5	3%	1	1%	6	3%
Muslim	49	29%	21	30%	70	29%
Pagan	9	5%	0	0%	9	4%

Born Again Christian	8	5%	7	10%	15	6%
Pentecostal	7	4%	3	4%	10	4%
Grand Total	169	100%	70	100%	239	100%
Pearson Chi-Square: = 6.668, **df =7, p** =0.464						
Age (in years)						
15-19	17	10%	12	17%	29	12%
20-24	46	27%	28	40%	74	31%
25-29	48	28%	19	27%	67	28%
30-34	31	18%	8	11%	39	16%
35-39	17	10%	2	3%	19	8%
40+	10	6%	1	1%	11	5%
Grand Total	**169**	**100%**	**70**	**100%**	**239**	**100%**
Pearson Chi-Square: = 29.530, **df =31, p** =0.522						

*Note significant: *P <0.05*

4.5.13 Immunization of children against Measles by marital status

Married respondents contributed the highest percentage (53%) of respondents that took their children for immunization against measles followed by those cohabiting (27%). The percentage share of the other sub-categories that took children for immunization was 11% for the singles, 2% for widow/widower and 7% for separated/divorced. The chi-square test statistics (χ^2=30.356, df= 5, P= 0.000) showed that there is a significant association between immunization of children against measles and marital status of the respondents. Most married women ensure that their children are immunized compared to women of other marital statuses. Hence marital status of women contributed more to immunization coverage of the measles disease.

4.5.14 Immunization of children against Measles by level of education

Out of 169 respondents that had taken their children for immunization, 57% had attended at least secondary education while 37% had attended primary education. 70 respondents did not take their children for immunization against Measles of which 40 and 21 had attended secondary and primary education respectively. The chi-square test statistics showed no significant relationship between immunization of a child and

education level. The chi-square test (χ^2=8.745, df= 4, P= 0.068) indicated that there is no significant relationship between education level and immunization of a children against Measles.

4.5.15 Immunization of children against Measles by employment status

Out of 169 respondents that took their children for immunization against Measles, 46% were employed (Full time employment 30%, part time employment 14% and self employed 2%) while 49% were not employed. 70 respondents did not take their children for immunization against Measles of which 45 respondents were not employed. The chi-square test (χ^2=9.540, df= 7, P= 0.216) indicated that their was no significant relationship between immunization of children against Measles with employment status. This implies that employment status was not a significant contributor in determining immunization coverage against Measles in Kawempe Division.

4.5.16 Immunization of children against Polio by monthly income

The categories of income comprised of respondents earning more than 500,000 (3%), 400,000-500,000 (1%), 300,000-400,000 (4%), 200,000-300,000 (12%), 100,000-200,000 (36%) and below 100,000 (43%). The chi-square test statistics showed that the level of significance of the relationship between immunization of a child and monthly income varied by immunizable disease. The chi-square test (χ^2=25.958, df= 6, P= 0.000) showed that there is a significant relationship between monthly income and immunization of children against Measles with majority of high monthly income earners ensuring that their children are immunized compared to women who earn low income per month. Hence, monthly income contributed more to immunization coverage of measles in Kawempe division.

4.5.17 Immunization of children against Measles by religion

A total of 169 respondents took their children for immunization of which 31% were protestants, 29% Moslems, 22% Catholics, 5% born again Christians, 3% Adventist, 4% Pentecostal and 5% pagans. A total of 70 respondents did not take their children for immunization of which 21 were Moslems, 14 Catholics, 24 Protestants and 3 Pentecostal. The chi-square test statistics (χ^2=6.668, df= 7, P= 0.464) indicated that there was no significant relationship between immunization of children against Measles and religion.

4.5.18 Immunization of children against Measles by age of the mother

A total of 169 respondents had taken their children for immunization against Measles out of which 37% were in the age group 15-24 years, 46% 25-34 and 16% were 35 years and above. Majority of respondents that had not taken their children to be immunized

against Measles were in the age group 20-24. The chi-square test (χ^2=29.530, df= 31, P= 0.522) revealed that age of mothers does not affect immunization of a children against Measles.

4.6 The Relationship between Socio-Demographic Factors and completion of Immunization schedules

The respondents were further asked to indicate whether their children completed the immunization schedules for DPT, Polio and Measles. In the same way, a chi-square was performed to establish the relationship between the socio-demographic factors and completion of the immunization schedule. Table 9 below indicates the relationship between socio-demographic factors and completion of DPT immunization schedule.

Table 9: Socio-demographic Factors that affect Completion of DPT Immunization Schedule in Kawempe Division

Marital Status	**Immunized**		**Not Immunized**		**Total**	
	n	%	n	%	n	%
Married	86	47%	21	38%	107	45%
Single	19	10%	4	7%	23	10%
Widow/Widower	4	2%	1	2%	5	2%
Cohabiting	65	35%	25	45%	90	38%
Separated	9	5%	4	7%	13	5%
Divorced	1	1%	0	0%	1	0%
Grand Total	184	100%	55	100%	239	100%
Pearson Chi-Square = 3.022, **df =5, p =0.697**						
Level of Education						
Tertiary/Post Tertiary	12	7%	1	2%	13	5%
Vocational (Post-	21	11%	5	9%	26	11%
Secondary	80	43%	25	45%	105	44%
Primary	61	33%	23	42%	84	35%
No Education	10	5%	1	2%	11	5%
Grand Total	184	100%	55	100%	239	100%
Pearson Chi-Square = 4.078, **df =4, p =0.396**						
Employment Status						
Working Full Time	56	30%	8	15%	64	27%
Working Part-Time	26	14%	8	15%	34	14%

