

**DETERMINANTS OF IMMUNIZATION
COVERAGE AMONG CHILDREN AGED 11-23
MONTHS IN A REFUGEE CAMP: A CASE OF
KAKUMA REFUGEE CAMP¹»**

BY

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**A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
AWARD OF THE DEGREE OF MASTER OF PUBLIC
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DECLARATION

I, Dr. Stephen Kamau Macharia declare that this thesis is my original work and neither has it been presented to any institution for the purpose of obtaining a degree nor been published in any journal.

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DEDICATION

This thesis is dedicated to my parents the late Nahashon and Naomi for their continuous support in my education, my wife Loise and our children Harrison, Naomi and Samuel who persevered my absence while I undertook my studies and provided support.

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TABLE OF THE CONTENTS

Title	i
Declaration	ii
Approval	iii
Dedication	iv
Acknowledgement	v
Table of contents	vi
List of Acronyms	ix
List of tables	xi
List of figures	xiii
Definition of terms	xiv
Abstract	xvi
Chapter 1	Introduction and Background Information
1.1	Introduction 1
1.2	Background information 2
1.3	Research Problem
1.3.1	Problem statement 4
1.3.2	Justification 4
1.3.3	Research question 5
1.4	Objectives
1.4.1	Broad objective 6
1.4.2	Specific objectives 6
Chapter 2	Literature review
Chapter 3	Methods and Materials
3.1	Study design 15
3.2	Study area 15
3.3	Study population 15
3.4	Sampling
3.4.1	Sample size 16
3.4.2	Sampling procedure 16

3.5	Data collection	17
3.6	Data processing, analysis and presentation	18
3.7	Minimization of errors and biases	18
3.8	Ethical considerations	19
3.9	Study limitation	19
Chapter 4	Findings	
4.1	Immunization coverage and KAP among mothers/guardians	20
4.1.1	Social demographic characteristics	20
4.1.2	Immunization coverage	21
4.1.2.1	Results of immunization	21
4.1.2.2	Factors that motivate or hinders immunization	23
4.1.3	Knowledge of mothers/guardian on immunization	26
4.1.4	Attitude of mothers/guardian towards immunization	29
4.1.5	Practice of mothers/guardians on immunization	32
4.1.6	Relationship between immunization status with the sex of a child—	33
4.1.7	Results of Logistic Regression Analysis	35
4.2	KAP among health workers	
4.2.1	Demographic characteristics of health workers	36
4.2.2	Work experience of the health workers	37
4.2.3	Knowledge of health workers on immunization	37
4.2.4	Attitude of Health workers towards immunization	42
4.2.5	Practice of health workers towards immunization	45
Chapter 5	Discussion	49
Chapter 6	Conclusions and Recommendations	
6.1	Conclusions	55
6.2	Recommendations	56
References		

ANNEXES

Annex 1 Map

Map of Turkana District 62

Map of Kakuma Refugee Camp..... 63

Annex 2 Introduction and consent form

3.1 Mother/guardian 64

3.2 Health Workers 64

Annex 3 Questionnaires

Questionnaire for mothers/guardian 65

Questionnaire for Health workers 73

Annex 4 Criteria for assessing adequate Knowledge, Attitude and Practice 83

Annex 5 Sampling Technique Methodologies 88

Annex 6 Births from May 2000- May 2001 89

LIST OF ACRONYMS

AFP	Acute Flaccid Paralysis
AIDS	Acquired Immunodeficiency Syndrome
BCG	Bacillus Calmette Guerin
COR	Community Outreach
CORPs	Community Own Resource Persons
DHMT	District Health Management Team
DPHN	District Public Health Nurse
DPT	Diphtheria-Pertusis-Tetanus
EPI	Expanded Program on Immunization
FP	Family Planning
GOK	Government of Kenya
GPV	Global Programme for Vaccine and immunization
HIV	Human Immunodeficiency Virus
HSO	Head of Sub Office
IEC	Information, Education and Communication
IMR	Infant Mortality Rate
IRC	International Rescue Committee
KAP	Knowledge, Attitude and Practice
KDHS	Kenya Demographic and Health Survey
KEMRI	Kenya Medical Research Institute
KEPI	Kenya Expanded Program on Immunization
KNH	Kenyatta National Hospital
KRC	Kakuma Refugee Camp
LQAS	Lot Quality Assurance Sampling

LWF	Lutheran World Federation
MCH	Maternal and Child Health
MOH	Ministry of Health
NCKK	National Council of Churches of Kenya
NGO	Non Governmental Organization
NIDs	National Immunization Days
OPV	Oral Polio Virus
PEI	Polio Eradication Initiative
PHC	Primary Health Care
RH	Reproductive Health
SDP	Service Delivery Point
SPSS	Statistical Package for Social Sciences
TBA	Traditional Birth Attendants
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children Education Fund
OVP	Open Vial Policy
WHA	World Health Assembly
WHO	World Health Organization

LIST OF TABLES

Table 2.1	Immunization coverage survey; 1987-1999.	11
Table 2.2	immunization coverage Turkana District	14
Table 2.3	Indicators of immunization services, KRC 1998-2000.	14
Table 4.1	Demographic characteristic of mothers/guardian	21
Table 4.2	Distribution of children by presence of immunization card	22
Table 4.3	Immunization coverage	22
Table 4.4	Reasons for not immunizing children.	23
Table 4.5	Hindrance to immunization.	24
Table 4.6	Reasons for motivating mother to immunize child	25
Table 4.7	Relationship of respondent's level of knowledge and socio-demographic characteristics	28
Table 4.8	Attitude of mothers/guardians towards immunization.	30
Table 4.9	Results of various socio-demographic characteristics and the attitude towards immunization	31
Table 4.10	Immunization status of children by sex -	33
Table 4.11	Relationship of Immunization status of child and mothers/guardian characteristics	34
Table 4.12	Results of logistic regression	35
Table 4.13	Demographic characteristics of health workers.	36
Table 4.14	Working aspect of health workers.	37
Table 4.15	Level of knowledge of health workers on immunization.	38
Table 4.16	Results on Knowledge on Immunization of Health workers	39
Table 4.17	Socio-demographic characteristics of health workers verses knowledge on immunization.	41
Table 4.18	Social demographic characteristic of Health workers and attitude on immunization.	44

Table 4.19	Relationship between practice and socio-demographic characteristic of health worker-----	48
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LIST OF FIGURES

Figure 4.1 Reasons for lack of motivation among mothers/guardian 25

Figure 4.2 Knowledge of mothers/guardians on EPI 26

Figure 4.3 Knowledge of health workers on KEPI 40

Figure 4.4 Reasons for poor coverage — 43

Figure 4.5 Supervisory visits 45

Figure 4.6 Health topics covered during health education talks _____ 46

Definition of terms

Not immunized

A Child was defined as "not immunized" against a given disease if, at the time of the interview, she/he had not received any vaccine dose.

Fully immunized

A Child was classified as "fully immunized " if she/he had received BCG vaccine, 3 doses of DPT vaccine, 3 doses of OPV vaccine, and 1 dose of measles at the age of 12 months. Adherence to the recommended schedule for BCG, OPV, DPT and measles vaccines was estimated by calculating the proportion of children who had completed primary immunization by 12 months of age.

Immunization Schedule

"Immunization scheduled" according to the Ministry of Health (MOH) Kenya during the study period were BCG and birth Polio given at birth; DPT I and OPV I at week 6; DPT II and OPV II at 10th week; DPT III and OPV III at 14th week; and measles at 9th month.

Cluster

A "Cluster" was defined as a set of households in a randomly selected group within a zone, phase or block, which are 'administrative units' in the camp.

Household

A household was defined as person or persons staying together in the same compound or under the same roof or several roofs, answerable to the same head and sharing a common source of food or income.

Valid dose

Valid doses included only those doses given according to KEPI policy for age and interval of administration.

Invalid dose

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Invalid doses were doses administered before the minimum age or after too brief an interval.

Missed opportunity

The child or mother attended an immunization session but was not given all of the doses: which he or she was eligible.

Invalid dose

Invalid doses were doses administered before the minimum age or after too brief an interval.

Missed opportunity

The child or mother attended an immunization session but was not given all of the doses for which he or she was eligible.

ABSTRACT

Over 100 million children are immunized annually saving 3 million young lives a year, but 1.7 million unreached children still die each year due to the six immunizable diseases namely: Poliomyelitis, Tetanus, Diphtheria, Whooping cough, Tuberculosis, and measles. Since mid 90,s there has been a gradual decline in the immunization coverage in developing countries due to multiple factors. In response to this, African countries started immunization schedules for children. No study has been done to determine factors that affect immunization coverage in a refugee setting.

The study assessed immunization coverage and factors that determine immunization coverage in Kakuma Refugee Camp. A descriptive study was designed and the target populations were children aged 11-23 months, the mothers/guardians of those children and health workers. A total of 210 children were selected using standard EPI cluster survey methodology. Standard structured questionnaires were used to collect information. Chi test of significant and logistic regression analysis were applied to relate the factors and determine the effect of variables.

The study revealed that the immunization coverage was 76.2% which is higher than the national coverage of 51.5% and that of host community Turkana which is about 12%. About 63% of the mothers/guardians had inadequate knowledge and 22.7% had irrational attitude on immunization. However, religion and education of the mothers/guardians had statistical significance on immunization status of the child. The knowledge on EPI was low among the health workers with 78% having inadequate knowledge on immunization. The attitude (58%) and practices (58%) of the health workers were rational. There was statistical significance on the practice and the year of service of the health workers.

The coverage was impressive but effort should be increased to raise the coverage to the global target. The study recommended that health education awareness campaigns should be conducted in the camp and in the host community and that regular refresher trainings should be conducted for the health workers who should be involved in the churches and mosques to deliver health education on immunization to congregation by involving the leaders.

CHAPTER 1

1.1 Introduction

Immunization is the process of protecting a person from a specific disease. It is a proven cost-effective weapon in the control, prevention and even elimination of diseases. Immunization can be active or passive. In active immunization, the vaccine is acting in place of a natural antigen. Antigens are biological substances made from bacteria or viruses and are either killed or live attenuated. In passive immunization, the body receives ready-made antibodies.

Vaccines have been used successfully in reducing the incidence of some diseases and this has given rise to Global Expanded Program on Immunization (EPI) against the six EPI target diseases, namely Poliomyelitis, measles, tuberculosis, tetanus, whooping cough and diphtheria. Elimination of smallpox by intensified immunization worldwide has given hope and encouragement in the fight against the EPI target diseases ¹.

Immunization in emergency situation has been a challenge due to breakdown of health services in the country of origin of the refugees due to protracted war and destruction of the infrastructures. Kakuma Refugee Camp which hosts refugees from 8 African countries is more complex because some of the camp communities have come from countries with different EPI policies while others have come from the countries with no EPI services at all.

In Kakuma Refugee Camp the EPI policy adopted are those of Kenya and targets for 6 immunizable diseases namely Polio, measles, tetanus, Diphtheria, Whooping cough and Pertusis. According to the policy, the child should be immunized before the age of one year. EPI is implemented by International Non Governmental Organization (INGO) in partnership with District Medical Officer of Health (DMOH) Turkana District.

1.2 Background Information

The history dates back in 17th century when Lady Mary Montagu introduced the concept of *variolation*. She deliberately inoculated persons with smallpox material to prevent them from getting the diseases. Edward Jenner later demonstrated this in 1796 on an eight-year old boy, who he inoculated with cowpox material and showed that the boy became immune to smallpox. The word then changed to vaccination. The discovery of Jenner's vaccine spread around the world within a decade.

In 1974, the World Health Organization (WHO) established the Expanded Programme on Immunization (EPI). In 1977, the World Health Assembly (WHA) set 1990 as the target for universal child immunization. The aim was to immunize all children of the world against the EPI target diseases. The general programme policies were approved in resolution WHA 30.53, adopted in May 1977. The importance of EPI as an essential component of MCH and PHC was emphasized in resolution WHA 31.53, where 100 countries signed these resolutions and agreed to start EPI in their respective countries. It was adopted in May 1978, and in the Declaration of Alma-Ata in September 1978. In 1982, the WHA warned that progress would have to be accelerated to meet the 1990 goal and urged member states to take action programs (resolution WHA 35.31). The five-point action program called for the promotion of EPI within the context of Primary Health Care; the investment of human resources; the investment of adequate financial resources; to ensure continuous program evaluation and adoption to achieve high coverage and maximum reduction in cases and deaths; and the pursuit of operational research and development.²

The EPI Global Advisor Group (1985) recommended that in furtherance of the five-points action program endorsed by the 35th WHA in 1982, three general and four specific

actions be taken by national programmes, supported by WHO, to accelerate EPr progress

The three general actions needed were to promote the achievement of the 1990 immunization goal at national and community levels through collaboration among ministries, organizations and individuals in both public and private sectors; adopt a mix of complementary strategies for programme acceleration; and ensure that rapid increase in coverage can be sustained through mechanisms, which strengthen the delivery of other PHC interventions. The four specific actions needed were: to provide immunization at every contact point; reduce dropout rates between first (BCG) and last immunization (measles); improve immunization services to the disadvantaged in urban areas; and increase priority for the control of measles, poliomyelitis and neonatal tetanus.’

International Rescue Committee implements a comprehensive health services in Kakuma Refugee camp. EPI activities are implemented by a community outreach program, which has a network of community health workers who work closely with the clinic and hospital health staff. The Ministry of Health through Turkana District public health nurse supplies EPI vaccines. However, vaccines supply is usually interrupted by poor road infrastructure but IRC occasionally help in shipment of these supplies. Due to high personnel costs, community outreach program is run by trained CHW's whose role includes EPI, health education campaigns and referral of sick patients to the nearest health facilities. All health services are rendered free of charge and they are evenly distributed in the camp.

1.3 RESEARCH PROBLEM

1.3.1 Problem statement

Immunization coverage for children aged 11-23 months has dropped from 67% in 1998 to 51.5% in 2003 in Kenya according to KDHS^{36, 38}. The trend for Turkana District

• • 17

remains the same according to KEPI . Outbreaks of measles have been reported in Kakuma Refugee Camp during the years 1999 and 2000. IMR increased in Kakuma Refugee Camp, up from 60 per 1000 live births in 1998 to 81 per 1000 live births in 2000⁴³. Occasionally, there is a problem of lack of some antigens prompting the re-scheduling of the visit. The supplies are received from district store in Lodwar District Hospital, 120 kilometers away. The camp receives new arrivals from Sudan, which is erratic and unexpected most of the time. At the reception center, all arrivals are screened for any disease and those not immunized get immunization. It is therefore difficult to estimate the number of the target population. Births are well distributed in the year with a slight peak occurring in the months of September. Routine immunization is done in the clinics as per the GOK schedule on immunizations. Statistics in Kakuma show high level of antigen coverage though no immunization survey has been conducted to assess the fully immunized children in the camp³⁵.

1.3.2 Justification

EPI diseases are preventable and can be controlled by raising the immunization coverage. The camp receives refugees from a number of countries in which the immunization services have been disrupted by war. Many children are not fully immunized by the age of 12 months as per the immunization schedule. The high antigen coverage may lead to misconception that the coverage is good whereas this may be due to many missed opportunities described above. The level of education and age of the mother/guardian is

low in Kakuma refugee camps compared to other area in Kenya. Furthermore, the refugee community is disadvantaged because of trauma by war or conflict from their countries. The cadre of health worker involved in the EPI is Community Health Workers who have been equipped with EPI skills.

The camp has high antigen coverage, but the percentage of those who are fully immunized by age of 12 months is not known. No immunization coverage survey has been conducted among the refugees to assess the coverage of fully immunized children. It is therefore of necessity to design a study to look into factors that determine immunization coverage in Kakuma Refugee Camp so that intervention program can be planned to increase the coverage, prevent the outbreaks of immunizable diseases, and reduce IMR.

1.3.3 Research Questions

What is the immunization coverage in Kakuma Refugee Camp? Is there any interaction between personal characteristic of mother/guardian and the immunization of children that could help in the development of better approach to EPI in complex emergency situations?