Marital Status	**Immunized**		**Not Immunized**		**Total**	
	n	%	n	%	n	%
Unemployed	87	47%	34	62%	121	51%
Looking For Employment	4	2%	2	4%	6	3%
Retired	1	1%	1	2%	2	1%
Student	7	4%	2	4%	9	4%
Self Employed	3	2%	0	0%	3	1%
Grand Total	184	100%	55	100%	239	100%
Pearson Chi-Square = 7.879, **df =7, p =0.343**						
Monthly Income						
More Than 500,000	8	4%	0	0%	8	3%
500,000-400,000	2	1%	1	2%	3	1%
400,000-300,000	10	5%	0	0%	10	4%
300,000-200,000	24	13%	4	7%	28	12%
200,000-100,000	64	35%	23	42%	87	36%
Less Than 100,000	76	41%	27	49%	103	43%
Grand Total	184	100%	55	100%	239	100%
Pearson Chi-Square = 10.398, **df =6, p =0.109**						
Religion						
Catholic	41	22%	11	20%	52	22%
Protestant	59	32%	18	33%	77	32%
Adventist	5	3%	1	2%	6	3%
Muslim	54	29%	16	29%	70	29%
Pagan	9	5%	0	0%	9	4%
Born again Christian	9	5%	6	11%	15	6%
Pentecostal	7	4%	3	5%	10	4%
Grand Total	184	100%	55	100%	239	100%
Pearson Chi-Square = 5.654, **df =7, p =0.581**						
Age (in years)						
15-19	21	11%	8	15%	29	12%
20-24	51	28%	23	42%	74	31%
25-29	55	30%	12	22%	67	28%
30-34	31	17%	8	15%	39	16%
35-39	17	9%	2	4%	19	8%
40+	9	5%	2	4%	11	5%
Grand Total	184	100%	55	100%	239	100%
Pearson Chi-Square: = 28.275, **df =31, p =0.607**						

*Note significant: *P <0.05*

4.6.1 Completion of immunization schedules for DPT by marital status

The married constituted the highest percentage (45%) of respondents followed by those cohabiting (38%). 10% of the respondents were single, 2% widow/widower and 5% separated/divorced. A total of 184 respondents completed immunization schedules for

DPT of which the majority (47%) were married followed by 35% who were cohabiting. A total of 55 respondents did not complete immunization schedules of which 25 and 21 of the respondents were cohabiting and married respectively. The chi-square test (χ^2=3.022, df= 5, P= 0.697) showed that there was no significant relationship between marital status and completion of the immunization schedules against DPT.

4.6.2 Completion of Immunization schedules DPT by level of education

Out of 299 respondents that had taken their children for immunization, only 184 completed the immunization schedules of which 61% had attended at least secondary education while 33% had attended primary education. 55 respondents did not complete immunization schedules against DPT of which 25 and 23 had attended secondary and primary education respectively. The chi-square test statistics showed no significant relationship between immunization of a child and education level. The chi-square test (χ^2=4.078, df= 4, P= 0.396) indicated that there is no significant relationship between education level and completion of immunization schedules of a children against DPT.

4.6.3 Completion of Immunization schedules DPT by employment status

Out of 229 respondents that took their children for immunization against DPT, 184 completed the immunization schedules of which 46% were employed (Full time employment 30%, part time employment 14% and self employed 2%) while 49% were not employed. 55 respondents did not complete immunization schedules against DPT for their children of which 36 respondents were not employed. The chi-square test (χ^2=7.879, df= 7, P= 0.343) indicated that their was no significant relationship between immunization of children against DPT with employment status. This implies that employment status was not a significant contributor in determining immunization coverage against DPT in Kawempe Division.

4.6.4 Immunization of children against DPT by monthly income

The categories of income comprised of respondents earning more than 500,000 (3%), 400,000-500,000 (1%), 300,000-400,000 (4%), 200,000-300,000 (12%), 100,000-200,000 (36%) and below 100,000 (43%). A total of 184 respondents completed immunization schedules for their children of which 41% had a monthly income that was below 100,000 UGx. With regards to non completion, 91% out of 55 respondents had an income of 200,000 or less per month. The chi-square test (χ^2=10.398, df= 6, P= 0.109) indicated that their was no significant relationship between completion of immunization schedules of children against DPT with monthly income.

4.6.5 Immunization of children against DPT by religion

A total of 229 respondents took their children for immunization of which 184 respondents completed the immunization schedules for their children. Of those that completed the schedules, 32% were Protestants, 29% Moslems, 22% Catholics, 5% born again Christians, 3% Adventist, 4% Pentecostal and 5% pagans. A total of 55 respondents did not complete the immunization schedules for their children of which 16 were Moslems, 18 Protestants and 11 Catholics. The chi-square test statistics (χ^2=5.654, df= 7, P= 0.581) indicated that there was no significant relationship between completion of immunization schedules against DPT.

4.6.6 Completion of DPT immunization schedule by age of the mother

A total of 229 respondents had taken their children for immunization against DPT out of which 184 completed the immunization schedule. 39% of the respondents that completed the schedule were in the age group 15-24 years, 47% were in age group 25-34 and 14% were 35 years and above. The chi-square test (χ^2=28.275, df= 31, P=

0.607) revealed that age of respondents does not affect completion of immunization schedules against DPT.

Table 10 below indicates the relationship between socio-demographic factors and completion of Polio immunization schedule.

Table 10: Socio-demographic Factors that affect Completion of Polio Immunization Schedule in Kawempe Division

Level of education	**Immunized**		**Not Immunized**		**Total**	
	n	%	n	%	n	%
Tertiary/post tertiary	12	7%	1	2%	13	5%
vocational (post-secondary)	19	11%	7	11%	26	11%
secondary	73	42%	32	50%	105	44%
primary	63	36%	21	33%	84	35%
No education	8	5%	3	5%	11	5%
Grand Total	175	100%	64	100%	239	100%
Pearson Chi-Square =3.285, df =4, p =0.511						
Marital Status						
Married	91	52%	16	25%	107	45%
Single	20	11%	3	5%	23	10%
Widow/Widower	5	3%	0	0%	5	2%
Cohabiting	47	27%	43	67%	90	38%
Separated	11	6%	2	3%	13	5%
Divorced	1	1%	0	0%	1	0%
Grand Total	175	100%	64	100%	239	100%
Pearson Chi-Square:=33.140**, df =5, p**=0.000**						
Employment Status						
Working Full Time	52	30%	12	19%	64	27%
Working Part-Time	24	14%	10	16%	34	14%
Unemployed	83	47%	38	59%	121	51%
Looking For Employment	4	2%	2	3%	6	3%
Retired	1	1%	1	2%	2	1%
Student	8	5%	1	2%	9	4%
Self Employed	3	2%	0	0%	3	1%
Grand Total	175	100%	64	100%	239	100%
Pearson Chi-Square: =6.904, df =7, p=0.439						
Monthly income						
More Than 500,000	8	4%	0	0%	8	3%
500,000-400,000	2	1%	1	2%	3	1%
400,000-300,000	10	5%	0	0%	10	4%
300,000-200,000	24	13%	6	9%	30	12%

Level of education	Immunized		Not Immunized		Total	
	n	%	n	%	n	%
200,000-100,000	64	35%	20	31%	84	34%
Less than 100,000	66	36%	37	58%	103	42%
Grand Total	184	100%	64	100%	248	100%
Pearson Chi-Square: =21.622, df =6, p=0.001**						
Religion						
Catholic	39	22%	13	20%	52	22%
Protestant	55	31%	22	34%	77	32%
Adventist	6	3%	0	0%	6	3%
Muslim	51	29%	19	30%	70	29%
Pagan	9	5%	0	0%	9	4%
Born Again Christian	8	5%	7	11%	15	6%
Pentecostal	7	4%	3	5%	10	4%
Grand Total	175	100%	64	100%	239	100%
Pearson Chi-Square: =8.780, df =7, p =0.269						
Age (in years)						
15-19	21	12%	8	13%	29	12%
20-24	46	26%	28	44%	74	31%
25-29	52	30%	15	23%	67	28%
30-34	30	17%	9	14%	39	16%
35-39	17	10%	2	3%	19	8%
40+	9	5%	2	3%	11	5%
Grand Total	175	100%	64	100%	239	100%
Pearson Chi-Square: =35.622, df =31, p=0.260						

*Note significant: *P <0.05*

4.6.7 Completion of immunization schedules for Polio by marital status

Of the respondents that completed the immunization schedules (175), the married constituted the highest percentage (52%) of respondents followed by those cohabiting (27%). 11% of the respondents were single, 3% widow/widower and 7% separated/divorced. A total of 64 respondents did not complete immunization schedules of which 43 and 16 of the respondents were cohabiting and married respectively. The chi-square test (X^2=33.140, df = 5, P= 0.000) showed that there is a significant relationship between marital status and completion of the immunization schedules against Polio.

4.6.8 Completion of Immunization schedules for Polio by level of education

A total of 184 respondents completed the immunization schedules of their children of which 60% had attended at least secondary education while 36% had attended primary education. 64 respondents did not complete immunization schedules against Polio of which 32 and 21 had attended secondary and primary education respectively. The chi-square test (χ^2=3.285, df= 4, P= 0.511) indicated that there is no significant relationship between education level and completion of immunization schedules of children against Polio.

4.6.9 Completion of Immunization schedules for Polio by employment status

175 completed the immunization schedules for polio of which 46% were employed (Full time employment 30%, part time employment 14% and self employed 2%) while 49% were not employed. 64 respondents did not complete immunization schedules against Polio for their children of which 38 respondents were not employed. The chi-square test (χ^2=8.963, df= 7, P= 0.439) indicated that their was no significant relationship between immunization of children against Polio with employment status. This implies that employment status was not a significant contributor in determining immunization coverage against Polio in Kawempe Division.

4.6.10 Completion of Immunization schedules against Polio by monthly income

The categories of income comprised of respondents earning more than 500,000 (3%), 400,000-500,000 (1%), 300,000-400,000 (4%), 200,000-300,000 (12%), 100,000-200,000 (34%) and below 100,000 (42%). A total of 184 respondents completed immunization schedules for their children of which 36% had a monthly income that was

below 100,000 UGx. With regards to non completion, 89% out of 64 respondents had an income of 200,000 or less per month. The chi-square test (χ^2=21,622, df= 6, P= 0.001.) indicated that there is a significant relationship between completion of immunization schedules of children against Polio with monthly income.

4.6.11 Completion of Immunization schedules against Polio by religion

Of the respondents (175) that completed the immunization schedules, 31% were Protestants, 29% Moslems, 22% Catholics, 5% born again Christians, 3% Adventist, 4% Pentecostal and 5% pagans. A total of 64 respondents did not complete the immunization schedules for their children of whom 19 were Moslems, 22 Protestants and 13 Catholics. The chi-square test statistics (χ^2=8.780, df= 7, P= 0.269) indicated that there was no significant relationship between completion of immunization schedules against Polio and religion.

4.6.12 Completion of Polio immunization schedule by age of the mother

Out of 175 respondents that completed the immunization schedule against polio, 38% of the respondents that completed the schedule were in the age group 15-24 years, 47% were in age group 25-34 and 15% were 35 years and above. The chi-square test (χ^2= 35.622, df= 31, P= 0.260) revealed that age of respondents does not affect completion of immunization schedules against Polio.

Table 11 below indicates the relationship between socio-demographic factors and completion of DPT immunization schedule:

Table 11: Socio-demographic Factors that affect Completion of Measles

Immunization Schedule in Kawempe Division

	Immunized		**Not Immunized**		**Total**	
	n	%	n	%	n	%
Marital Status						
Married	82	54%	25	29%	107	45%
Single	18	12%	5	6%	23	10%
Widow/Widower	3	2%	2	2%	5	2%
Cohabiting	39	26%	51	59%	90	38%
Separated	9	6%	4	5%	13	5%
Divorced	1	1%	0	0%	1	0%
Grand Total	152	100%	87	100%	239	100%
Pearson Chi-Square = 26.735, **df =5, p** =0.000 **						
Level of Education						
Tertiary/post tertiary	12	8%	1	1%	13	5%
vocational (post-secondary)	18	12%	8	9%	26	11%
secondary	60	39%	45	52%	105	44%
primary	54	36%	30	34%	84	35%
No education	8	5%	3	3%	11	5%
Grand Total	152	100%	87	100%	239	100%
Pearson Chi-Square: = 7.288, **df =4, p**=0.121						
Employment Status						
Working Full Time	47	31%	17	20%	64	27%
Working Part-Time	19	13%	15	17%	34	14%
Unemployed	71	47%	50	57%	121	51%
Looking For Employment	3	2%	3	3%	6	3%
Retired	2	1%	0	0%	2	1%
Student	7	5%	2	2%	9	4%
Self Employed	3	2%	0	0%	3	1%
Grand Total	152	100%	87	100%	239	100%
Pearson Chi-Square:= 8.963, **df =7, p**=0.255						
Monthly Income						
More than 500,000	8	5%	0	0%	8	3%
500,000-400,000	2	1%	1	1%	3	1%
400,000-300,000	9	6%	1	1%	10	4%
300,000-200,000	20	13%	8	9%	28	12%
200,000-100,000	56	37%	31	36%	87	36%
Less than 100,000	57	38%	46	53%	103	43%
Grand Total	152	100%	87	100%	239	100%
Pearson Chi-Square: = 28.740, **df =6, p**=0.000**						
Religion	**Last Child**		**Last Child not**		**Total**	
	Fred	%	Fred	%	Fred	%
Catholic	33	22%	19	22%	52	22%