1.4 OBJECTIVES

1.4.1 Broad objective

To determine immunization coverage and factors that influence immunization in children aged 11-23 months in Kakuma Refugee Camp.

1.4.2 Specific objectives

1. To determine the immunization coverage of children aged 11 -23 months.
2. To assess the knowledge, attitude and practice of mothers with children aged 11-23 months on immunization.
3. To assess the knowledge, attitude and practice of the health workers on immunization.
4. To relate the immunization status of the children with mothers/guardian knowledge and attitude on immunization.

CHAPTER 2

Literature review

Over 100 million children are now immunized annually, saving 3 million young lives a year, but 1.7 million unreached children still die each year from the six EPI target diseases. In 125 countries, as many as 80% of young children have been immunized. There were less than 6500 polio cases worldwide in 1998, and polio eradication is in sight. The new Global Alliance for Vaccine and Immunization is committed to raise immunization rates and speed the introduction of new and underused vaccines, and promotion of safe injection practices in developing countries. The average cost of vaccines, syringes, needles, cold chain equipment and health worker training and salaries needed to immunize one child against the six major childhood diseases is estimated at \$17. UNICEF has started the Vaccine Independence Initiative (VII), which requires the government to plan and budget for vaccines. It then helps the government to procure vaccines at the best possible cost.³

In Africa region, immunization remains among the top priority public health services. In 1995, the regional immunization coverage had stabilized at 69% for BCG, 54% for DPT3/OPV3 and measles, and 38% for two doses and more of tetanus toxoid⁴. This coverage shows a downward trend compared to early 1990s. However weak points have remained particularly in Africa due to geographical locations by impeding access to routine immunization, massive displacement of unvaccinated persons particularly in war

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torn countries, and low routine Immunization coverage

Achievements in immunization coverage for countries in Eastern and Southern epidemiological blocks of Africa were impressive. Seventy-five percent of the countries had developed a surveillance system for AFP and polio, measles, and neonatal tetanus by

1995. Eleven countries had reported "zero" incidence of poliomyelitis for the past four years. However, polio is endemic in most African countries^{6,7,8} and the risk of poliovirus importation and circulation remains significant in polio-free country⁹. Supplemental immunization activities have been carried out through NIDS¹⁰.

Neonatal tetanus rate of less than 1/1000 live birth was reported in 18 countries in 1993 but recent EPI assessment confirmed the decline in the cases due to improvement in Ante-natal services, improving Tetanus Toxoid coverage, and training and involvement of TBAs¹¹. Some countries have initiated strategies to supplement Tetanus toxoid immunization and improve clean delivery practices in the high-risk areas¹². BCG coverage shows an increase with impressive increase in immunization rates in several less developed countries as a result of increase EPI program¹³ though sustainability of EPI program has been affected by how immunization is perceived by lay population and the perception of utility and need effect demand¹⁴. Some countries have reported as low as 30% immunization coverage¹⁵.

However, the child immunization coverage has never reached the levels to curtail disease transmission and to reduce the morbidity burden with the target diseases due to factors related to acceptance, immunization service providers and organization of health services⁶. Low immunization coverage has been found to be associated with certain neighborhoods, certain ethnic groups, low socio-economic status and new arrivals. Health lessons have been found to be confusing parents and previous ineffective immunization program has made residents mistrustful of the current program in Yaounde¹⁷. Sex and birth order of the child; marital status, age, occupation, education, knowledge, attitude and practice of the mother; and sending mothers without immunizing the child have been found to be factors that influence non-attendance in the child

immunization¹⁸. Though traditional and religious beliefs can influence immunization coverage, a survey conducted in Zimbabwe indicated that the problem lay in the poor quality of EPI services. Mothers were well informed, highly motivated and may have suggestions on how services could be improved, but were rarely given opportunity to discuss them with the health workers¹. Negative correlation between outbreaks and routine coverage also affect immunization coverage²⁰.

Child health outreach programs have been shown to have an impact on the child

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vaccination among other factors. However, greater involvement of women in intervention program have a greater impact on the EPI since the target population are women who tend to blend well with traditional roles of child bearing and nurturing²².

Community participation/involvement is critical in sustaining health program. Lack of community participation, attitude of the health staff, intersectoral collaboration and health

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education have been shown to be important in EPI implementation.

Serological responses to EPI vaccines given in infancy have been shown to persist at very satisfactory levels throughout early childhood²⁴. Pediatric HIV infection should not be considered as a limiting factor in implementation and the progress of EPI worldwide. HIV infection attributable to medical injections is suspected to be low, although case-control studies have not provided definite results^{25,26}.

KEPI was launched in 1980 with the overall goal to strengthen immunization services in the country. It was introduced in the first pilot district in 1981 and expanded to the rest of the country by the end of 1986. The program's main objective is to immunize children aged 0-11 months against the six immunizable diseases. The main strategy to achieve this is to immunize daily from fixed centers and to supplement this by outreach centers.

Community Nurse and Public Health Technicians give immunization in over 3000 SDP (private, NGOs, and GOK). The staff is trained in KEPI operation to ensure that they have essential skills in EPI and knowledge needed to carry out these important services.

KEPI has implemented Global Polio Eradication Initiative by conducting four NIDS since 1996. Measles and vitamin A were included in NIDS (1999, 2000).

Surveillance system in EPI target diseases have been strengthened as a strategy to eradicate polio, eliminate neonatal tetanus, and control of measles²⁷.

Since its inception in 1980, KEPI has increased immunization of the target population, achieving and maintaining coverage of over 75% by the early 1990's.

Data on the immunization coverage for the displaced population and for the refugees are not available. However, in a number of countries, war related disruption of immunization services has triggered out-breaks of polio and other vaccine related diseases. One hundred and fifty cases of polio were reported in Russia Federation in 1995 following a 3-year disruption of immunization services, in Iraq there was an upsurge following Gulf war²⁹, 1996 in Albania³⁰, Angola³¹ and Sudan³². Elsewhere, the mobility of refugee populations and the Internally Displaced Persons continue to hamper efforts to organize and follow-up both routine immunizations, leaving many children only partially immunized and therefore unprotected. Cluster surveys conducted in 1996 estimated routine OPV 3 coverage among infants, in northern Somali to be under 30%, while coverage in the south of the country was estimated to be even lower³³; Democratic Republic of Congo reported 36% fully immunized³⁴; Angola 29%.

There are several refugee camps in Africa. However, in East and central Africa, many refugee camps are in the maintenance phase though they continue to receive new arrivals due to the continued war in the countries of origin. Many children come who are not

immunized and few partially immunized. Majority gets immunization past the recommended age.

In the two refugee camps in Kenya, namely Dadaab and Kakuma situated in Eastern and Rift Valley province respectively, the immunization coverage is unknown though the reported antigen coverage is high, which may be attributed to the children who are getting immunizations past the recommended age. There is no literature on the full immunization coverage in any of the refugee camps in Kenya³⁵.

The 1998 Kenya Demographic and Health Survey (KDHS) documented a significant decline in coverage of approximately 15% to coverage of approximately 60%³⁶. This has

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further declined to unacceptable level in the year 1999 . There are marked disparities between districts and provinces, with Nyanza Province having coverage as low as 44.4% and Western Province 51.2%³⁷.

Table 2.1: National Immunization Coverage from 1987-1999

Year/ Antigen	1987	1992	1993	1994	1998	2003
BCG	91%	93%	96.3%	94.6%	95.9%	86.8%
DPT3	74%	85.8%	86.9%	85.8%	79.2%	72.7%
OPV3	75%	85%	86.7%	85.5%	80.4%	66.8%
Measles	60%	81.2%	83.8%	80.7%	79.2%	72.1%
Fully Immunized	51% (Survey)	76.7% (Survey)	78.7% KDHS	76.1% (Survey)	65.4% KEPI	51.5% (KDHS)

Sources: Ministry of Health, Kenya Expanded Program on Immunization surveys, 1987, 1992 and 1994; and Kenya Demographic and Health Surveys 1993, 1998, and 2003.

Major measles outbreaks throughout the country in 1998-1999 may have contributed to this significant decline in coverage according to KEPI reports from 1996 to 1999.³⁷

In 2006, Kenya reported its first case of polio in 22 years, marking a setback in global efforts to eradicate the crippling disease. The case was reported among the refugee community in Dadaab Refugee Camp in North Eastern Province. The existing WHO policies and guidelines for EPI has not been fully adopted in Kenya. This coupled with a slow pace in policy formulation at the national level and poor communication of policies to first level health workers, have resulted in lack of clarity on those policies and on implementation. The effects are clearly noted in the lack of clear policies on monitoring quality of vaccines and of importation of vaccines, especially outside KEPI, implementation of Open Vial Policy and reduction of vaccine wastage and the inclusion of new antigens is most apparent; supplies of cold chain equipment and other essential EPI supplies are irregular because of inadequate GOK funding and due to ad-hoc funding by donors. This problem is further aggravated by the lack of a comprehensive inventory system at the district and facility level; and due to the irregular maintenance of equipment. Funds are not allocated for the procurement of spare parts for the cold chain at the District level; and supplies are therefore erratic; funding of EPI has historically been substantially on donor supported since inception, the dependence that has made the programme vulnerable to the whims of donors who at times exercise unsure leverage on the performance of the programme. There is need to alter this dependence to assure the programme of funding under government sources. Human resource development is vital for sustainability of EPI. Historically, EPI training has been offered in-service. The high cost of training, and the lack of adequate resources for training and training materials, and high staff turnover has resulted in an inadequate number of KEPI trained health workers to offer EPI services. This has had an adverse effect on the quality of EPI services in the key areas such as cold chain/ logistics, programme management and disease surveillance

and control. Immunization coverage is closely linked to the quality of services offered. For the coverage to be increased and sustained, the following critical areas of quality of immunization must be addressed: Missed opportunities³⁹ and high dropout rates; Unsafe injection practices²⁵; and Adverse effects following immunization.

The high decline in immunization coverage and the consequent problems is unacceptable. The interventions proposed include resource mobilization for EPI; effective service delivery; capacity building, will be done through training of service providers for sustainability and enhancement of quality of care; and advocacy and social mobilization to improve the participation of the beneficiaries (parents/caretakers) and other stakeholders at all levels. This will help achieve overall objectives through IEC⁴⁰.

In a quantitative survey done in 1992 on the factors that promote and hinder immunization activities in South Nyanza districts, the knowledge of immunization activities among mothers was considerably higher compared to men and local leaders. Mothers believed that they receive good services from the health facilities though they had complaint about them. The frequently mentioned factors that affect immunization were procrastination (the tendency to postpone action for no apparent reason), child is sick, health staff scold mothers, immunization postponed, clinic is far, other commitments and child will be bewitched. The knowledge on immunizable diseases was relatively low, with measles being the best-known immunizable disease⁴¹.

In immunization coverage survey conducted by KEPI in Nero, Kilifi, and Suba Districts (April, 2000) to evaluate KEPI activities, it was shown that Nyeri had high immunization coverage with 97% of children 11-23 months being fully immunized as compared to Suba with 37%. Kilifi had 77% of children fully immunized⁴².

Turkana District immunization coverage has been low according to the KEPI reports. Fully immunized children under 1 year have been between 12-38%³⁷. See table 2.2 below.

Table 2.2: Turkana District Immunization Coverage 1994-March 2001

Year	BCG	DPT3	OPV3	Measles	Fully Immunized Child <1yr
1994	108%	62%	66%	55%	33%
1995	52%	36%	34%	33%	16%
1999	95%	62%	60%	57%	28%
2000	101%	88%	80%	97%	38%
2001	34%	29%	28%	20%	12%

Source: Ministry of Health, Kenya Expanded program on Immunization report 2001

Statistics in Kakuma refugee camp show high level of antigen coverage that may be high due to missed opportunities and new arrivals, majority of whom are over 12 months³⁵. DPT coverage is 86% but there is no recent information available on the number of fully immunized in the year 2000 (Table 2.3).

Table 2.3: Indicators of the immunization services, Kakuma refugee camp 1998-2000

Year	BCG	OPV 3	DPT 3	Measles	Fully Immunized Child < 1 yr
1998	-	-	-	-	-
1999	85%	92%	92%	106%	-
2000	82%	82%	82%	86%	-

Source: Kakuma Refugee Camp Annual Health Report 1999 and 2000

C CHAPTER 3

METHODS AND MATERIALS

3.1 Study design

The study design was descriptive conducted in Kakuma Refugee Camp.

3.2 Study area

The study was carried out in Kakuma Refugee Camp which is located in Northern Rift Valley Province of Kenya in Turkana district, 120 kilometers North of Lodwar Town. Kakuma refugee camp has a population of about 85,000⁴⁵, 82% from South Sudan, 15% from Somalia and the rest from Ethiopia, Eritrea, Rwanda, Burundi, Uganda, and the Democratic Republic of Congo. The camp is divided into 8 zones. The Sudanese are in all the zones. However in zone 7 and zone 8 majority are Somalis. Zone 5 has a mixed nationality (Annexes 1 and 2).

3.3 Study populations

The population studied was children aged 11-23 months at the time of the survey, among the residents of Kakuma Refugee Camp. The children were selected from the birth register (Annex 5). Children aged 11-23 months were included in the sample in accordance with the Kenya National Immunization coverage surveys. Child welfare card or when this is not available, verbal autopsy confirmed the age by asking mother/guardian. Also included in the study were mothers/guardians with children aged 11-23 months as well as all health workers in the community and those delivering immunization services in the clinics and hospitals.

3.4 Sampling

3.4.1 Sample size

The number of children included in the study was 211 according to the WHO EPI cluster survey methodology. EPI Survey using cluster sampling technique have been developed and widely applied.⁴⁸ The use of total number of births as a sampling frame permitted accurate selection of clusters with the appropriate sampling weights. The inclusion of children randomly selected from each cluster ensured representativeness (Annex 6).^{49,50}

3.4.2 Sampling procedure

A standard EPI cluster survey methodology involving systematic sampling from a cumulative population list was used to select 30-cluster sites⁴⁴. Two stage cluster sampling procedure was used. Kakuma refugee camp is divided into 3 camps, namely Kakuma I, Kakuma II, and Kakuma III. Each camp is divided into zones or phases. Each zone or phase is divided into groups and each group is constituted by households.

A list of all groups with populations of children aged 11-23 months was developed using the birth register (Annex 5). The cumulative population was then prepared. The sampling interval was estimated by dividing the total population of children aged 11-23 months by the number of clusters (i.e. 30).

A random number between 1 and the sampling interval gave a random start and the cluster was chosen by adding the sampling interval to this random number in the cumulative population list until 30 clusters were selected.

In each cluster, a random direction was chosen by spinning a bottle. The number of houses was counted in a straight line to the perimeter of cluster (group). A random house was chosen, and the next nearest until 7 children/guardians were seen in the cluster. The

immunization status of children 11-23 months was recorded and mothers/guardians interviewed on KAP.

1 health workers covering the clusters (group) selected and those in the clinics and hospital were also interviewed on KAP (Annex 2).

3.5 Data collection

Personal interview method using two sets of structured questionnaires was applied. The first questionnaire had 3 parts,

- a) Part 1 collected information on the immunization status of the children aged 11-23 months.
- b) Part 2 collected information on reasons of completion or not completing immunization schedule.
- c) Part 3 collected information on KAP of mothers/guardian with children aged 11-23 months.

The second questionnaire had 3 parts and collected information from the health workers in MCH/FP clinic.

- a) Part 1: Identification of the health worker
- b) Part 2: Personal characteristics of the health workers
- c) Part 3: KAP on immunization among the health workers.

The questionnaire for mothers/guardians was pre-tested on the mothers with children 11-23 months in some groups, which had been excluded from the study and in the host population. The Kenya Enrolled Community Nurses were trained as the research assistants and assisted in the supervision of data collection. Enumerators were recruited from CHWs and trained on data collection and handling. The principal investigator supervised the exercise. Data collection took 4 days between 24th and 27th June 2002.