	Immunized		Not Immunized		Total	
	n	%	n	%	n	%
Protestant	50	33%	27	31%	77	32%
Adventist	5	3%	1	1%	6	3%
Muslim	40	26%	30	34%	70	29%
Pagan	9	6%	0	0%	9	4%
Born Again Christian	8	5%	7	8%	15	6%
Pentecostal	7	5%	3	3%	10	4%
Grand Total	152	100%	87	100%	239	100%
Pearson Chi-Square: = 8.340, **df =7, p**=0.304						
Age (in years)						
15-19	16	11%	13	15%	29	12%
20-24	41	27%	33	38%	74	31%
25-29	44	29%	23	26%	67	28%
30-34	26	17%	13	15%	39	16%
35-39	15	10%	4	5%	19	8%
40+	10	7%	1	1%	11	5%
Grand Total	152	100%	87	100%	239	100%
Pearson Chi-Square: = 29.902 **df =31, p**=0.522						

*Note significant: *P <0.05*

4.6.13 Completion of immunization schedules for Measles by marital status

Of the respondents (152) that completed the Measles immunization schedules, married respondents constituted the highest percentage (54%) followed by those cohabiting (26%). 12% of the respondents were single, 2% widow/widower and 7% separated/divorced. A total of 87 respondents did not complete immunization schedules of which 25 and 51 of the respondents were cohabiting and married respectively. The chi-square test (χ^2=26.735, df= 5, P= 0.000) showed that there is a significant relationship between marital status and completion of the immunization schedules against Measles.

4.6.14 Completion of Immunization schedules for Measles by level of education

Out of 152 respondents that had completed immunization schedules for measles, 59% had attended at least secondary education while 36% had attended primary education. 87 respondents did not complete immunization schedules against Measles of which 45

and 30 had attended secondary and primary education respectively. The chi-square test (χ^2=7.288, df= 4, P= 0.121) indicated that there is no significant relationship between education level and completion of immunization schedules of a children against Measles.

4.6.15 Completion of Immunization schedules for Measles by employment status

152 completed the immunization schedules of which 47% were employed (Full time employment 31%, part time employment 13% and self employed 2%) while 49% were not employed. 87 respondents did not complete immunization schedules for Measles for their children of which 53 respondents were not employed. The chi-square test (χ^2=8.963, df= 7, P= 0.255) indicated that their was no significant relationship between immunization of children against Measles with employment status. This implies that employment status was not a significant contributor in determining immunization coverage against Measles in Kawempe Division.

4.6.16 Immunization of children against Measles by monthly income

The categories of income comprised of respondents earning more than 500,000 (3%), 400,000-500,000 (1%), 300,000-400,000 (4%), 200,000-300,000 (12%), 100,000-200,000 (36%) and below 100,000 (43%). A total of 152 respondents completed immunization schedules for their children of which 38% had a monthly income that was below 100,000 UGx. With regards to non completion, 89% out of 87 respondents had an income of 200,000 or less per month. The chi-square test (χ^2=28.740, df= 6, P= 0.000) indicated that there is a significant relationship between completion of immunization schedules of children against Measles with monthly income.

4.6.17 Immunization of children against Measles by religion

Of the respondents that completed immunization schedules for measles, 33% were Protestants, 26% Moslems, 22% Catholics, 5% born again Christians, 3% Adventist, 5% Pentecostal and 6% pagans. A total of 87 respondents did not complete the immunization schedules for their children of whom 30 were Moslems, 27 Protestants and 19 Catholics. The chi-square test statistics (χ^2=8.340, df= 7, P= 0.304) indicated that there is no significant relationship between completion of immunization schedules against Measles with religion.

4.6.18 Completion of Measles immunization schedule by age of the mother

38% of the respondents that completed the immunization schedule were in the age group 15-24 years, 48% were in age group 25-34 and 17% were 35 years and above. The chi-square test (χ^2=29.902, df= 31, P= 0.522) revealed that age of respondents does not affect completion of immunization schedules against Measles.

The fact that a cross-sectional study design was used, it was difficult to identify causal risk factors and interpret the associations found. For example, this study showed that marital status and amount of income earned by the parents were found to be associated with taking children for immunization and completing Polio and Measles immunization schedules. There are two possible explanations for this association. The first one is that parents who are married and have a high income are likely to be in position to take their children for Measles immunization and to have their children complete Polio and Measles immunization schedules. The second is that parents who are married and have high monthly income is a consequence result of a course of action or decision taken by the parents rather than a cause for them to take their children for Measles immunization and completing Measles and Polio

immunization schedules. There was no effect of non-response because a 7.5% over-sampling was done during the study to overcome the effect. The response rate was 99.2% while the non-response rate was only 0.8%.

CHAPTER FIVE

DISCUSSION

The current study was designed to explore the immunization coverage for DPT, Polio and Measles in infants of twelve to eighteen months and analyse the factors associated with coverage in Kawempe Division.

Results of the study indicate that immunization coverage in Kawempe Division has tremendously improved as evidenced by the percentages of parents and caretakers who took their children for immunization, giving a coverage of 95.8% for DPT, 89.5% for Polio and 70.7% for Measles compared to 2005, 2006 and 2007, respectively where immunization coverage for Polio was 47.0%, 40.1% and 52.1%, for DPT was 54.4%, 46.0% and 60.0%; and Measles was 50.0%, 56.0% and 58.7% (MOHDR 2005-2007; KDHDR 2005-2007).

The increase in immunization coverage in the area under study is attributed to the increase in the number of private clinics in Kawempe Division which are easily accessible and are facilitated to provide immunization services on weekly basis. This is enhanced by community out reach immunization services provided in each of the parishes. This encourages mothers to take their children for immunization as services are brought nearer. It is also important to note that out of 239 respondents, 43.9% had completed secondary level, 35.1% primary level, 10.9% vocational training level and 5.4% tertiary institutions only 4.6% had no formal education. This implies a high literacy rate among respondents.

According to a study conducted on the reasons for non-vaccination and the effects of socio-demographic factors on vaccinations, it was revealed that distance from the health

centre is significantly related to the level of immunization coverage (Sebahat & Nadi 2006). Similarly, in Kenya, a study by Ndiritu et al. (2006) on immunization coverage showed that immunization coverage declined with increasing distance from the vaccination clinics in Kilifi district.