3.6 Data processing, analysis and presentation

Data entry and analysis was done in Kakuma and Nairobi. Data were analyzed using SPSS statistical software. Proportions and confidence intervals were computed taking into account the design effect. The denominator in the calculation of immunization coverage was all children whose mothers/guardians were interviewed. The chi-square [X^2] test of significance was applied to determine factors that are related to Mothers and Health workers knowledge, attitude and practice on EPI. The effect of socio-demographic characteristics on immunization coverage was analyzed using logistic regression analysis. In addition, logistic regression analysis was done to determine the effect of each of the considered variables on knowledge, attitude and practice on immunization status of the child independent of the other factors. The level of significance chosen for comparisons was 5%. Descriptive statistics were also determined during analysis.

3.7 Minimization of error and biases

Selection bias

Number of children may vary due to mortality, relocation to new camps, voluntary repatriation to country of origin and resettlement to the third country. Using random clustering technique minimized selection bias.

Non-response bias

Non-respondents in a sample may exhibit characteristics, which differ systematically from the characteristic of the respondents. Differential and non-differential misclassification can occur due to enumerator difference in the questioning approach and misunderstanding of the questions by the respondents. This type of error was minimized by pre-testing the questionnaire to ensure that the questions were well understood by the

respondents, and training the enumerators so that they used the same technique in gathering information.

3.8 *Ethical consideration*

The research proposal was submitted to the UNHCR, through International Rescue Committee for approval. The information given was confidential and the names were not asked for during the exercise. However, the mothers of the children who were not fully immunized were given health education on immunization and referred to the nearest facility for immunization. Consent was required from the respondents before collecting any information. Those not willing to join the study were excluded.

3.9 *Study limitation*

The camp consists of 8 nationalities with multicultural practices. The language barrier was a major limitation and therefore a translator was required at all stages of interview. Since the study was designed to examine the refugee profile, it faces limitations in generalizing the results in the national perspectives. Moreover, the study is restricted, by its small sample size, particularly the health workers.

C HAPTER 4 ' FINDINGS

This chapter presents results of the survey. It is divided into two sections: Results of immunization coverage of children aged 11-23 months and knowledge, attitude and practice of mothers/guardians towards immunization are presented in section I; and section two, compares the knowledge, attitude and practice among various cadre of health workers towards immunization on the EPI diseases.

4.1 IMMUNIZATION COVERAGE AND KAP AMONG MOTHERS/ GUARDIANS

4.1.1 Social Demographic Characteristics

A total of 211 respondents were interviewed. . All mothers/guardians interviewed were registered refugees in Kakuma Refugee Camp. Demographic information relating to the respondents is summarized in Table 4.1.

Age was not specified for 8 of the respondents. Of the remaining 203 respondents, the mean age was 27.2 years with a range of 15-49 years. Mothers/guardians were relatively young with 61% aged 25 - 34 years.

Ninety five percent of the respondents were females while only 4.8% were male. The majority of respondents 94.1%, were married, 4.9% widowed and 1% were single.

Only about 8% of the respondents were in salaried employment, while 7% were in business. The majority 85% were unemployed.

Of the respondents surveyed, 62.1% had no formal education, 31.3% had primary level of schooling (primary 1-8) while 4.3% had been to secondary school. Most of the respondents (79.1%) were Christian by religion: Catholic (39.8%) and Protestant (39.3%). Muslims represented nearly a fifth of the respondents (20.9%).

Table 4.1: Demographic Characteristics of Respondents

Variable	Classification	Frequency	Percent
Age (in years)	<19	15	7.4
	20-24	48	23.6
	25-29	61	30.0
	30-34	63	31.0
	35-39	10	4.9
	>40	6	3.0
	Total	203	100.0
Sex	Male	10	4.8
	Female	198	95.2
	Total	208	100.0
Marital status	Single	2	1.0
	Married	191	94.1
	Widow	10	4.9
	Total	203	100.0
Occupation	Salary	16	7.6
	Business	15	7.1
	Unemployed	179	85.2
	Total	210	100.0
Education	None	131	62.1
	Adult education	1	0.5
	Primary 1-8	66	31.3
	Secondary	9	4.3
	College/university	2	0.9
	Others	2	0.9
	Total	211	100.0
Religion	Catholic	84	39.8
	Protestant	83	39.3
	Muslim	44	20.9
	Total	211	100.0

4.1.2 Immunization Coverage

4.1.2.1 Results of Immunization Coverage

Analysis of the distribution by age of children was possible for 206 of the 211 children for whom age was reported. The mean age was 16.3 months. The male to female ratio of

children was almost 1:1. Virtually all the children (96.7%) had immunization cards (Table 4.2).

Table 4.2: Distribution of Children by Sex and Presence of Immunization Card

Characteristic		Frequency	Percent
Sex	Male	95	47.5
	Female	105	52.5
	Total	200	100
Immunization card	Present	202	96.7
	Absent	7	3.3
	Total	209	100.0

Immunization cards and histories verified the immunization status. About three-quarters (76.2%) of the children were reported to be fully immunized according to immunization cards and mothers/guardian histories while 22.4% were partially immunized (Table 4.3). Some 75.6% of the children were immunized before the age of one year. This is consistent with the KEPI policy to immunize majority of children before they celebrate their first birthday.

Table 4.3: Immunization Coverage

		Frequency	Percent
Immunization status	Not Immunized	3	1.4
	Partially immunized	47	22.4
	Fully Immunized	160	76.2
	Total	210	100.0
When were fully immunized	Before 1 year	152	95
	After 1 year	8	5
	Total	160	100.0

4.1.2.2 Factors that Motivated or Hindered Immunization

Respondents with children who were not fully immunized were asked to state the reasons for not immunizing the children. "Immunization time passed" was cited by 26.1% of the respondents; while 13% of the respondents stated that they were unaware of the need for immunization; 10.9% were unaware of the need to return for 2nd and 3rd dose; and 13% did not know the place/ time of immunization as tabulated in Table 4.4.

Table 4.4 Reasons for not Immunizing Child (N=46)

Reasons for not immunizing the child	Frequency	Percent
Immunization time passed	12	26.1
Unaware of the need for immunization	6	13
Not knowing the place/time of immunization	6	13
Unaware of the need for return for 2 & 3 dose	5	10.9
Mother & child sick	5	10.9
Fear of side reaction	3	6.5
No apparent reason	3	6.5
Had travelled out of the camp	3	6.5
Others	2	4.3
Immunization time passed & staff was rude	1	2.2
Total	46	100

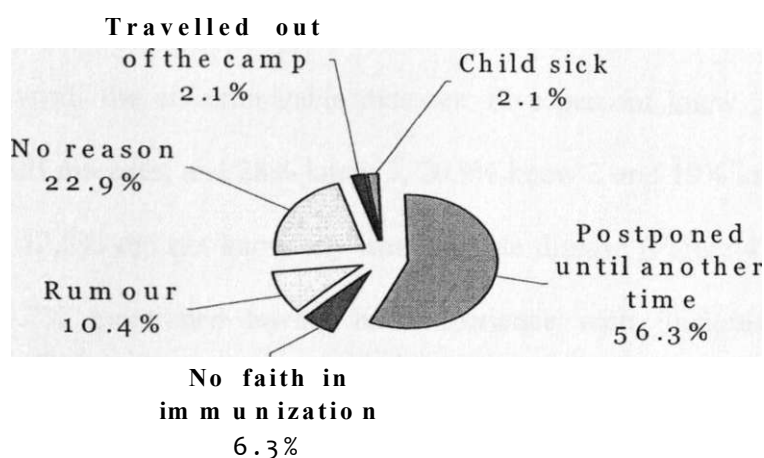
Respondents were also asked to state factors that hindered them from taking their children for immunization. Major reasons given were: inconvenient time of immunization (20.9%), vaccine not available (16.7%), child ill and when taken to the clinic was not immunized (14.6%) and mother too busy (12.5%). Other reasons given were reported with decreasing frequencies. Table 4.5 show factors given by the respondents that hindered them from taking children for immunization.

Table 4.5: Factors that Hinder Immunization (N=48)

Factors that hinder immunization	Frequency	Percent
Inconvenient time of immunization	10	20.9
Lack of vaccines	8	16.7
Refusal by health worker because the child is sick	7	14.6
The mother/guardian is too busy with other activities	6	12.5
Family problem e.g. mother ill	5	10.4
Child is sick and not taken for immunization	3	6.3
Distance of immunization center (far)	2	4.2
No health worker at duty station (Vaccinator)	2	4.2
Waiting time too long	1	2.1
Health worker refusing to give immunization because the mother/guardian lost the Immunization card	1	2.1
Health workers are rude	1	2.1
Forget the return date	1	2.1
Traveled out of the camp	1	2.1
Vaccinator absent & vaccine not available	1	2.1
Total	48	100

Respondents were also asked why they were not motivated to have their children immunized. Of the 48 respondents, more than a half (56.3%) stated that they postponed immunization till another time without apparent reason; while 10.4% cited rumours that the vaccine causes sickness and about 23% could not provide any answer (Figure 4.1).

Figure 4.1: Reasons for Lack of Motivation among Mothers/Guardians



Respondents with children who had received some or all the immunizations were asked to state what motivated them to doing so. The reasons given for motivation are summarized in Table 4.6. About a quarter (26.4%) of the respondents said that they benefited from the integrated health services; while 26.4% had desire to raise a healthy child. About 18% of the respondents said that they took the child for immunization because of prior exposure to immunization program.

Table 4.6: Reasons Motivate Respondents to Immunize Children (N=163)

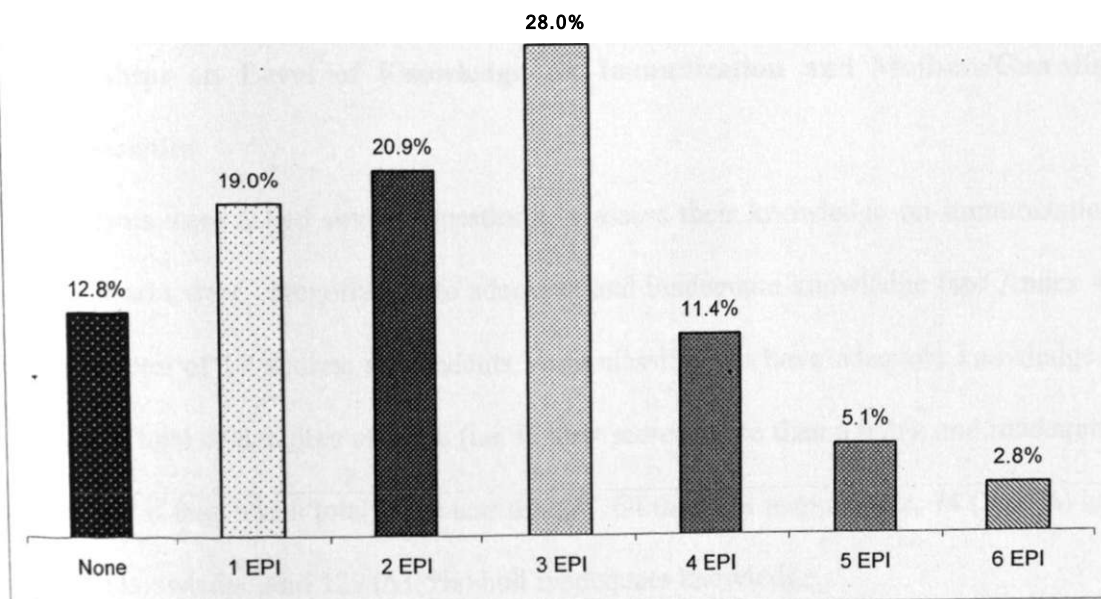
Reasons that motivate to immunize children	Frequency	Percent
Benefit of integrated health services	43	26.4
Desire to raise a healthy child	43	26.4
Prior exposure to immunization	29	17.8
Others	28	17.2
Benefit of child card at hospital, school, birth certificate	10	6.1
Clear understanding of immunization	6	3.7
Availability of experts at the health facility	3	1.8
Distance to health facility	1	0.6
Total	163	100

4.1.3 Knowledge of Mothers/Guardians on Immunization

The survey information was also gathered to assess knowledge, attitude and practice of mothers/guardians with children aged 11-23 months. On knowledge only 2.8% of the respondents knew all the six-immunizable diseases. Five percent knew 5 EPI diseases, 11.4% knew 4 EPI diseases, and 28% knew 3, 20.9% knew 2 and 19% knew only 1 EPI disease. Overall 12.8% did not know any immunizable disease (Figure 4.2). Of the 211 respondents, 59.7% mentioned having had experience with immunizable diseases. Measles and polio were mentioned more frequently. Health workers are the main source of information (84%) in the hospital, clinics and community.

About 74% (n=155) of the respondents knew that the child completes immunization at age of 9 months and 63.5% (n=134) said that a child is taken for immunization five times before completing immunization schedule.

Figure 4.2: Knowledge on EPI Target Diseases



Asked about the side effects of vaccination, hotness of the body 64% (135) was the most common mentioned reaction that occurs after the child is immunized. Other mentioned reactions included child crying the whole night (6.2%), swelling at the site of injection, restlessness and vomiting. Two or more of the above reactions were mentioned by 18% (38) of the respondents. 6.2% (13) did not know any reaction that can occur after a child has been immunized.

When asked about what they do when a reaction occurs, 57.8% said that they return the child to the health facility or consult CHW. However, 12.3% would give drugs at home and 9% would only observe the child. Nine percent did not know what to do after the reaction has occurred. Sixty-three percent of the respondents felt that the child should not be immunized when sick and 19.9% did not know whether a child should be immunized when sick or not. Ninety percent knew that the child is protected from the EPI diseases when immunized. However, 10% did not know the benefit of immunizing the child.

Relationships on Level of Knowledge on Immunization and Mothers/Guardian Characteristics

Respondents were asked several questions to assess their knowledge on immunization. The responses were categorized into adequate and inadequate knowledge (see Annex 4). Out of a total of 17 scores, respondents **were** classified to have adequate knowledge if they had a total of 8 scores or more (i.e. if they scored more than a half); and inadequate knowledge if they had a total score less than 8. Of the total respondents, 74 (36.5%) had adequate knowledge and 129 (63.5%) had inadequate knowledge.

Analyses were then done to determine the association between socio-demographic characteristics and knowledge on immunization. The relationships are summarized in table 4.7 below.

Table 4.7: Relationship on Level of Knowledge and Socio-demographic Characteristics of Mothers/Guardians

	Level of knowledge		Total	X ² statistic	Significance
	Inadequate	Adequate			
Age group					
<19 years	8(53.3)	7 (46.7)	15(100)	0.841	0.84
20-24 years	30 (62.5)	18(37.5)	48 (100)		
25-29 years	40 (65.6)	21 (34.4)	61 (100)		
30+ years	51 (64.6)	28 (35.4)	79(100)		
TOTAL	129 (63.5)	74 (36.5)	203 (100)		
Occupation					
Economic Activity	19(61.3)	12(38.7)	31 (100)	0.211	0.646
Unemployed	118(65.6)	62 (34.4)	180(100)		
Total	137 (64.9)	74 (35.1)	211 (100)		
Education					
None	93 (69.4)	41 (30.6)	134(100)	5.92	0.05
Primary 1-4	24 (66.7)	12(33.3)	36(100)		
Primary 5-8	20 (48.8)	21 (51.2)	41 (100)		
Total	137 (64.9)	74 (35.1)	211 (100)		
Religion					
Catholic	64 (76.2)	20 (23.8)	84 (100)	0.822	0.016
Protestant	46 (55.4)	37 (44.6)	83 (100)		
Muslim	27 (61.4)	17(38.6)	44(100)		
Total	137(64.9)	74 (35.1)	211 (100)		

In parentheses are percentages

The proportion with adequate knowledge tends to fall with rising age (except age 30+ years). However the difference was not statistically significant; ($X^2 = 0.841$, $df=3$; $p=0.84$).

The occupations were collapsed into two because of the small numbers namely: Economic activity (those in salaried employment and in Business) and unemployed. It is seen that respondents in the survey who were engaged in some economic activity (employed/ business) were marginally more likely to have adequate knowledge on immunization (39%) compared to those who were unemployed (35%). However, the difference was not statistically significant.

Knowledge on immunization tended to increase with increase in education. Clearly, respondents with upper primary and higher were more likely to have adequate knowledge on immunization (51.2%) compared to those with no formal education (31%). The difference was statistically significant.

Protestant Christians were found to be more likely to have adequate knowledge on immunization (45%) compared with Catholics (24%) and Muslims (17%), the difference was statistically significant.

4.1.4 Attitude of mothers/guardians towards immunization

The questions on attitude were assigned scores depending on correct responses recorded. The aggregate scores were 7 points. Those respondents who obtained at least four points (more than half) out of the seven were considered to have rational attitude. Otherwise respondents with scores less or equal to three were considered to have irrational attitude towards immunization. The survey showed that nearly three quarters of the respondents (77.3%) could be said to have rational attitude towards immunization (Table 4. 8).

Table 4.8: Attitude of the Respondents on Immunization.

Attitude	Frequency	Percent
Irrational attitude	48	22.7
Rational attitude	163	77.3
Total	211	100.0

Analysis of the data revealed that fifty two percent of the respondents knew that a child who is not immunized can bring about a public health problem, and 27% were concerned that the child can spread disease to others if not immunized. Only 6.6% (11) knew of a child who had not been immunized of whom 78.6% (11) had tried to talk to the mother about immunization. Among the respondents, 73.3% (15) had no reason why the child had not been immunized. However, 20% (3) gave distance as a reason why the child had not been immunized.

About 88.0% (181) of the respondents get worried if a child misses immunization and 43.1% (78) of them would take the child for immunization the earliest possible time. About 34.0% (89) would not know what to do if the child misses immunization. Out of all the respondents, 92.0% (193) always carry immunization card any time they go for services at the health facility. However, 93.8% consider it necessary to carry the child immunization card. Of the 185 respondents, 60% said that the card is a requirement at the health facility whereas 14% know that the card gives details of health status of the child. About 66.0% of all the respondents consider immunization to be important.

Relationships of Attitude on Immunization and Mothers/Guardian Characteristics

Results of relationships of various socio-demographic characteristics and the attitude towards immunization are shown in table 4.9. The results show that the association between age and attitude towards immunization is generally weak. Among the

respondents aged under 25 years, 77.8% of them were classified to have rational attitude compared to 78.7 % of the respondents aged 25- 29 years and marginally falling to 77.2% among respondents aged 30 years and over. The difference was not statistically significant.

Table 4.9: Relationship on Socio-demographic Characteristics and Attitude on immunization.

	Attitude		Total	X ² statistic	P-Value
	Irrational	Rational			
Age group					
Under 25 years	14(22.2)	49 (77.8)	63 (100)	0.043	0.979
25-29 years	13 (21.3)	48 (78.7)	61(100)		
30+ years	18(22.8)	61 (77.2)	79(100)		
Total	45 (22.2)	158 (77.8)	203(100)		
Occupation					
Economic Activity	8 (25.8)	23 (74.2)	31 (100)	0.193	0.66
Unemployed	40 (22.2)	140 (77.8)	180(100)		
Total	48 (22.7)	163 (77.3)	211(100)		
Educational level					
<=Primary 1-4	39 (22.9)	131(77.1)	170(100)	0.018	0.892
>=Primary 5-8	9(22)	32 (78)	41(100)		
Total	48 (22.7)	163 (77.3)	211(100)		
Religion					
Muslim	6(13.6)	38 (86.4)	44(100)	18.7	0.001
Catholics	32 (38.1)	52 (61.9)	84(100)		
Protestants	10(22)	73 (88.0)	83(100)		
Total	48 (22.7)	163 (77.3)	211(100)		

In parentheses are percentages

The level of education has no significant effect on the attitude towards immunization, which seems to be more or less similar among the respondents with 77.1% of these with

primary 1-4 and below being assessed as having rational attitude compared with 78.0% with upper primary 5-8 and above.

Protestant and Muslims (88.0% and 86.4% respectively) were found to be more likely to have rational attitude on immunization compared with Catholics (61.9%), the differences were statistically very significant ($X^2 = 18.7, p=0.001$).

Occupation was re-classified in "economic activity" to combine salary and business due to small numbers. It is noted that the difference in attitude levels by occupation was not statistically significant. {Odds Ratio (OR) = 0.8, 95% CI: 0.31 - 2.12}.

4.1.5 Practice of Mothers/Guardians on Immunization

The immunization centers are within a walking distance. About 68% (n=147) are within 1 kilometer. Almost all 98.6% (n=208) walk to the health. If a child misses immunization, 73.9% (n=153) would take a child to the health facility at a convenient time for advice. The problem encountered when the respondent takes a child for immunization includes too long immunization process 47.4% (n=93), lack of vaccine 17.3% (n=34), unwelcoming staff and language barrier. About 10.0% felt that there is no problem with the system. More health staff and additional facilities were some of the mentioned solution to the above-mentioned problems. Other solutions include increase in vaccines and supplies, and motivation of the staff. Some of the respondents felt that going to the clinic early would solve the problem of long waiting time.

Discussion of immunization with spouses/friends was mentioned in 51.7% (n=106) of the respondents and information shared includes benefits of immunizing the child, next visit and growth monitoring of the child. Of those who do not share information thought that they would be bothering others and some said it was because of family problem 40%

(n=40). Some of the respondents gave the reason of staying alone while others do not have adequate knowledge on immunization.

Relationships on Practice and Level of Education of Mothers/Guardians

Relationship between immunization status of the child with the level of education the mother/guardian was determined. Table 4.10 shows the immunization status of children surveyed according to education of the respondent. Children of respondents with primary level of education and above have higher fully immunization coverage level (80%) than children of respondents with no formal education (74%). The difference was, however, not statistically significant, ($X^2 = 1.092$, $df=2$, $p= 0.58$).

4.1.6 Relationship on Immunization Status with Sex of Child and Mothers/Guardians Characteristic

Table 4.10 shows no significant difference in immunization status between sexes, 74.7% of the male being fully immunized compared to 78.1% for the females ($X^2= 0.313$, $p=0.575$), Odds Ratio=1.21, 95% CI: 0.6 - 2.44.

Table 4.10: Immunization Status by Sex of Child

Sex	Immunization status		Total
	None/Partial	Fully Immunized	
Male	24 (25.3)	71 (74.7)	95 (100)
Female	23 (21.9)	82 (78.1)	105 (100)
Total	47 (23.5)	153 (76.5)	200(100)

In parentheses are percentages

Table 4.11 shows that there was statistically significant difference on immunization status of the child with mothers/guardian religion, knowledge and attitude. Muslims are more likely to take a child for immunization compare to a Christian.

Table 4.11: Relationship of Immunization status of the child with mothers/guardian Characteristics

	Immunization status			Total	X* statistic	p-value
	None	Partially	Fully			
Age						
< 25 years	1 (33.)	12(27.9)	49 (31.4)	62 (30.7)	0.204	0.903
>24 years	2 (66.7)	31 (72.1)	107 (68.6)	140 (69.3)		
Total	3 (100.0)	43 (100.0)	156(100.0)	202(100.0)		
Sex						
Male	0 (0.0)	2 (4.3)	8(5.1)	10(4.8)	0.194	0.907
Female	3 (100.0)	44 (95.7)	150 (94.9)	197 (95.2)		
Total	3 (100.0)	46(100.0)	158 (100.0)	207(100.0)		
Education						
< Primary 5	2 (66.7)	40 (85.1)	128 (80.0)	170 (81.0)	1.017	0.601
>Primary 4	13(3.3)	7(14.9)	32 (20.0)	40(19.0)		
Total	3 (100.0)	47(100.0)	160(100.0)	210(100.0)		
Occupation						
Unemployed	2 (66.7)	44 (93.6)	132 (83.0)	178 (85.2)	4.050	0.132
Economic Activity	1 (33.3)	3 (6.4)	27(17.0)	31 (14.8)		
Total	3 (100.0)	47(100.0)	159(100.0)	209(100.0)		
Religion						
Muslims	0(.0)	4(8.5)	40 (25.0)	44 (21.0)	6.771	0.034
Christians	3(100.0)	43 (91.5)	120 (75.0)	166 (79.0)		
Total	3(100.0)	47(100.0)	160(100.0)	210(100.0)		
Attitude						
Irrational attitude	1 (33.3)	19(40.4)	28(17.5)	48 (22.9)	11.018	0.004
Rational attitude	2(66.7)	28 (59.6)	132 (82.5)	162 (77.1)		
Total	3(100.0)	47(100.0)	160(100.0)	210(100.0)		
Knowledge						
Inadequate	2 (66.7)	38 (80.9)	97 (60.6)	137 (65.2)	6.556	0.038
Adequate	1 (33.3)	9(19.1)	63 (39.4)	73 (34.8)		
Total	3(100.0)	47 (100.0)	160(100.0)	210(100.0)		

In parentheses are percentages

A mother with adequate knowledge and rational attitude is more likely to have a fully immunized child. The other characteristic have no statistical significance.

4.1.7 Results of Logistic Regression Analysis

Logistic regression analysis was done to determine the effect of mother/guardians knowledge, attitude and socio-demographic characteristics on immunization status of the child. Mother/guardians with rational attitude and being a Muslim are more likely to take the child for immunization. There was significant statistical difference on religion and attitude. Other factors had no significant statistical difference. The results are shown in table 4.12 below.

Table 4.12: Results on Logistic Regression Analysis

	B	S.E.	Wald	df	Sig.	Exp(B)
Religion	-1.316	0.64	4.225	1	0.04	0.268
Occupation	1.372	0.727	3.559	1	0.059	3.943
Education	-0.235	0.552	0.181	1	0.67	0.79
Sex	-0.446	0.886	0.254	1	0.614	0.64
Age	-0.198	0.412	0.232	1	0.63	0.82
Knowledge	0.672	0.424	2.506	1	0.113	1.958
Attitude	1.009	0.412	5.989	1	0.014	2.743
Constant	-0.23	1.088	0.045	1	0.833	0.795

4.2 KAP AMONG HEALTH WORKERS

4.2.1 Demographic characteristics

A total of 50 health workers consisting of nationals and refugee incentive workers, were interviewed. Their demographic characteristics are presented in table 4.12.

Table 4.13: Demographic characteristics of the health workers

Variable	Classification	Frequency	Percent
Age group (years)	<24	11	22.0
	25-29	15	30.0
	30-34	20	40.0
	>35	4	8.0
	Total	50	100.0
Sex	Male	35	70
	Female	15	30
	Total	50	100
Religion	Catholic	17	34.7
	Protestant	27	55.1
	Muslim	5	10.2
	Total	49	100.0
Marital status	Married	28	57.1
	Single	20	40.8
	Widow	1	2.0
	Total	49	100.0

Seventy percent of the health workers were aged between 25 and 34 years. The mean age was 28 years (range 19 - 44). Males accounted for 70% of the health workers interviewed. Slightly over a half of the health workers interviewed were married (57.1%) while 40.8% were single. Most health workers interviewed (89.8%) were Christian -

Catholic (34.7%) and protestant (55.1%). Muslims accounted for 10.2% of the-health workers interviewed.

4.2.2 Work Experience of Health Workers

Thirty-percent of the health workers have served for less than three years while at the other extreme, 26% have served for more than six years. Majority were holders of certificate grade (93.9%), who include Medical assistants, enrolled community nurses, nurse assistants, CHWs, and TBAs. Forty percent of the health workers interviewed have had special training on EPI (Table 4.13).

Table 4.14: Working Experience of Health Workers

Variable	Classification	Frequency	Percent
Years of service	<3 years	15	30.0
	3-5years	22	44.0
	6-8years	8	16.0
	9+ years	5	10.0
	Total	50	100.0
Training	Diploma	1	2.0
	Certificate	46	93.9
	None	2	4.1
	Total	49	100.0

4.2.3 Knowledge of Health Workers on Immunization

A number of questions were asked to assess the level of knowledge on immunization.

For each question answered correctly, a score of one was assigned with a maximum score

of 23 points. Respondents who scored an aggregate score of 13 points and over were considered to have adequate knowledge on immunization. Overall, only 22.0% of all the health workers surveyed were classified to have adequate knowledge.

Table 4.15: Level of Knowledge of Health Workers on Immunization (N=50)

Level of Knowledge	Frequency (n)	Percent
Inadequate	39	78.0
Adequate	11	22.0
Total	50	100.0

Most of the respondents, 96% (n=48) knew that immunization prevents children from diseases. Of the 50 respondents, only 28% knew that BCG is live vaccine, 46% knew the correct dose (0.05ml), 68% knew that BCG is administered intradermally, and 14% knew that the vaccine is stored at 0-8°C at the service delivery point.

On DPT, only 14% (n=7) knew that the vaccine is a toxin, 48% (n=24) knew the correct dose of 0.05ml, 78% (n=39) knew that the vaccine is administered intramuscularly, 12% (n=6) knew the storage temperatures of 0-8°C, 68% (n=34) knew that the vaccine loses potency when frozen and 42% (n=21) knew that DPT 3 is given at 12 weeks.

On OPV, 26% (n=13) knew that it is a live vaccine, 64% (n=32) knew that it is given as 2 drops, 80% (n=40) knew that it is administered orally and 36% (n=18) knew that OPV 3 is given at 12 weeks.

On measles, 26% (n=13) knew that it is a live vaccine, 42% (n=21) knew the correct dose (0.5ml), and 74% (n=37) knew that the vaccine is administered intramuscularly. Eighteen percent (n=9) knew that the vaccine is stored 0-8°C and 74% (n=37) knew the age at

which the vaccine is given (9 months). Only 18% (n=9) knew that the vaccine should be kept for 6 hours after opening the vial (Table 4.15).

Table 4.16: Results on Correct Knowledge of Vaccines (N=50)

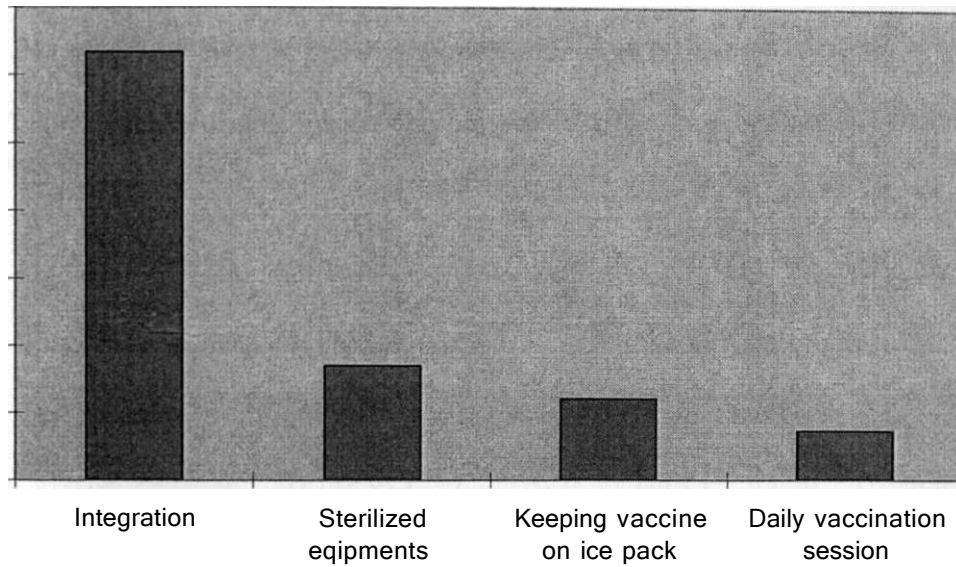
	In percent (%)				
	BCG	DPT	OPV	Measles	Mean
Type of vaccine	28	14	26	26	23.5
Dosage	46	48	64	42	50.0
Route of administration	68	78	80	74	75.0
Storage	14	12	.	18	14.7
Age at which the vaccine is given	86	42*	36*	74	59.5

•DPT 3 and OPV 3

Of the 50 respondents, only 28% knew that there is no contraindication to EPI vaccination. About 92% knew the target group for the immunization (children < 1 year and pregnant mothers). About 96% (n=48) could mention information included in the child health card. Most frequently mentioned were dates of current immunization and date for the next visit and the information is given while the child is being immunized.