The high levels of coverage for DPT and Polio attendances could be attributed to the fact that these vaccines were normally administered in the early stages right at birth in the case of Polio when a mother gives birth in hospital, health centre or a clinic.
Measles vaccine was given at a later stage i.e. at 9 months and this could account for its lower coverage of 70.7% compared to 89.5% for Polio and 95.8% for DPT.

Unlike findings of this study, research conducted by Singh and Yadav (2001), on childhood immunization in urban slums of India, found out that slum dwellers did not access these services. It was argued that weak community organization and low collective confidence in public institutions were responsible for this scenario. On the other hand, although this study indicated that availability of health infrastructure was one of the reasons why immunization coverage in Kawempe Division was high, findings of a study on health infrastructure and immunization coverage in rural India, revealed that the availability of health infrastructure did not necessarily lead to wider immunization coverage (Datar, Mukherji & Sood 2005). These differences can be attributed to the fact that the current study was conducted in an urban setting with availability of many private clinics, health centres and hospitals such as Mulago national referral and teaching hospital located evenly in the division while the India study was conducted in a rural area where 43% of the children lived in villages with no health facilities. For example, a study on immunization in rural Malawi indicated that low

compliance to vaccination recommendations was associated with living in villages where there were no vaccination teams (Vaahtera et al 2000). The findings were further in agreement with those of Ibnouf et al. (2007) in Sudan which revealed that children in urban areas were more likely to be immunized than those in rural settings.

Findings of this study also revealed that most parents normally complete the Polio and DPT immunization schedules but fail to complete the Measles schedule, where immunization is carried out at 9 months after delivery. On the other hand, a study by Cheyne (1994), on immunization in urban areas in China revealed that failure to complete immunization in urban areas was associated with mother's unawareness about repeat visits to achieve complete immunization rather than vaccine awareness. This led to failure by mothers to make repeated visits to achieve complete immunization.

Results from the survey also indicate that the majority of the respondents were female, accounting for 97.1% of the total number of respondents. This has an impact on the level of immunization in the area because it is normally the mothers who are involved in children's nursing, upbringing and immunization. Very few men or fathers take interest in knowing when the child is due for immunization.

The data gathered from the survey did not differ from the facts. According to the Head of the Kawempe Division Health Department, immunization coverage in Kawempe Division was high. He revealed that apart from the government hospitals and health centres, all private clinics in Kawempe Division were facilitated to provide these services on weekly basis. In addition, the Division organizes community outreach immunization services nine (9) times a month in each of the parishes.

Although available literature shows that the average routine immunization coverage for DPT, Measles and Polio in Kampala district for children aged 12 to 18 months was 53.3% with the division coverage for Nakawa, Makindye, Central, Rubaga and Kawempe at 69.3%, 67.7%, 69.5%, 55.2%, and 50.3% respectively (MOHDR, 2005/7; KDHDR, 2005/7), these coverage rates were still below the targeted score of 80% as per UNEPI Standards. It should be noted however, that immunization coverage for polio and DPT in Kawempe Division is currently higher than what is targeted by UNEPI with over 80% of the children immunized.

Perceptions about factors affecting immunization coverage of respondents varied. Almost all respondents believed that the attitude of mothers was important in enhancing utilization of immunization services in Kawempe Division due to the fact that in an African setting women play a fundamental role in health up bring of children. 63.2% of the respondents indicated that anti-vaccine rumors do not affected the use of immunization services this is because a lot of advocacy has been done by all the stake holders and it is hoped that in the years to come more Ugandans will have a positive attitude towards immunization. As only 21.3% of the respondents believed that the use of mobile vaccination teams enhanced utilization of immunization services in Kawempe Division, it is important to note that mobile vaccination teams have been more popular in rural areas than urban areas. The fact that Kawempe division is urban, implies that immunization centers are more accessible due to short distances.

Analysis of association carried out indicated that there was no relationship between marital status, level of education, employment status monthly income, religion and age of parents and taking children for DPT and Polio immunization. However, marital

status and monthly income had a significant relationship with parents taking their children for Measles immunization. In essence married parents are in position to complete immunization schedules for measles than those who were still cohabiting due to the strong collective ownership, care and up bring of the growing child. On the other hand, parents with more income were able to complete the immunization schedules due to the fact that symptoms of measles are rampant and enforce an emergency which eliminates those that may not be in position to raise the required costs. It is also important to note that parents incur some costs every time they take children for immunization which some of the poor mothers cannot afford. This highly affects completion of immunization schedules.

Level of education, employment status and income of parents and marital status, religion and age of the parents did not affect parents' decision to take their children for DPT and Polio immunization but marital status and monthly income affected Measles immunization. On the other hand, a similar study on child immunization coverage in the slum areas of Rajshahi City Corporation, Bangladesh found that socio-demographic factors such as mother's education, husbands' occupation and family's monthly income affected enhanced immunization coverage (Rafiqul, Mahfuzar & Mosfequr 2007). It can be argued that the situations in Bangladesh and Kawempe are different but both being slum areas would have had some similar findings.

Although literature had indicated that there was a relationship between education and immunization levels, this study found out that this was not the case in Kawempe division. This might be due to the fact that most of the mothers and caretakers involved in the study were educated up to secondary level. This suggests that they were aware

about immunization services and knew the importance of immunization. In addition, a lot of advocacy campaigns have been done by NGOs, Ministry of Health among other stakeholders which has enabled even the uneducated to understand the importance of immunization.

The study indicated that there were significant relationships between the various socio-demographic factors and completing the immunization schedule. Chi-square tests showed that there was a significant relationship between marital status and monthly income and completing the polio immunization schedule. Completion of immunization against polio was more popular than DPT due to the fact that a number of parents have an experience of the effects polio can cause.

In addition, there was a considerable relationship between marital status and parents' monthly income and completing the Measles immunization schedule. Therefore, the parents with higher incomes were more likely to complete the immunization schedule since they were able to cater for the costs involved during repeated visits. In addition, symptoms of measles are rampant and enforce an emergency which eliminates those that may not be in position to raise the required costs.

This study suggests that there are a number of challenges faced by medical workers in delivery of immunization services that impinge on its progress. Among these is poverty and negligence by parents. This is important information since there seems to be inadequate literature on factors associated with delivery of immunization services in urban slum areas.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This section wraps up the key findings of the study and suggests recommendations to be taken into consideration. As noted in chapter 4 and 5, the study findings have clearly indicated that the majority of parents in Kawempe Division actually endeavor to take their children for immunization particularly for DPT and polio. This suggests that immunization coverage in the Division has improved compared to previous reports. The challenge however is failure to complete the immunization schedule especially measles. Relevant authorities should ensure that parents complete the immunization schedule since wide coverage alone cannot solve the problem of combating immunizable diseases. This calls for interventions geared towards helping parents in Kawempe Division to complete the immunization schedule.

6.2 Recommendations

- ✓ Kawempe Division health department should endeavour to sensitize parents about the importance of completing the immunization schedule, especially with regard to Measles.
- ✓ Kawempe Division local leaders should come up with education programmes that target poor people so that they are able to make informed decisions regarding immunization of their children.
- ✓ Kawempe Division health department should conduct measles immunization campaign. Such a campaign should include: specific communication focused on measles immunization by 9 months and special measles drive before seasons known for measles outbreak.

REFERENCES

American Red Cross (2002). *Measles Initiative to Vaccinate 14 Million Children in Kenya During One-week Campaign*. Nairobi: American Red Cross. [Online], Available: http://www.redcross.org/press/intl/in_pr/020614measles.html [04/18/08 10: 12 AM].

American Red Cross (2003). *Zambia Mass Measles Vaccination Campaign First on Measles Initiative's 2003 Schedule*. Washington: American Red Cross. [Online], Available: http://www.measlesinitiative.org/030606press.html [04/18/08 09:25 AM].

American Red Cross (2004). *Measles Initiative Partners Fight the Two Most Deadly Childhood Diseases in Africa Testing an Integrated Approach to Reach Every Child*. Washington: American Red Cross. [Online], Available: http://www.redcross.org/pressrelease/0,1077,0_314_3818,00.html [04/18/08 11:20 AM].

Amin, A.A. (2005). Social Science Research (Conception, methodology, analysis) Kampala. Uganda.

Anah, M.U., Etuk, I.S. & Udo, J.J. (2006).Opportunistic Immunization With In-Patient Programme: Eliminating a Missed Opportunity in Calabar, Nigeria, *Annals of African Medicine* **5**(4)188-191.

Baluka J. (2003). *The impact of Decentralization on Immunization Coverage in Ntungamo District*. Kampala, Ministry of Health.

Bardenheier B., Yusuf H., Rosenthal J., Santoli J., Shefer A. Cricket D., Abigail M. & Chu, S. (2004). Factors Associated with Under-immunization at 3 Months of Age in Four Medically Underserved Areas. *Public Health Reports*, **119**(5): 479-485.

BASICS 11. (2003). *Increasing Immunization Coverage in Uganda*: *The Community Solving and Strategy Development Approach*. Kampala: BASICS II.
[Online], Avalable**:**
http://www.basics.org/documents/pdf/Uganda_Advocacy_Nov25.pdf
[04/18/08 11:50 AM].

Bates, A.S., Fitzgerald, J.F., Dittus, R.S. & Wolinsky, F.D. (1994). Risk Factors for Under-immunization in Poor Urban Infants. *JAMA*, **272**(14):1105-1110.

Bhuiya, A. Bhuiy, I. & Chowdhury, M. (1995). Factors Affecting Acceptance of Immunization Among Children in Rural Bangladesh. *Health Policy and Planning*, **10** (3):304-311.

Borooah, V.K. (2004). Gender Bias Among Children in India in Their Diet and Immunization Against Disease. *Social Science and Medicine Journal*, **58**:1719-1731.

Borus, P.K. (2004). Missed opportunities and inappropriately given vaccines reduce immunization coverage in facilities that serve slum areas of Nairobi. *East African Medical Journal*, **81**(3):124-129.

CDC. (2005). *Basic and Common Questions: The Importance of Childhood Immunization*. Atlanta: CDC. [Online], Available: http://www.cdc.gov/vaccines/vac-gen/importance.htm [04/18/08 04:25 PM].

Cheyne, J. (1994). Immunization in Urban Areas: Issues and Strategic. *Bull World Health Organ*, **72**(2):183-194.

Chhabra, P., Nair, P., Gupta, A., Sandhir, M. & Kannan, A.T. (2007) Immunization in Urbanized Villages of Delhi. *Indian Journal of Pediatrics*, **74**: 131-134.

Datar, A., Mukherji, A. & Sood, N. (2005). Health Infrastructure & Immunization Coverage in Rural India. *Indian Journal of Medicine* **125:** 31-42.

Demographic and Health Surveys Report (2000). *Immunization Coverage Validation Survey 1999/2000, Uganda.* Kampala, Ministry of Health.

Demographic and Health Surveys Report (2005). *A Review of National Immunization Coverage in Uganda*. Kampala, Ministry of Health.

DISH 11 Projects (2002). *Childhood Immunization in Uganda: A Report of Qualitative Research.* Kampala, K2-Research Uganda Ltd.

Edmunds, W.J., Brisson, M., Melegaro, A. & Gay, N.J. (2002). The Potential Cost Effectiveness of a Cellular Pertussis Booster Vaccination in England and Wales. *Vaccine,* **20**:1316-30.

Fairbrother, G. Hanson, H.K., Friedman S. and Butts, G.C. (1999). The Impact of Physician Bonuses, Fees and Feedback on Childhood Immunization Coverage Rates. *American Journal of Public Health*, **89**:171-5.

Grenfell, B.T. & Anderson R.M. (1989). Pertussis in England and Wales: An Investigation of Transmission Dynamics and Control by Mass Vaccination. *Proc. R. Soc. London,* **236**:213- 52.

Guerin, N. (1998). Assessing Immunization Coverage: How and Why? *Vaccine*, **16**: 81-83.

Hethcote, H.W. (1997). An Age-structured Model for Pertussis Transmission. *Math Biosc*, **145**:89-136.

Howe, K, (1990). Standards for Qualitative and Quantitative Research. A Prolegomenon. *Educational Researcher*, **19**(4)2-9.

Ibnouf, A.H., Van den Borne, H.W. & Maarse, J.A.M. (2007). Factors Influencing Immunization Coverage Among Children Under Five Years of Age in Khartoum State, Sudan. *Electronic Publishing*, **49**(8) 14.

International Federation of Red Cross and Red Crescent Societies. (2004). *Africa - Measles and Polio Reduction Appeal.* Geneva: International Federation of Red Cross and Red Crescent Societies. [Online], Available: http://www.ifrc.org/cgi/pdf_appeals.pl?annual04/015004.pdf [04/20/08 09: 47 AM].