Among the health workers, 82.0% know about the existence of KEPI policy on immunization. Integrating immunization into MCH/FP/PHC program was the most frequently mentioned policy (63.4%), while, use of sterile needles and syringes was mentioned by 17.1% of the health workers. Other policies mentioned included keeping vaccines on the ice pack during vaccination session (12.2%) and holding vaccination sessions daily in a fixed facility (7.3%). Figure 4.3 below shows the distribution of knowledge in KEPI policy among the respondent.

Figure 4.3: Knowledge on KEPI among the Health Workers



The benefits of policy on EPI were mentioned. The most frequent were helping the health worker to view the mother holistically in 27.9% (12) of the respondents, control of cross infections in 27.9% (12), health education to mothers in 25.6%(11) and use of vaccines more effectively and efficiently in 18.6% (8). Eighty eight-percent of the respondents carry vaccines as part of supplies during the vaccination exercise. However, only 4% (2) remember to carry syringes and needles, and 8% (4) carry IEC materials. Out of 20% of the respondents who said they knew immunization coverage of Turkana District, only 1 person mentioned the correct district coverage. The reasons given by those who did not know about the district coverage include lack of feedback for surveys done 55.6% (n=20) and failure of supervisors to share reports in 25.0% of the respondents. However, 16.7% gave the reason of not having worked for long in the EPI program.

Relationships on level of Knowledge and Characteristics of Health Workers

Statistical tests were carried out to assess the relationships between socio-demographic characteristics and knowledge on immunization as shown in Table 4.16.

Table 4.17: Socio-demographic characteristics of health workers verses knowledge on immunization

	Level of knowledge		Total	X ² statistic	p-value
	Inadequate	Adequate			
Religion					
Catholic	13(76.5)	4 (23.5)	17(100)	0.029	0.98
Protestant	21 (77.8)	6 (22.2)	27(100)		
Muslim	4(80)	1(20)	5(100)		
Years of service					
Less 3 years	10(66.7)	5 (33.3)	15(100)	1.604	0.205
3 years and over	29 (82.9)	6(17.1)	35 (100)		
Level of training					
Diploma	0(0)	1 (100)	1 (100)	4.047	0.132
Certificate	36(78.3)	10(21.7)	46(100)		
No training	2(100)	0(0)	2(100)		
Age group					
< 24 years	8 (72.7)	3 (27.3)	11 (100)	0.23	0.63
25 years and over	31 (79.5)	8 (20.5)	39(100)		
Marital Status					
Single	16(76.2)	5 (23.8)	21(100)	0.04	0.84
Married	22 (78.6)	6(21.4)	28 (100)		

In parentheses are percentages

The analysis show that one in three health workers who have served for less than three years had adequate knowledge on immunization compared to about one health worker in five (17%) who had served for three year or more. The difference was however, not statistically significant ($X = 1.6, p=0.205$). It will be noted that the size of the latter group was small. The analysis yielded an odds ratio of 0.414, 95% confidence interval: $0.103 < OR < 1.66$.

There was no significant difference in the knowledge on immunization among the health workers by religion, ($X^2 = 0.029, p=0.98$).

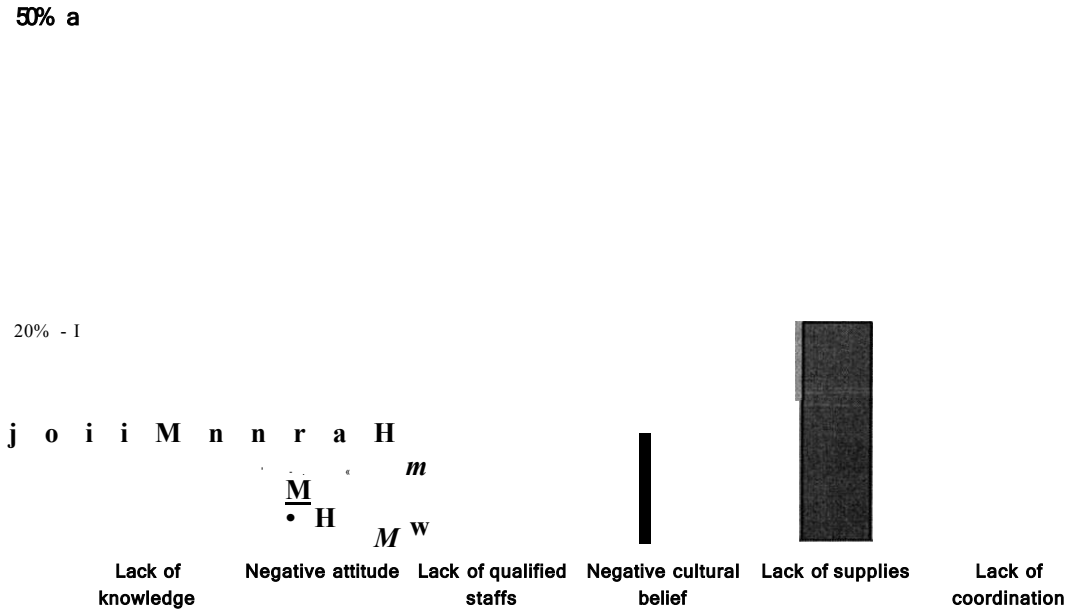
The proportion of respondents aged 24 years and below with adequate knowledge on immunization was marginally higher than that of respondents aged 25 years and over. The former group was however small. The difference was not statistically significant.

On marital status, no significant difference was found between married and single (including widowed) respondents of whom 23.8% and 21.4% had adequate knowledge on immunization respectively ($X^2 = 0.04, df1, p=0.84$; Odds Ratio= 0.83, 95% CI: 0.23 - 3.4).

4.2.4. Attitude of health workers towards immunization

Attitude is a very important aspect in the provision of health care. Immunization coverage in the camp was not seen as a problem by 61.2% of the respondents. Of those who thought there was a problem in coverage (38.8%), the causes of poor coverage were mentioned as lack of knowledge among the refugee community 52.6%, lack of vaccines and supplies 21.1%, cultural beliefs 10.5%, lack of qualified staff (5.3%), negative attitude by refugee community (5.3%), and lack of coordination. Figure 4 below shows the distribution of the causes of poor coverage.

Figure 4.4: Reasons for Poor Coverage



About 78% of the respondent said they are willing to work in the MCH/FP clinic. The reason given for the willingness was to acquire more knowledge on immunization and to gain experience in providing EPI services 54.2% (n=26). Of those not willing was because they are working in other departments (2.1%) and others is because they have not been trained on EPI.

Relationships of Attitude on Immunization and characteristics of Health Workers

A number of questions were asked to assess attitude on immunization. For each question answered correctly, a score of 1 was assigned. Respondents who scored an aggregate score of 3 points and over were considered to have rational attitude on immunization. Respondent who had a rational attitude were 29 (58%) and those with irrational attitude were 21 (42%). The proportion of respondents aged 24 years and below with rational

attitude on immunization was marginally higher than that of respondents aged 25 and above years.

Statistical tests were performed to show the relationship between socio-demographic characteristics of health workers and attitude on immunization (Table 4.18).

The difference was statistically significant. However, there was no significant difference in the attitude on immunization among the health workers by religion, year of service, level of training and marital status.

Table 4.18: Socio-demographic characteristics of health workers verses attitude on immunization

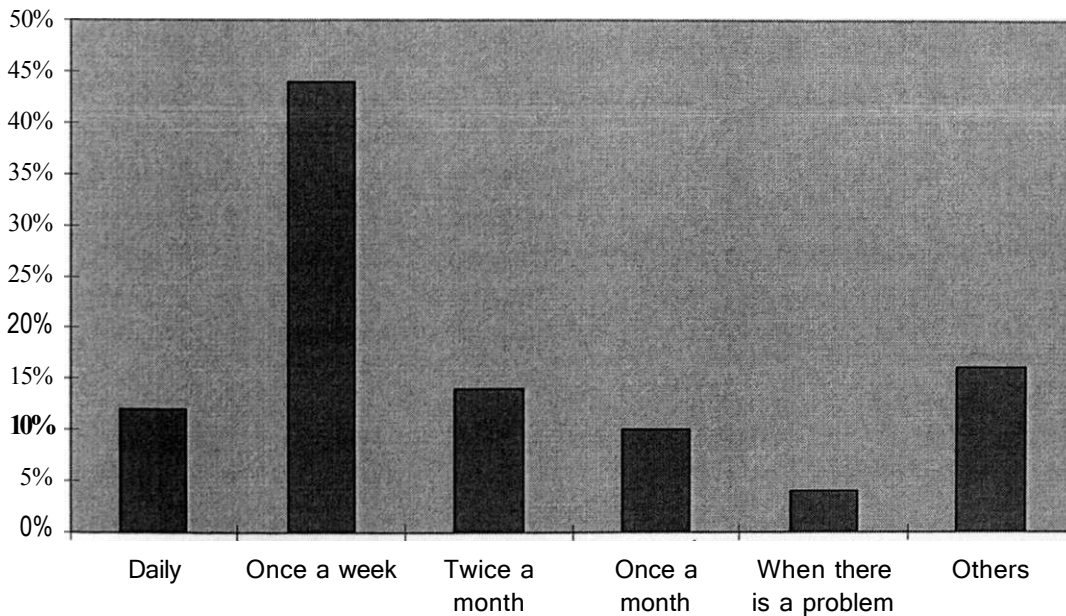
	Level of attitude		Total	X ² statistic	p-value
	Irrational	Rational			
Religion					
Catholic	7(41.2)	10(58.8)	17(100)	0.669	0.72
Protestant	11 (40.7)	16(59.3)	27(100)		
Muslim	3 (60.0)	2 (40.0)	5 (100)		
Years of service					
Less 3 years	6 (40.0)	9 (60.0)	15(100)	0.035	0.851
3 years and over	15(42.9)	20 (57.1)	35 (100)		
Level of training					
Diploma	0(0)	1 (100)	1 (100)	0.799	0.67
Certificate	20 (43.5)	26 (56.5)	46(100)		
No training	1(50)	1(50)	2(100)		
Age group					
< 24 years	2(18.2)	9(81.8)	11 (100)	3.28	0.092
25 years and over	19(48.7)	20 (51.3)	39(100)		
Marital Status					
Single	9 (42.9)	12(57.1)	21(100)	0.04	0.84
Married	12(42.9)	16(57.1)	28 (100)		

In parentheses are percentages

4.2.5 Practice of health workers towards immunization

Almost all the respondents 96% consider supervision of EPI activities important. However, the EPI supervisor visits on daily basis in only 14% of the respondents. Most of the respondents 51.1% (22) said that they are supervised once per week. Figure 4.4 below shows the distribution of the visits by the COR manager.

Figure 4.5: Distribution of Supervisory Visits



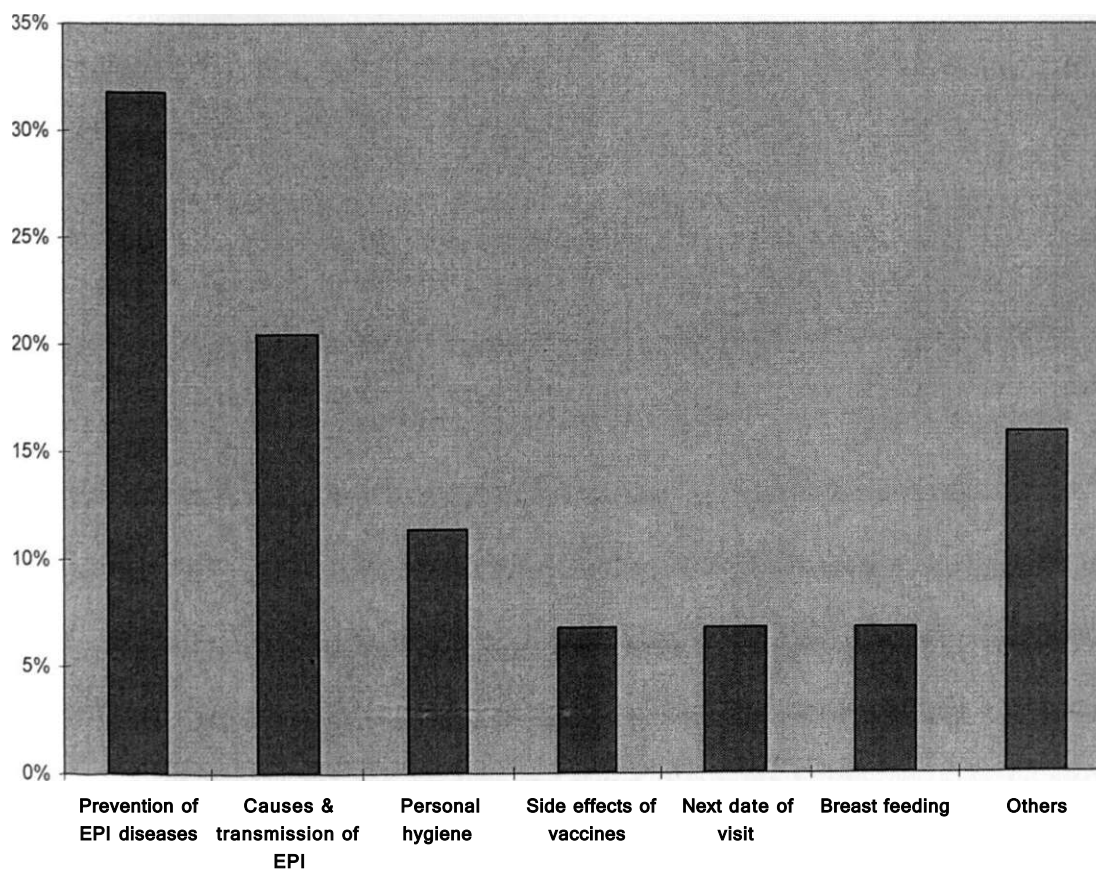
About 60.0% of the respondents go for the outreach services and almost half on weekly basis. For those not going for outreach, the reason is because they are also assigned other duties in the hospital and clinics (50%). Other reasons given were lack of motivation by the supervisors 18.3% and lack of adequate knowledge on EPI 6.3%.

Source of information on EPI is received from COR manager 52.1% (n=25), immunization manual in 27.1% (n=13), through refresher training and colleagues 12.6% (n=6), and electronic and own initiative 8.2% (n=4).

Lack of adequate knowledge to effectively carry out immunization was mentioned as a major problem encountered during immunization in 50% (n=25). Other problems include transport 19%, lack of supplies 19%, inadequate staff 2.4%, language barrier 2.4% and fear of accidental prick 2.4%.

Provision of training 34.9%(n=15), provision of transport 20.9% (n=9), community mobilization 18.6% (n=8), improved supervision 9.3% (n=4), hiring of interpreters 4.7% (n=2), and universal precaution were given as possible solution to the above-mentioned problems.

Figure 4.6: Health Topics covered during Health Education Talks



In order to improve the immunization coverage in the camp, 83.7% (n=41) of the respondents said that an active approach was more practical. However, both active and passive approach should be employed.

Almost 50% of the respondents have been involved in the community immunization campaigns i.e. measles and polio campaigns. About 88.0% (n=44) are involved in health education talks but only 63.4% (n=26) gives it on daily basis. Among the topic given include prevention of EPI diseases 31.8%, cause and transmission of EPI diseases 20.5%, and personal hygiene 11.4%. Other topics include side effects of EPI vaccines 6.8%, nutrition 6.8%, breastfeeding 6.8%, belief and attitude on EPI 4.5%, follow-up dates 6.8%, and family planning 2.3% (Figure 4.6). About 72.0% are involved in the EPI disease surveillance.

Relationships on Practice on immunization and Characteristic of Health Workers

A score of 1 was assigned for each question on practice answered correctly. Respondents who scored an aggregate score of 3 points and over were considered to have rational practice on immunization. Out of 48 respondents 58.0% (n=28) had rational practice and 42.0% (n=20) had irrational practice. (See table 4.20).