Kampala District, (2006). *Kampala District Population Statistical Abstract, 2006: An information Guide Document*. Kampala, Kampala City Council.

Kampala District, (2007). *Annual Health Development Reports 2005/2007.* Kampala, Kampala City Council.

Kidane, T. & Tekie, M. (2000). Factors Influencing Child Immunization Coverage in a Rural District of Ethiopia. *Ethiopian Journal of Health Development,* **18** (3).

Kongstvedt, P.R. (2007). *Essentials of Managed Health Care*. Hong Kong: Jones and Bartlett Publishers.

Langsten, R. & Hill, K.(1998).The accuracy of mothers' reports on child vaccination: evidence from rural Egypt. *Social Science and Medicine*, **46**(9):1205-1212.

Melgaard B. (2001). Immunization in the 21st Century- the Way Forward. *Acta Tropica,* **80**:119-124.

Ministry of Finance, Planning and Economic Development, (2003). *Infant Mortality in Uganda 1995- 2000: Why the Non-improvement?* Kampala, Ministry of Finance, Planning and Economic Development.

Ministry of Finance, Planning and Economic Development, (2007). *Infant Mortality in Uganda 2000-2005*. Kampala, Ministry of Finance, Planning and Economic Development.

Ministry of Health, (2002). *Annual Health Development Report for Uganda, 2000/2002*. Kampala, Ministry of Health.

Ministry of Health, (2007). *Annual Health Development Report for Uganda, 2005/2007*. Kampala, Ministry of Health.

Nath, B., Singh, V., Awasthi, S.,Bhushan, V., Kumar, V, & Singh, S.K.(2007) Determinants of immunization coverage among 12-23 months old children in urban slums of Lucknow district, India. *Indian Journal Medicine*, **61**(11)598-606.

Ndiritu, M., Cowgill, K.D., Ismail, A., Chiphatsi, S., Kamau, T., Fegan, G., Felkin, D.R., Newton, C.R.J.C., & Scott, J.A.G, (2006). Immunization Coverage and Risk Factors for Failure to Immunize with Expanded Programme on Immunization in Kenya After Introduction of New Haemophilus Influenza Type 6 Virus and Hepatitis 6 Virus Antigens. *BMC Public Health*, **6:**132.

Nuwaha, F., Mulindwa, G. & Balenzi, J. (2001). Causes of low attendance at National Immunization Days for Polio eradication in Bushenyi District, Uganda. *Tropical Medicine & International Health*, **5**(5): 364 – 369.

Odiit, A. & Amuge, B. (2003). Comparison of vaccination status of children born in health units and those born at home. *East African Medical Journal*, **80**(1).

Ogunlana, S. (2005). *The Importance of Immunization*. [Online], Available: http://ezinearticles.com/ [03/25/08 04:15 PM].

PAHO. (2002). *Childhood Immunization: True Investment in the Health Nations.* Washington: PAHO. [Online], Available: http://www.paho.org/english/dpi/100/100feature13.htm [03/25/08 08:15 AM].

Rafiqul, I., Mahfuzar, R. & Mosfequr, R. (2007). Immunization Coverage Among Slum Children: A Case Study of Rajshahi City Corporation. *The Middle East Journal of Family Medicine,* **5** (6).

Reilly, T.A., Marthe, V.P. & Fries, B.E. (1978). A Delay-scheduling Model for Patients Using a Walk-in Clinic. *Journal of Medical Systems*, **2**:303-313.

Sebanhat, D.T. & Nadi, B. (2006). *Vaccination coverage and reasons for non vaccination in a district of Istanbul.* Marmara University Medical Faculty Department of Public Health, Istanbul, Turkey.

Singh, A. (2007). Record-based Immunization Coverage Assessment in Rural North India*. The Internet Journal of Third World Medicine,* **4**(1) 1.

Singh, P. & Yadav, R. (2001). Immunization Status of Children in Bimaru States. *Indian Journal of Pediatrics*, **68**:495-500.

Stafford, E.F.Jr. & Agarwal, S.C. (1979). Managerial Analysis and Decision Making in Out-patient Health Clinics. *Journal of Operations Research Sociology*, **30**:905-915.

Subramanyam, K. & Sekhar, S.C. (1987). Improving Vaccine Supplies to Rural India. *Socio-Economic Planning Science,* **21**(2):131-138.

Tugumisirize, F., Tumwine, J.K, & Mworoza(2002). Missed Opportunities and Caretaker Constraints to Chilhood Vaccination in rural areas of Uganda.*East African Medical Journal*, **79**(7): 347-354.

Uganda Bureau of Statistics (2001) *2000 Uganda Demographic and Health Survey*. Uganda Bureau of Statistics and ORC Macro, Entebbe Uganda.

Uganda Bureau of Statistics (2007). *2006 Uganda Demographic and Health Survey*. Uganda Bureau of Statistics and Macro International Inc. Entebbe, Uganda.

Uganda National Expanded Programme of Immunization. (2005). *Uganda National Expanded Programme of Immunization standards*. Kampala, Ministry of Health.

Vaahtera, M., Kulmala, T., Maleta, K., Cullinan. T., Salin, M.L. & Ashorn, P. (2000).

Childhood Immunization in Rural Malawi: Time of Administration and Predictors of Non-compliance. *Annals of Tropical Paediatrics: International Child Health*. **20** (4): 305-312.

Vallbona, C. (1993). Importance of Immunization in Child Care and Prevention. *Springer*, **10**(5):365-377.

Waisbord, S. (2004). *Assessment of Communication Programs In Support of Polio Eradication*: Global Trends and Case Studies. Washington, DC, Academy for Educational Development.

World Bank (2006). *Disease and Mortality in Sub-Saharan Africa.* Washington, World Bank Headquarters.

WHO. (1999). Measles: Progress Towards Global Control and Regional Elimination. *Weekly Epidemiology,* **74**(50): 429-434.

WHO. (2001). *Immunization Drop-Out in Uganda*. Kampala: WHO Country Office.

WHO. (2002). Vaccines: Summary Country Profile –Uganda. *Immunization and Biologicals Global 2002*. Kampala, WHO Country Office.

WHO. (2005). *Immunization against Diseases of Public Health Importance*. Geneva, WHO Headquarters.