Statistical analysis showed that rational practice is proportional to the number of years in service. The finding was statistically significant (chi-square = 4.21, p=0.04). There was no statistical significant difference in practice on immunization among the health workers by religion, level of education, age and marital status. (See table 4.20).

Table 4.19: Relationships between practice and socio-demographic characteristics of Health Workers

	Level of Practice		Total	X ² statistic	p-value
	Irrational	Rational			
Religion					
Catholic	9 (52.9)	8(47.1)	17(100)	1.86	0.395
Protestant	10(40.0)	15(60.0)	25 (100)		
Muslim	1(20)	4 (80.0)	5 (100)		
Years of serv ice					
Less 3 years	3 (20.0)	12(80.0)	15(100)	4.21	0.04
3 years and over	17(51.5)	16(48.5)	33 (100)		
Level of training					
Diploma	0(0)	1 (100)	1 (100)	3.68	0.16
Certificate	17(38.6)	27 (61.4)	44(100)		
No training	2(100)	0(0)	2(100)		
Age group					
< 24 years	3 (27.3)	8 (72.7)	11 (100)	1.21	0.27
25 years and over	17(45.9)	20 (54.1)	37(100)		
Marital Status					
Single	11 (57.9)	8(42.1)	19(100)	3.07	0.08
Married	9(32.1)	19(67.9)	28 (100)		

In parentheses are percentages

CHAPTER FIVE: DISCUSSION

It is the right of every child to be immunized and the duty of every parent/guardian to ensure that the child is fully immunized. A child was considered fully immunized if he/she had received BCG vaccination, three doses of OPV, three doses of DPT and a dose of measles. The study in the Kakuma Refugee Camp showed reasonably impressive full immunization coverage of 76.2%. The coverage has significantly improved compared to immunization coverage by cluster done in 1992⁵³, which had shown that the coverage was at 28.2%. KDHS 2003 results showed that 51.5% of children aged 11-23 months had been fully immunized according to vaccination card or mother's report. The good performance in the camp can be attributed to reliable funding by donors and continued support from KEPI. The results in the camp are reliable because most of information was derived from the cards. Card retention in the refugee population is high with over 96%. The survey conducted in 1992 had shown that card retention in refugee community was significantly lower than in the general population. Studies have also shown that ignoring mother's reports can result in a serious underestimation of the true vaccination coverage.⁴²

Although access to routine immunization, massive displacement of unvaccinated persons particularly in war torn countries and low immunization coverage have been shown to be limitation,^{2,5} this study has shown that refugee camps in care and maintenance phase have better coverage than in the refugee country of origin and the host community.³⁷ This may be as a result of availability of free health services which are accessible to the refugees and the host community.

It is evident that the immunization coverage increases with the increase in mothers/guardians education. This broadly falls in line with the observation that education enhances the knowledge of mothers/guardians to effectively prevent, recognize and seek treatment of childhood illnesses. This study has shown that the education level has no effect on immunization coverage in Kakuma Refugee Camp. This is in contrast to Kenyan situation (KDHS 2003) where the education of the mother was shown to have a significant effect with better coverage observed in educated mothers. The observation in the camp is encouraging taking into consideration that most mothers are not formally educated and yet the coverage is high. Therefore, there are other factors that might be involved. A demographic factor that might be expected to operate here is that illiterate women, being older, are of higher average parity and consequently may be more experienced mothers with a greater likelihood of having their children immunized. The study showed that most mothers/guardians are motivated by other factors which include integrated health services, desire to raise a healthy child and prior exposure to immunizable diseases. Community outreach program may be contributing to high immunization coverage in the camp as has been shown in other studies.²⁰

Other studies have shown that health workers are the most important source of information on immunization to many mothers while spouse is the most single important person a mother turns to for advice on immunization.⁵³ However, this study has shown that health workers do not have adequate knowledge on EPI. This can affect the quality of health education because of poor health messages as has been shown in study conducted in Yaounde Cameroon which showed that confusing health messages have a

negative impact on immunization coverage. Efforts should be made to ensure that the health workers receive necessary skills to improve their knowledge on immunization.

Factors that hindered mothers/guardians from taking child for immunization were mentioned with logistical problem coming out more commonly. These included among others lack of vaccines and vaccinator being absent. However, administration issues like lack of vaccinator at the immunization post also featured. However, some mothers had a feeling that immunization time was inconvenient. A study done in Nyanza province in Kenya showed that the frequently mentioned factors that affect immunization were tendency to postpone immunization for no apparent reason, child sick, rude health staff, immunization postponed due to lack of vaccine and own commitments. It has been observed that distribution of food and non-food items affect the health seeking behaviour of the refugees including immunization services. The immunization exercise should be improved in terms of waiting time. This can be done through expanding the services by increasing the number of staff, as evidently came out of this study.

Though 88% of the respondents knew at least 1 of the six immunizable diseases; only 2.8% knew all the six. On the other hand, almost 60% have had an experience with immunizable disease. Similarly, in a study done in the rural community in Nyanza province in Kenya showed that knowledge on immunizable diseases was low; with measles being the best known, as seen in this study. Measles has high fatality rate especially for those not immunized and has frequent outbreaks. These two findings suggest that most mothers/guardians have learned through experience (having seen a sick person). This approach is poor and health staff should take an active role in educating mothers/guardians on EPI program.

Child should complete immunization by age of 1 year as has been shown in this study. This is not surprising as the mothers/guardians closely monitor the milestone and would like the child to be vaccinated for all antigens before 1 year of age. Knowledge on side effects was adequate with 66% mentioning hotness of the body. Majority knew the action to be taken when the child gets the side effect of vaccine. It was observed that as a routine, children are given antipyretic whenever they get immunized. However, this practice is not common and it is not recommended by the EPI. One of the serious defects was that mothers/guardians thought that the child should not be immunized when sick. There is no contraindication to immunization against the childhood illness. Majority know that the benefit of immunizing the child is to protect them against diseases.

The study has shown that Protestant and Muslims have rational attitude on immunization compared to Catholics whereas Protestants were found to have relatively adequate knowledge compared to Catholics and Muslims. Religious beliefs and practices have been shown to have an influence on immunization status of a child as seen in a study conducted in Zimbabwe.¹⁹ The attitude of mothers/guardian's ways to promote correct and future efforts to improve the immunization coverage in the camp and when repatriated back in the country of origin. Mothers when well informed can suggest on how services can be improved.¹⁹ However, some attitudes developed on the basis of requirement by health, like carrying the cards as a requirement, may impact negatively on the immunization program due to misconception about immunization card.¹⁶

The study showed that the facilities in the camp are accessible to the refugee community. Though vaccination process is long and sometimes lack of vaccines and supplies, KEPI

in partnership with UNHCR and INGO have improved on vaccine delivery in the camp by establishing a cold chain at camp level. This is in line with KEPI strategy to have immunization being integrated in the PHC activities and have the services offered daily at fixed facilities.⁵³ However, based on the location of Kakuma refugee camp, logistics has been a big challenge since all the vaccine has to be supplied by District Health Office in Lodwar town.

Kakuma Refugee Camp involves health workers from the community in the delivery of the health services. Most of the outreach health workers are from the refugee as well as host communities. This ensures that all communities and religions are represented because of cultural diversity among the refugees. Most of the health workers are certificate holders having being trained in the camp and in the country of origin to deliver services to refugee community in the camp. The male predominance can be explained by the fact that among the refugee communities in the camp, education of girl-child is not emphasized and this affected education level of women. It is therefore difficult to get women with minimum education to enable them compete favorably with the men counterparts. Majority of health workers have been trained in the camp and on-job. The study has shown that the knowledge on antigen is low. This finding suggests that the training on EPI is not done regularly and the topics do not cover all aspects of immunization. The knowledge also suggests that the respondents tend to remember activities routinely done. Things that are routinely done are easy to remember.

The health workers who have served fewer years have adequate knowledge compared to those who have served longer. This can be explained by the fact that the newly employed

staff are fresh from training and therefore have higher chance of remembering things taught compared to those who have stayed in service for long and tend to do things as a routine. However, efforts should be made to include EPI training in the curriculum for the routine training. Refresher training should be given to all irrespective to the number of years they have serviced. Rational attitude of health workers is encouraging because it enhances the interaction between the mothers and the health workers however the older health workers have relatively irrational attitude. This could be related to the low knowledge found in the same group, which could be because of failure to up-date their knowledge on EPI.

Since the study was designed to examine the refugee profile, it faces limitations in generalizing the results in the national perspective. There are indications that increased coverage may be due to the availability of free immunization, backed by accessible refugee health services and general awareness among the refugee community. In this context, there emerge some important questions. Is the coverage sustainable in the Camp? If funding agencies shift their priority from EPI, can the government continue with the immunization programme? Published data suggest that once donor countries withdraw their support or when private market forces are allowed to play a major role in the provision of immunization, there is a decline in coverage.

CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

1. This survey done in Kakuma Refugee Camp showed reasonably impressive immunization coverage of 76.2%. The immunization coverage is higher than that of Turkana District of between 12 - 38 % and that of Kenya of 51.5%. •
2. The level of knowledge on EPI is low among the mothers/guardians but the attitude and practices are rational. However, this varies with the level of formal education and religion.
3. The knowledge on EPI is low among the health workers but the attitude and practices were rational though the difference was not significant except for the practice which is dependent on the year of service.
4. Religion has influence on the uptake of immunization in the camps. In Kakuma Refugee Camp, religious has been shown to have effect on immunization through varying attitudes and level of knowledge among different religion.

6.2 Recommendations

1. Though immunization coverage is high in the camp, there is need to increase public demand for immunization by creating awareness in the refugee community. Attempts should be made to convince women that there is no contraindication to immunization. The importance of completing immunization schedule should also be emphasized. The community outreach officer IRC in the camp with liaison with District Public Health Nurse Turkana district should organize for joint awareness campaign in the camp and in the host community.

2. The Knowledge on EPI for mothers/guardians should be increased through designing of quality health messages on immunizable diseases. The COR manager should involve the community in the camp in designing IEC material that is suitable for KRC. An intervention program should also be designed to promote health and prevent diseases through creating awareness in churches/Mosque in liaison with the church leaders and Imams

3. In general, KAP on EPI among the health worker should be improved by ensuring regular refresher trainings on immunization policies for all Health Workers by the MOH-KEPI in collaboration with IRC. Refresher training should be given to all health workers and efforts should be made to include EPI training in the curriculum for routine training. Community outreach officer in the camp with liaison with Ministry of Health should organize for TOT training for health workers to ensure that the camp has sufficient own resource persons to conduct the training internally.

4. Religion of mother/guardian has an influence in the immunization status of the child.

Since all the mothers/guardians have a religion affiliation, the health worker in the camp should utilize the religious fraternity to reach mother/guardians with immunization messages.

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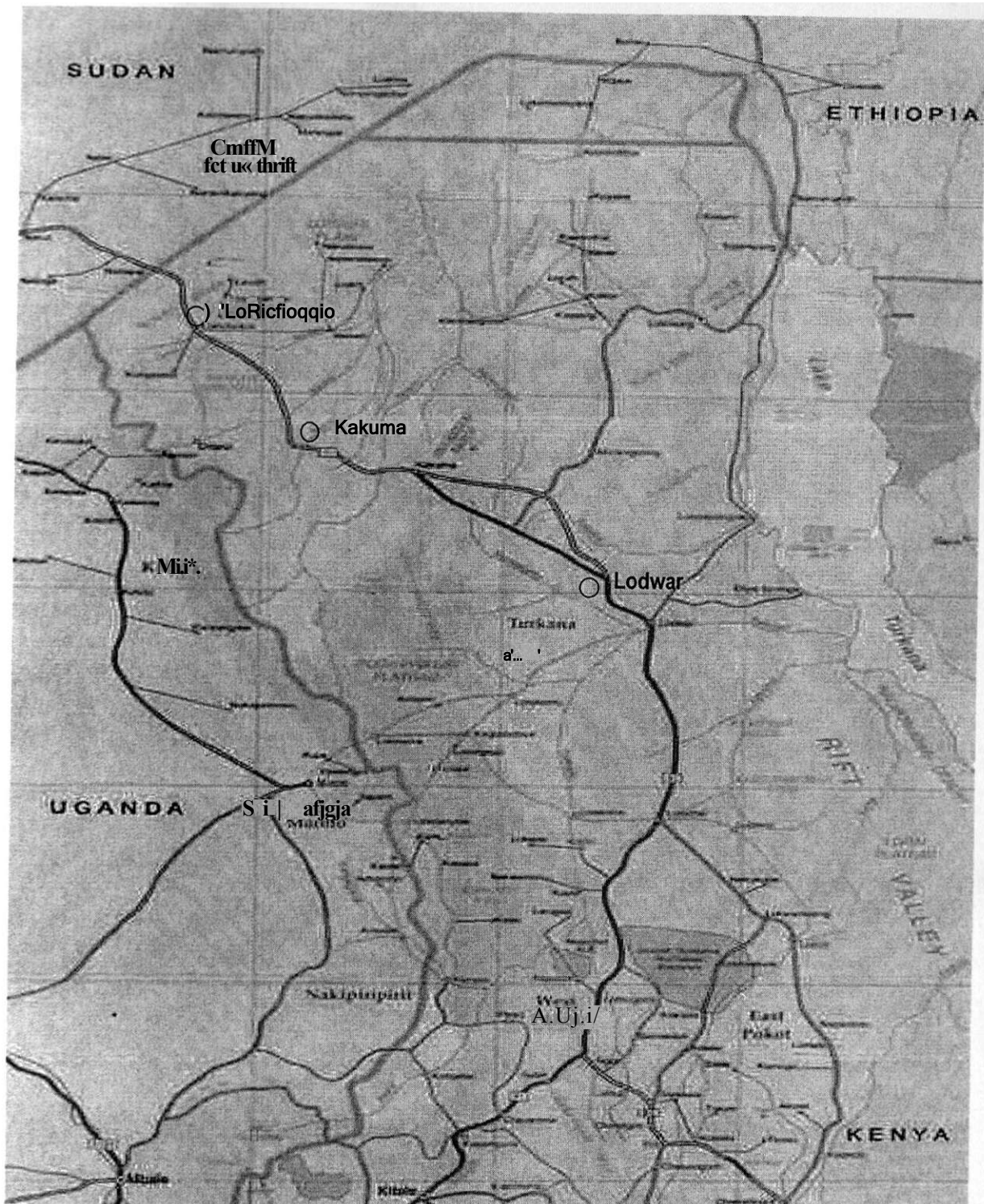
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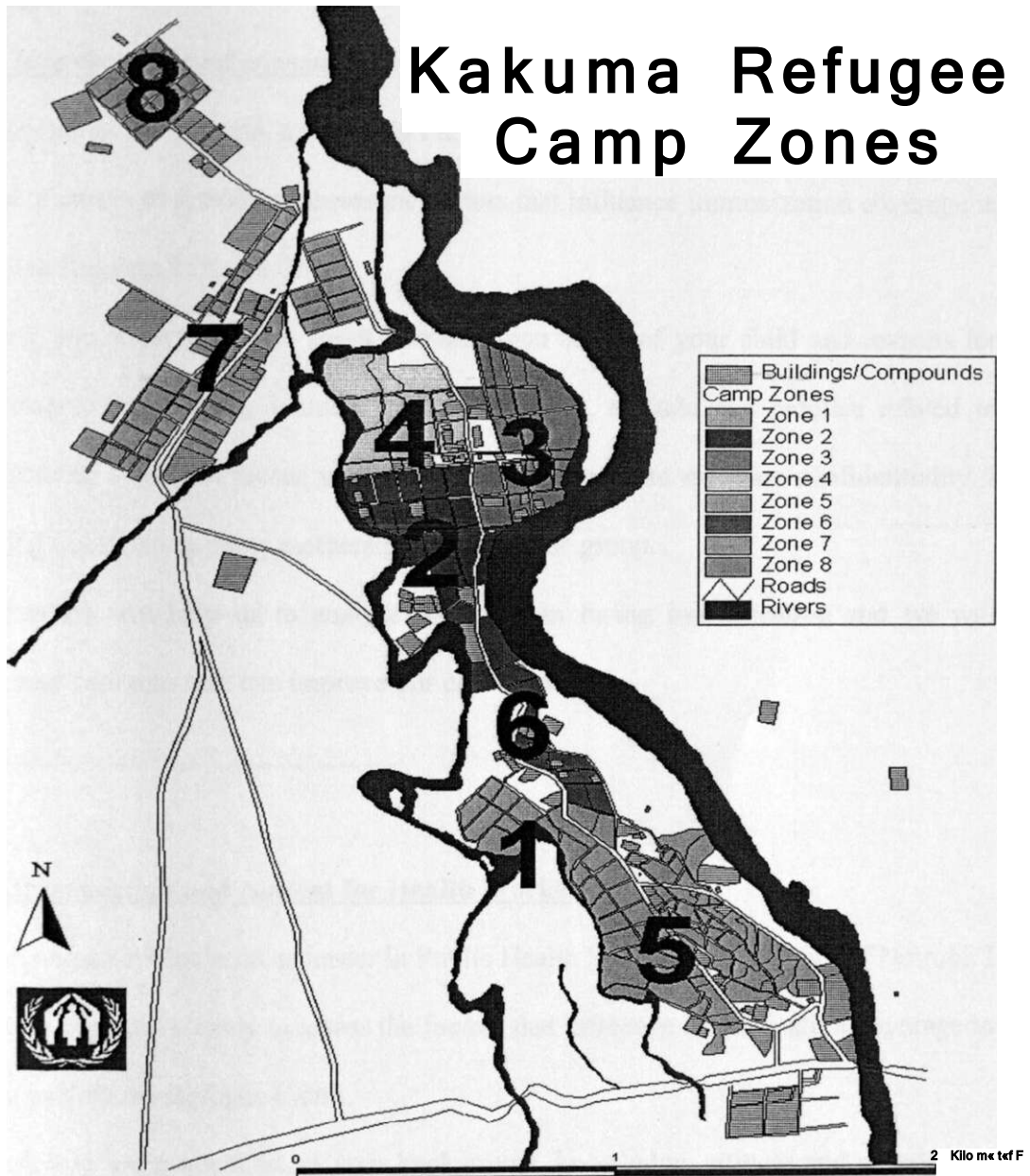
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Annex 1 A