WHO. (2005). *Immunization Maintains Strong Performance Made in Last Quarter Century*. Geneva, WHO Headquarters.

WHO/UNICEF. (2001). *Five-year Regional Plan of Action 2001-2005*. Nairobi, UNICEF Regional Offices.

WHO/UNICEF. (2004). *Estimates of Routine Immunization Coverage in Uganda.* Kampala, UNICEF Country Office.

WHO/UNICEF. (2008). *Global Immunization Data*. Geneva, WHO Headquarters.

ANNEXES

Annex (I) Draft Questionnaire for Mothers or Care-givers

Annex (II) Immunization Card (Child Health Card)

Annex (III) Kawempe Division: List of Parishes and Zones

Annex (IV) Immunization Register

Annex (V) UNEPI Standards

Annex (VI) Permission Letter

ANNEX I

QUESTIONNAIRE FOR MOTHERS OR CARE GIVERS

TOPIC: "IMMUNIZATION COVERAGE AND FACTORS ASSOCIATED WITH FAILURE TO COMPLETE CHILDHOOD IMMUNIZATION COVERAGE IN KAWEMPE DIVISION, UGANDA"

TARGET: MOTHERS OR CARE GIVERS SELECTED FROM HOUSEHOLDS IN KAWEMPE DIVISION

Dear Respondent,

Good day. My name is Dr Bataringaya Kamanda a Ugandan student of the University of the Western Cape, Faculty of Community and Health Sciences, School of Public Health in South Africa. I am studying Immunization coverage and factors associated with failure to complete childhood immunization coverage in Kawempe Division, for children aged 12 to 18 month. I would like to ask you a few questions and discuss with you issues pertaining to immunization coverage and you are free to ask for clarity of questions asked. The study is purely academic, thus all information collected will be used to design interventions to improve immunization coverage. All the information you give will be kept confidential and used for the purpose of this study and will not in any way affect the services you get from your health facilities or the relationship with health workers. The questionnaire will be interviewer-administered and the interview will take approximately 40 minutes Please this is not a test but I am trying to get information that will assist

Kampala District Authorities to improve immunization coverage for your community. This is voluntary participation and you can decide to participate without any consequences of any kind. This questionnaire has also been translated to local language. Kindly indicate if we can proceed with the interview.

Thank you very much.

INSTRUCTIONS: (For all Parts <u>One</u> to <u>Three</u> please circle or write the appropriate response).

PART ONE: BACKGROUND INFORMATION

101. Please, provide your actual age :……...…(years)

102. Gender:

1. Male
2. Female

103. What is your marital Status?

1. Married
2. Single
3. Widow/Widower
4. Cohabiting
5. Separated
6. Divorced

104. What is your highest Education Level?

1. Tertiary/Post – tertiary)
2. Vocational (Post - secondary)
3. Secondary

4. Primary
5. No education

105. What is your spouses' level of education?

1. Tertiary/Post -tertiary
2. Vocational (Post – secondary)
3. Secondary
4. Primary
5. No education

106. What is your current employment status?

1. Working full time
2. Working part-time
3. Unemployed
4. Looking for a job
5. Retired
6. Student
7. Other (Specify…….)

107. What is your spouse's employment status?

1. Working full time
2. Working part-time
3. Unemployed
4. Looking for a job
5. Retired

6. Student
7. Other (Specify…….)

108. Monthly Income:

1. More than UGX. 500,000
2. Between UGX 500,000 – 400,000
3. Between UGX 400,000 – 300,000
4. Between UGX 300,000 – 200,000
5. Between UGX 200,000 – 100,000
6. Less than UGX100, 000.

109. What is your religion?

1. Catholic
2. Protestant
3. Adventist
4. Muslim
5. Evangelical churches
6. Traditional
7. Others (Specify……..)

110. How many children do you have? …….

111. How many dependants do you have? .....

PART TWO: IMMUNIZATION COVERAGE IN KAWEMPE DIVISION

201. Did you take your last child for DPT Immunization?

1. Yes 2. No

202. Did your last child complete DPT Immunization Schedule?

1. Yes 2. No

203. Did you take your last child for Polio Immunization?

1. Yes 2. No

204. Did your last child complete the Polio Immunization Schedule?

1. Yes 2. No

205. Did you take your last child for Measles Immunization?

1. Yes 2. No

206. Did your last child complete the Measles immunization schedule?

1. Yes 2. No

207. Do you have your child's immunization card?

1. Yes 2. No

PART THREE: FACTORS INFLUENCING IMMUNIZATION COVERAGE

301. The role of community health workers in the area enhances delivery of immunization services.

1. Yes 2. No

302. Short distance from my home to immunization centre encourages me to take my child to receive immunization services.

1. Yes 2. No

303. The knowledge on immunization activities enhances the use of immunization services in Kawempe.

1. Yes 2. No

304. Availability of health infrastructures enhances utilization of immunization services in Kawempe division.

1. Yes 2. No

305. Availability of immunization equipment enhances use of immunization services in Kawempe division.

1. Yes 2. No

306. Anti-vaccine rumors affect use of immunization services in Kawempe division.

1. Yes 2. No

307. Bad weather conditions affect the utilization of immunization services in Kawempe division.

1. Yes 2. No

308. Place of delivery enhances the utilization of immunization services in Kawempe division.

1. Yes 2. No

309. Migrations of families affect utilization of immunization services in Kawempe division.

1. Yes 2. No

310. The use of mobile vaccinations teams enhances utilization of immunization services in Kawempe division

1. Yes 2. No

311. Mass media is a strong tool for promotion of utilization of immunization services in Kawempe division.

1. Yes 2. No

312. Community awareness is important in promoting utilization of immunization services in Kawempe division.

1. Yes 2. No

313. The level of education of the mother is important in enhancing utilization of immunization services in Kawempe division

1. Yes 2. No

314. The age of the mother plays an important role in the use of immunization services in Kawempe division.

1. Yes 2. No

315. The attitude of the parents plays an important role in enhancing the use of immunization services in Kawempe division

1. Yes 2. No

316. Marital status of the mother plays an important role in the use of immunization services in Kawempe Division.

1. Yes 2. No

317. Political good will of the community leaders in Kawempe division enhances delivery of immunization services.

1. Yes 2. No

318. Decentralization of critical health services is essential in enhancing the use of immunization services in Kawempe division

1. Yes 2. No

This is the end of the questionnaire. Thank you for taking time to answer these questions. We appreciate your help.