Map of Turkana District





ANNEX 2

2.1 Introduction and consent for mothers/guardians

Hello, my name is Macharia, a master in Public Health Student at University of Nairobi. I am here to carry out a study to assess the factors that influence immunization coverage in children in Kakuma Refugee Camp.

I will ask you some questions about immunization status of your child and reasons for completing/not completing immunization, knowledge, attitude and practice related to immunization. I will not record your name because I want to maintain confidentiality. I am asking questions to many mothers/guardians in the group.

Your answers will help us to analyze the problem facing immunization and we will recommend solutions that can improve our coverage.

Sign

2.2 Introduction and consent for Health Workers

Hello, my name is Macharia, a master in Public Health Student at University of Nairobi. I am here to carry out a study to assess the factors that influence immunization coverage in children in Kakuma Refugee Camp.

I will ask you some question on your background, knowledge, attitude and practice on EPI diseases in relation to immunization. I will not record your name because I want to maintain confidentiality. I am asking the questions to many health workers in the camp.

Your answers will help us to analyze the problems facing immunization and the areas that need training and recommend solutions that can improve our coverage.

Sign

ANNEX 3

I. QUESTIONNAIRE FOR MOTHERS/GUARDIANS

Parti

Identification

Serial number

Group No.

Date of interview

Personal characteristics

1. Age
2. Sex 1. Male 2. Female
3. Marital status 1. Single 2. Married 3. Widow 4. Widower
4. Occupation
 1. Salary
 2. Farmer
 3. Business
 4. Unemployed
 5. Others
specify__
5. Education
 1. None
 2. Primary 1-4
 3. Primary 5-8
 4. Secondary
 5. College/university
 6. Others
Specify
6. Religion
 1. Catholic
 2. Protestant
 3. Muslim
 4. Others
Specify

PART II

Child immunization status

1. Date of birth of the child
2. Age in months
3. Sex 1.Male 2.Female
4. Immunization card 1.Yes 2. No
 1. BCG Date given_
 2. DPT 3 Date given_
 3. OPV 3 Date given_
 4. Measles Date given_
5. Immunization status
 1. Not immunized
 2. Partially immunized
 3. Fully immunized
6. Was the child fully immunized before 1 year 1 .Yes 2.No
If Yes, go to Q 10 if No, go to Q 7.

Part 2

Reason for not immunizing the child

7. What reasons do you give for not immunizing the child?
 1. Unaware of the need for immunization
 2. Unaware of the need to return for the 2nd and 3rd dose
 3. Not knowing the place and / or time of immunization
 4. Fear of side reaction
 5. Immunization time passed
 6. Did not see the need to
 7. No apparent reason
 8. Others
specify.
8. Why are you not motivated to take the child for immunization?
 1. Postpone until another time
 2. No faith in immunization
 3. Rumor
 4. No reason
 5. Others
specify__

9. What hindered you from taking the child for immunization?
1. Place of immunization too far
 2. Time of immunization inconvenient
 3. Vaccinator absent
 4. Vaccine not available
 5. Mother too busy
 6. Family problem e.g. mother ill
 7. Child ill, not taken to the clinic
 8. Child ill, taken to the clinic but not given immunization
 9. Long waiting time
 10. Immunization denial because card got lost
 11. Too expensive transport
 12. Health staff rude
 13. Users fee
 14. Others
specify

Reasons that motivated the mother to immunize the child

10. What reasons can you give that made/caused you to take the child for immunization?
1. Prior exposure to immunization
 2. Benefit of integrated health services
 3. Desire to raise a health child
 4. Clear understanding of immunization
 5. Benefit of the child card at the hospital, school, and birth certificate
 6. Neighbour example
 7. Distance to health facility
 8. Good relation with the health staff
 9. Husband support
 10. Availability of experts at the health facility
 11. Others specify

Knowledge on immunization

11. Which immunizable diseases do you know?
1. Polio
 2. Measles
 3. Whooping cough
 4. Diphtheria
 5. Tuberculosis
 6. Tetanus
 7. Don't know
 8. Others
Specify _____

12. Have you ever had an experience with an immunizable Disease? 1. Yes 2. No.
If Yes, go to Q 13. If No, go to Q 14.

13. If Yes, Which one
Specify

14. From which source did you get this information?

1. Health worker
2. Community health worker
3. Radio
4. Students
5. Posters
6. Administration
7. Public baraza
8. Others specify

15. At what age should a child complete immunization?

1. Less than 9 months
2. At 9 months
3. 10-12 months
4. Over 12 months
5. don't know

16. How many times do you take a child to a health facility to complete all the immunization?

1. 1
2. 2
3. 3
4. 4
5. 5
6. Don't know
7. Others
specify__

• 17. What reaction may occur after a child has received immunization?

1. Hotness of the body
2. Vomiting
3. Skin rash
4. Child cry that whole night
5. Swelling at immunization site
6. Convulsions
7. Don't know
8. Others
Specify _____

- \ 8. What should you do after a reaction has occurred?-
1. Return the child immediately to the health facility
 2. Consult CHW
 3. Consult herbalist
 4. Observe a child
 5. Don't know
 6. Others
Specify.
19. When should a child not be immunized?
1. When child is too sick
 2. When advised by health staff not to do so
 3. When a child has had the disease being immunized for
 4. Don't know
 5. Others
Specify.
20. What are the benefits of immunizing a child?
1. Protect a child against diseases
 2. To cure diseases
 3. Don't know
 4. Others
Specify.

Practice

21. What is the distance to the nearest immunizing center?
1. <1Km
 2. 1-5 Km
 3. 5-10 Km
 4. >10 Km
 5. don't know
22. How do you get there?
1. Walking
 2. Bicycle
 3. Vehicle
 4. Others
Specify.
23. How long do you take to get there?
1. <1 hr
 2. 1-2 hrs
 3. 2-3 hrs
 4. 3-4 hrs
 5. 4-5 hrs
 6. > 5 hrs

24. What should you do when your child has missed an immunization or you have been late to take the child for immunization?
1. Take a child at early convenient time to a health facility for advice
 2. Ignore the missed immunization
 3. Go to another facility for the immunization
 4. Get a new card to continue
 5. Stop taking child for immunization
 6. Don't know
 7. Others
- Specify_
25. What problems do you encounter when you take your child for immunization?
1. Unwelcoming staffs
 2. Lack of vaccine
 3. Lack of needles and syringes
 4. Process take too long
 5. Others
- Specify _____
26. What do you think should be done to solve the above problem?
27. Do you ever discuss about immunization with your spouse/friends? 1. Yes 2. No.
If Yes go to Q 28, If No go to Q 29.
28. What kind of information do you share?
29. If No to Q. 27, which reasons do you give?
1. May think that I am bothering them
 2. Family difference
 3. Don't care
 4. Others
- (Specify)_

Attitude

30. Do you consider not taking your child for immunization a public health problem?
1. Yes 2. No
If No, go to Q31, If yes go to Q 32.
31. If No, give reasons.
32. If yes, why?
33. Do you know of a child who has not been immunized? 1. Yes 2. No.
If Yes, go to 34. If No, go to 36.
34. Have you tried to talk to the mother about immunization?
1. Yes 2. No.
If Yes, go to 35. If No, go to 36.
35. What reason did she give for not having the child immunized?
1. Distance
2. Lack of transport
3. Lack of money
4. No reason
5. Others Specify_
36. Do you get worried if your child misses immunization? 1. Yes 2. No.
If Yes, go to Q. 37. If No, go to Q 38
37. What do you do about it?
38. If No to Q 36, what reasons do you give?
1. The child is not sick
2. I can take the child any other day
3. The vaccine has not effect
4. Don't care
5. No reason
6. Others (Specify)
39. How often do you carry your child health card when going to health facility for any other reason apart from immunization?
1. Always
2. Have to be reminded
3. Occasionally
4. Don't have one
5. Others Specify__

40. Do you consider carrying child immunization card necessary? 1."Yes 2. No.
If Yes, go to Q. 41. If No, go to Q 42.

41. If Yes, give reason(s).

42. If No to Q. 40, give reason(s).

43. Which immunization do you consider most important to your child?

1. All
2. Measles
3. DPT
4. OPV
5. BCG
6. None
7. Don't know
8. Others

Specify _____

II: QUESTIONNAIRE FOR HEALTH WORKERS

Identification

Serial number_

Name of health facility_

Sector of health facility_

Date of interview_

Personal characteristic of the health worker

1- Age

2. Sex 1. Male 2. Female

3. Religion

- 1) Catholic
- 2) Protestant
- 3) Muslim
- 4) Others specify_

4. Marital status 1. Married 2. Single 3. Widow 4. Widower

5. Year of first appointment_

6. Working number of years_

7. Training level

1. University
2. Diploma
3. Certificate
4. Others specify_

8. Cadre of health worker

1. Doctor
2. Clinical officer
3. Nurse
4. Others specify_

9. Do you have special training on EPI? 1. Yes 2. No

10. What training have you received on KEPI?

- 1) Integrated in the diploma and certificate courses training
- 2) In-service training on KEPI
- 3) Community Outreach Program
- 4) Others Specify__

- **Knowledge on EPI Diseases**

11. What is the purpose of immunization?

1. To prevent diseases
 2. To cure diseases
 3. Don't know
 4. Others
- Specify

12. What type of vaccine is BCG?

1. Toxin
 2. Live
 3. Don't know
 4. Others
- specify

13. What is the dosage?

Specify

14. How is BCG administered?

1. Oral
 2. Intradermally
 3. Intramuscularly
 4. Don't know
 5. Others
- Specify _____

15. How is BCG stored?

1. Deep freezer
2. 0-8 0^C
3. Ice park
4. Don't know
5. Others Specify

16. At what age is the BCG vaccine given?

- 1) At birth
 - 2) 4 weeks
 - 3) 8 weeks
 - 4) 12 weeks
 - 5) 9 months
 - 6) Don't know
 - 7) Others
- Specify _____

17. What type of vaccine is DPT?

1. Toxin
2. Live
3. Don't know
4. Others
Specify.

18. What is the dosage of DPT vaccine?

Specify.

19. How is DPT vaccine administered?

- 1) Orally
- 2) Intradermally
- 3) Intramuscularly
- 4) Others
Specify.

20. How is BCG vaccine stored?

- 1) Deep freezer
- 2) 0-8 0^C
- 3) Ice pack
- 4) Don't know
- 5) Others Specify.

21. What are the risks of storing DPT in extreme temperatures below 0° ?

22. At what age is DPT 3 vaccine given?

- 1) At birth
- 2) 4 weeks
- 3) 8 weeks
- 4) 12 weeks
- 5) 9 months
- 6) Others Specify.

23. What type of vaccine is OPV?

- 1) Toxin
- 2) Live
- 3) Don't know
- 4) Others
Specify _____

24. What is the dosage of OPV vaccine?
25. How is OPV vaccine administered?
- 1) Oral
 - 2) Intradermal
 - 3) Intramuscularly
 - 4) Don't know
 - 5) Others
Specify.
26. At what age is OPV 3 vaccine given?
- 1) At birth
 - 2) 4 weeks
 - 3) 8 weeks
 - 4) 12 weeks
 - 5) 9 months
 - 6) Don't know
 - 7) Others Specify.
27. What type of vaccine is measles?
- 1) Toxin
 - 2) Live
 - 3) Don't know
 - 4) Others
Specify.
28. What is the dosage of measles vaccine?
Specify_
29. How is measles vaccine administered?
- 1) Oral
 - 2) Intradermarlly
 - 3) Intramuscularly
 - 4) Don't know
 - 5) Others
Specify_
30. How is measles vaccine stored?
- 1) Deep freezer
 - 2) 0-8 0^C
 - 3) Ice pack
 - 4) Don't know
 - 5) Others Specify.

31. How long should you keep measles vaccine after opening?
32. At what age is measles vaccine given?
- 1) At birth
 - 2) 4 weeks
 - 3) 8 weeks
 - 4) 12 weeks
 - 5) 9 months
 - 6) Others
Specify
33. Are there contraindications related to the six EPI vaccines? 1. Yes 2. No. If No, go to Q 35.
34. If Yes, which ones.
35. Who are the target groups for KEPI immunizations?
- 1) Children under one year
 - 2) Pregnant mothers
 - 3) People with cut wounds
 - 4) Health workers
 - 5) Don't know
 - 6) Others
Specify
36. What process do a mother go through before the child is immunized?
. Briefly describe the process.
37. What information do you record in the health card?
- 1) Weight of the child
 - 2) Date of immunization
 - 3) Date of next visit
 - 4) Don't know
 - 5) Others
Specify

38. What information do you give to the mother?
- 1) Whether the child is growing well
 - 2) Advice on the diet
 - 3) Importance of completing the immunization
 - 4) Side effects after immunization and how to go about it
 - 5) Next visit
 - 6) Don't know
 - 7) Others
Specify_

39. How do you give the information to mothers?
- 1) Group talk before immunization
 - 2) Talking to the mother at vaccination table
 - 3) At the next visit
 - 4) Not at all
 - 5) Don't remember to talk to mothers
 - 6) Don't know
 - 7) Others specify

Attitude

40. Have you ever heard about immunization policy in Kenya? 1. Yes 2. No.
If Yes, go to Q 41. If No, go to Q 43.

41. If Yes, what does it say?
- 1) Integrating immunization into MCH/FP/PHC program
 - 2) Sterilizing all immunization equipment using steam sterilizer for 20 minutes
 - 3) Use one sterile needle and syringe per injection to prevent cross infection
 - 4) Use potent vaccine kept at 0-8 degrees
 - 5) Keep vaccine on the ice pack during vaccination session to maintain potency
 - 6) Discard all opened and used vaccine at the end of the day
 - 7) Hold vaccination session daily in fixed facilities from 8.00am to 5.00 pm supplemented by outreach services where appropriate.

42. How does this knowledge help you?
- 1) Helps to view the mother whollistically
 - 2) Prevent cross infections
 - 3) How to use vaccines effectively and efficiently
 - 4) How to discard sharps materials to prevent contamination of instrument
 - 5) Skills to administer health education to mothers
 - 6) Others (Specify)

43. What supplies do you carry during immunization exercise?
- 1) Vaccines
 - 2) Sterilizer
 - 3) Syringes and needles
 - 4) Dressing materials
 - 5) IEC materials
 - 6) Others Specify
44. Do you know the immunization coverage of your district? 1. Yes 2. No.
If Yes, go to Q 45. If No, go to Q 45.
45. If Yes to Q 43, what is the coverage?
46. If No to Q 44, which reasons would you give?
- 1) No feedback of surveys done in the camp
 - 2) Monthly reports not distributed to health workers
 - 3) No time to read through reports
 - 4) Concentrating in other health activities
 - 5) Don't care
 - 6) Others (Specify)
47. Is immunization coverage a problem in the camp? 1. Yes 2. No.
If Yes, go to Q. 48. If No, go to Q 49.
48. If Yes to Q. 47, what do you think is the cause of the poor coverage?
- 1) Lack of knowledge among the refugee community
 - 2) Cultural reasons of the refugee community
 - 3) Lack of vaccines and equipments
 - 4) Lack of qualified staffs
 - 5) Negative attitude of staffs towards refugee community
 - 6) Others (Specify)
49. What is the magnitude of the problem in immunization in this country?
- 1) Serious
 - 2) Moderate
 - 3) Mild
 - 4) Don't know
 - 5) Others
Specify_
50. Are you at any one time willing to work in the MCH/FP clinic?
- 1) Very willing
 - 2) Reluctant
 - 3) No
 - 4) Other
Specify_

51. Give reason for your response to Q. 50.

52. Do you consider outreach services important in the camp? 1. Yes 2. No.
If Yes go to Q 53. If No, go to Q 54.

53. If yes, why?

- 1) Reach more children
- 2) Identify defaulters and immunize them
- 3) Give health education to refugee community
- 4) Others (Specify)

54. If No, give reasons

- 1) Waste of time and resources
- 2) Clinics are accessible
- 3) No fee for service
- 4) Community well educated
- 5) Others (Specify)

Practice

55. Do you consider supervision important in KEPI activities? 1. Yes 2. No
If yes go to Q. 56. If No, go to Q. 57

56. How often do the COR manager supervise you?

- 1) Once a month
- 2) Twice a month
- 3) Three times a month
- 4) Four times a month
- 5) Others Specify

57. If no to Q. 55, give reasons?

- 1) Waste of time
- 2) Supervisors not motivating
- 3) Too frequent
- 4) No information disseminated
- 5) Others (Specify)

58. Do you go for outreach services in your catchment area? 1. Yes 2. No.
If yes, go to Q 59. If No, go to Q 60

59. How often do you go for outreach services?

- 1) None
- 2) Weekly
- 3) Every two weeks
- 4) Monthly
- 5) Others Specify_____

60. If No to Q 58, give reason.

- 1) Lack of transport
- 2) Lack of personnel
- 3) Community do not respond
- 4) Lack of motivation from the COR Managers
- 5) Others

61. Where do you get information on immunization?

- 1) COR Manager
 - 2) Immunization manual
 - 3) Colleagues
 - 4) Own initiative
 - 5) Others
- Specify

62. What problems do you encounter as you go about your duties on immunization?

- 1) Lack of syringes and needles
 - 2) Lack of equipments
 - 3) Lack of facilities
 - 4) Lack of adequate knowledge
 - 5) Inadequate number of staff
 - 6) Others
- Specify

63. What do you think should be done to solve the problems to Q. 62?

64. In your view, which approach is practical in your catchment area to increase the immunization coverage?

- 1) Passive approach
 - 2) Active approach
 - 3) Both approach
 - 4) None
 - 5) Don't know
 - 6) Others
- Specify.

65. Have you been involved in a community immunization programme? 1. Yes 2. No.
If Yes, go to Q 66. If No, go to Q 67.

66. If Yes, which one?

- 1) Polio campaign
- 2) Measles campaign
- 3) Others

Specify___

67. Do you normally give health education to mothers in the MCH clinic?

1. Yes 2. No

If yes, go to Q. 68. If No, go to Q 70.

68. How often is the health education carried out?

- 1) Daily
- 2) Twice a week
- 3) Once a week
- 4) Others

Specify.

69. What do you include in your topic?

- 1) Cause and transmission of EPI diseases
- 2) Clinical features of EPI diseases
- 3) Prevention of EPI diseases
- 4) Side effects of EPI vaccines
- 5) Beliefs and attitude on EPI
- 6) Others

Specify.

70. Are you involved in surveillance of EPI diseases? 1. Yes 2. No.

If Yes go to Q 71. If No, go to Q 72.

71. If Yes to Q. 70, how do you go about it?

- 1) Refer the case to the outpatient department
- 2) Fill in the case record form and send it to officer in charge of the facility
- 3) Notify the DPHN
- 4) Others

Specify.

72. If No to Q. 70, why?

Annex 4

CRITERIA FOR ADEQUATE KNOWLEDGE, ATTITUDE AND PRACTICE

1 MOTHERS AND GUARDIAN

1. Which immunizable diseases do you know?

Polio	1 score
Measles	1 score
Whooping cough	1 score
Diphtheria	1 score
Tuberculosis	1 score
Tetanus	1 score

2. At what age should a child complete immunization? At 9 months - 1 score

3. How many times do you take a child to a health facility to complete all the immunization? 5 times - 1 score

4. What reaction may occur after a child has received immunization?

Hotness of the body	- 1 score
Vomiting	- 1 score
Skin rash	- 1 Score
Child cry that whole night	- 1 score
Swelling at immunization site	- 1 score
Convulsions	- 1 score

5. What should you do after a reaction has occurred?

Return the child immediately to the health facility	- 1 score
Consult CHW	- 1 score

6. When should a child not be immunized?

No indication	- 1 score
---------------	-----------

7. What are the benefits of immunizing a child?

Protect a child against diseases	- 1 score
----------------------------------	-----------

Total Score	18 scores
<u>Adequate Knowledge</u>	9 and above
Inadequate Knowledge	< 9 scores

Attitude

1. Do you consider not taking your child for immunization a public health problem?

Yes	- 1 score
-----	-----------

2. Do you know of a child who has not been immunized?

Yes	- 1 score
-----	-----------

3. Have you tried to talk to the mother about immunization?
Yes - 1 score
4. Do you get worried if your child misses immunization?
Yes - 1 score
5. How often do you carry your child health card when going to health facility for any other reason apart from immunization?
Always - 1 score
6. Do you consider carrying child immunization card necessary?
Yes - 1 score
7. Which immunization do you consider most important to your child?
All - 1 score

Total Score **7 score**
Adequate Attitude **4 and above**
Inadequate Attitude **<4**

Practice

1. How do you get there?
Walking - 1 score
Bicycle - 1 score
2. What should you do when your child has missed an immunization or you have been late to take the child for immunization?
Take a child at early convenient time to a health facility - 1 score
3. Do you ever discuss about immunization with your spouse/friends?
Yes - 1 score

Total scores **4 scores**
Adequate positive practice **2 and above**
Inadequate positive practice **< 2 scores**

II HEALTH WORKER

Knowledge

1. What is the purpose of immunization?
To prevent diseases - 1 score
2. What type of vaccine is BCG?
Toxin - 1 score
3. What is the dosage?
0.5 ml - 1 score
4. How is BCG administered?
Intradermal ly - 1 score
5. How is BCG stored?
0-8 0^C - 1 score
6. At what age is the BCG vaccine given?
At birth - 1 score
7. What type of vaccine is DPT?
Toxin - 1 score
8. What is the dosage of DPT vaccine?
0.5 ml - 1 score
9. How is DPT vaccine administered?
Intramuscularly - 1 score
10. How is BCG vaccine stored?
0-8 0^C - 1 score
11. What are the risks of storing DPT in extreme temperatures below 0° ?
Losses potence - 1 score
12. At what age is DPT 3 vaccine given?
12 weeks -1 score
13. What type of vaccine is OPV?
Live - 1 score
14. What is the dosage of OPV vaccine?
2 drops - 1 score
15. How is OPV vaccine administered?
Oral - 1 score
16. At what age is OPV 3 vaccine given?
12 weeks - 1 score
17. What type of vaccine is measles?
Toxin - 1 score
18. What is the dosage of measles vaccine?
0.5 ml - 1 score

19. How is measles vaccine administered? Intramuscularly	- 1 score
20. How is measles vaccine stored? 0-8 0 ^C	- 1 score
21. How long should you keep measles vaccine after opening? 6 hours	1 score
22. At what age is measles vaccine given? 9 months	1 score
23. Are there contraindications related to the six EPI vaccines? No	1 score
24. Who are the target groups for KEPI immunizations? Children under one year	1 score
Pregnant mothers	1 score
People with cut wounds	1 score
25. What information do you record in the health card? Weight of the child	1 score
Date of immunization	1 score
Date of next visit	1 score
26. What information do you give to the mother? Whether the child is growing well	1 score
Advice on the diet	1 score
Importance of completing the immunization	1 score
Side effects and how to go about it	1 score
Next visit	1 score
Total score on Knowledge	34 scores
Adequate knowledge	20 and above
Inadequate knowledge	< 20 scores

Attitude

1. Have you ever heard about immunization policy in Kenya? Yes	-1 score
2. Do you know the immunization coverage of your district? Yes	- 1 score
3. Is immunization coverage a problem in the camp? No	- 1 score
4. What is the magnitude of the problem in immunization in this country? Moderate	- 1 score
5. Are you at any one time willing to work in the MCH/FP clinic?	

Very willing - 1 score

6. Do you consider outreach services important in the camp?

Yes - 1 score

Total scores = 6 scores

Adequate attitude = 3 and above

Inadequate = < 3 scores

Practice

1. Do you consider supervision important in KEPI activities?

Yes - 1 score

2. Do you go for outreach services in your catchment area?

Yes - 1 score

3. In your view, which approach is practical in your catchment area to increase the immunization coverage?

Passive approach/Active approach - 1 score

4. Have you been involved in a community immunization programme?

Yes - 1 score

5. Do you normally give health education to mothers in the MCH clinic?

Yes - 1 score

6. Are you involved in surveillance of EPI diseases?

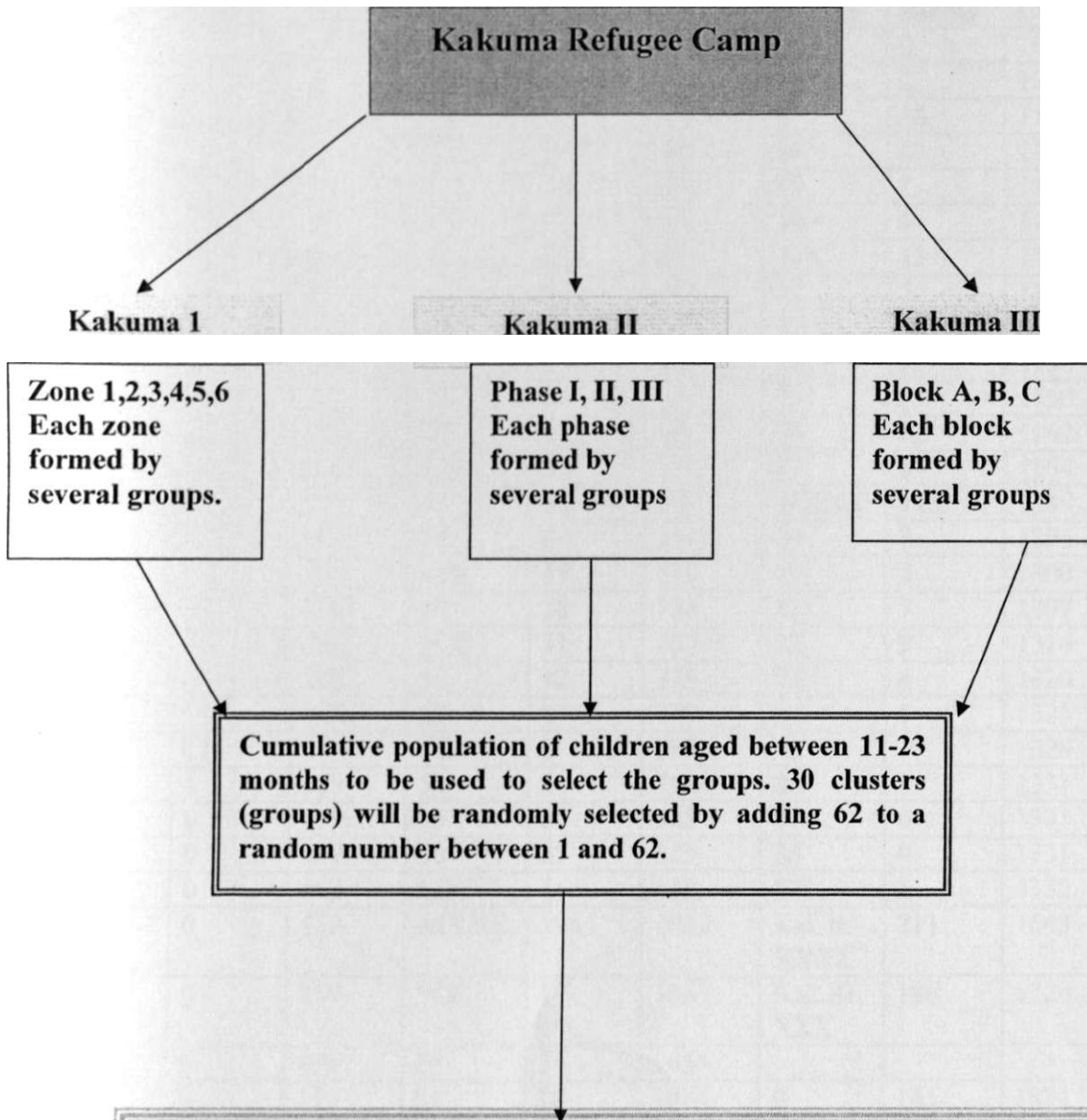
Yes - 1 score

Total scores = 6 scores

Adequate = 3 and above

Inadequate = < 3 scores

Annex 5
Sampling Technique Methodology



A direction will be picked by spinning a bottle. All households in the chosen direction with children 11-23 months will "be visited until 7 children are included in the study. Health Workers in the groups and clinics will be selected for the interviews

Annex 6: Births from July 2000 to July 2001

Group	Births	Cum.	Group	Births	Cum.	Group	Births	Cum.
1	1	1	33X	19	535	65	2	1088
2	1	2	34	33	568	66	1	1089
3	0	2	35	9	577	67	18	1107
4	0	2	36X	30	607	68	0	1107
5X	12	14	37	3	610	69	1	1108
6	26	40	38	6	616	70	1	1109
7	15	55	39	14	630	71X	13	1122
8	37	92	40	10	640	72	5	1127
9	42	134	41	0	640	73	15	1142
10XX	115	249	42	1	641	74	8	1150
11X	33	282	43	0	641	75	0	1150
12	23	305	44	0	641	76	12	1162
13	14	319	45X	38	679	77	2	1164
14	28	347	46	18	697	78XXX	125	1289
15X	33	380	47	6	703	79	7	1296
16	15	395	48X	15	718	80	4	1300
17X	25	420	49	18	736	81	7	1307
18	10	430	50X	31	767	82	9	1316
19	6	436	51	12	779	83	4	1320
20	11	447	52	0	779	84	5	1325
21	11	458	53	9	788	85	3	1328
22	1	459	54	0	788	86	3	1331
23	0	459	55	0	788	87	0	1331
24	0	459	56	27	815	88	0	1331
25	0	459	57X	41	856	89	1	1332
26	0	459	58XXX	196	1052	Kak II XXXX	211	1543
27	0	459	59X	1	1053	Kak III XXX	186	1729
28	0	459	60	3	1056			
29	0	459	61	18	1074	0	145	1874
30	0	459	62	5	1079			
31X	16	475	63	5 -	1084			
32	41	516	64	2	1086			

X= Cluster