DECLARATION

This research thesis is my original work and has not been presented for a degree in any other University.

Signature .................................. Date ..............................

Margaret Wangui Njeru

Q139/27683/2014

Supervisors:

This research thesis has been submitted for review with our approval as University Supervisors.

Signature .................................. Date ..............................

Dr Albert Gachau

Department of Pathology

Kenyatta University

Signature .................................. Date ..............................

Dr Priscilla N. Kabue

Department of Community Health Nursing

Kenyatta University
DEDICATION STATEMENT

I dedicate this research paper to my husband and family for their endurance during my studies.
ACKNOWLEDGEMENT

I would like to show appreciation to the Chairman of the Department of Population and Reproductive Health and the lecturers who trained me all the way through this course. I am indebted to my supervisors Dr Albert Gachau and Dr Priscilla N. Kabue for their assistance and ensuring that I have done and completed this thesis. I am grateful for their effort and continued unrelenting input through encouraging remarks and suggestions. My family has been of immense contribution from the beginning to the end of this paper. I am particularly grateful for their patience for the times I had to remain in school over the weekends and at times arrive home late.

I welcome the help colleagues at my work place offered. Special thanks goes to friends and classmates who stood with me through out in the course of this study. I would like to appreciate many others who directly or indirectly contributed to a successful completion of my thesis.

I would like to also acknowledge the respondents in the study as well as the various authorities such as KU – ERC and NACOSTI that made the study possible.

Thank you so much.
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ANC</td>
<td>Antenatal Care</td>
</tr>
<tr>
<td>BCG</td>
<td>Bacille Calmette Guerin</td>
</tr>
<tr>
<td>CDH</td>
<td>County Directors of Health</td>
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<td>CHIS</td>
<td>County Health Information System</td>
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<td>EPI</td>
<td>Expanded Programme on Immunization</td>
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<td>GAVI</td>
<td>Global Alliance for Vaccine and Immunization</td>
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<td>GIVS</td>
<td>Global Immunization Vision and Strategy</td>
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<td>GVAP</td>
<td>Global Vaccine Action Plan</td>
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<tr>
<td>IPV</td>
<td>Injectable polio vaccine</td>
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<td>KEPI</td>
<td>Kenya Expanded Programme on Immunization</td>
</tr>
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<td>KHPF</td>
<td>Kenya Health Policy Framework</td>
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<td>KNH</td>
<td>Kenyatta National Hospital</td>
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<td>KU-ERC</td>
<td>Kenyatta University Ethics Review Committee</td>
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<tr>
<td>MNCH</td>
<td>Maternal, Neonatal and Child Health</td>
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<td>MDGs</td>
<td>Millennium Development Goals</td>
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<td>NACOSTI</td>
<td>National commission of science and technology and innovation</td>
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<td>OPV</td>
<td>Oral Polio Vaccine</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>PCV10</td>
<td>Pneumococcal vaccine</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
</tr>
<tr>
<td>TBA</td>
<td>Traditional Birth Attendant</td>
</tr>
<tr>
<td>TB</td>
<td>Tuberculosis</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>UVIS</td>
<td>Unit of Vaccines and Immunization</td>
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<tr>
<td>VPD</td>
<td>Vaccine Preventable Diseases</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Definition of operational terms

**Antenatal care:** Care that you receive from a health professional during pregnancy

**BCG:** Vaccination against tuberculosis administered intradermally at birth.

**Compliance:** This is defined or conceptualized to receiving the required number of doses of vaccines at the appropriate age as shown in the immunization schedule table and recorded in the child’s record card.

**Expanded Programme on Immunization:** This is a World Health Organization with an agenda of ensuring all children are immunized with all vaccines approved by WHO all over the globe.

**Immunization:** A process where one is protected from diseases through provision of vaccines.

**Maternal Child Health Services:** Refers to various facilities and programs offered to mothers and children to protect them from diseases that may endanger their life’s and hinder them from realizing good health outcomes. This includes care during pregnancy and until after delivery and care of the child during the child’s early years of life.

**Multi-dose vaccine:** Vaccines requiring multiple doses to sustain high response levels for the purpose of producing the desired outcomes.

**Oral Polio Vaccine:** This is a vaccine used throughout the world to provide immunity to the virus that causes poliomyelitis (polio).
**Traditional Birth Attendant:** A Pregnancy and child birth care provider offering services outside the health facility set up and mainly in the homesteads.

**Vaccination schedule:** These are services of vaccination which are age and time specific provided as per WHO guidelines to achieve maximum effectiveness after completing all the doses in the National child immunization schedule.

**Vaccine:** an antigen introduced into a child’s body through injectable or oral route to offer protection against childhood killer diseases.
Abstract

Immunization is a key approach that can be successfully employed to reduce deaths and illnesses among children. Immunization presently averts an estimated 3 million deaths annually for children aged under five. Kenya Expanded Program on Immunization has a stipulated immunization schedule guideline that should be adhered to for effective utilization of immunization services for improved health outcome. The study was prompted by the alarming statistics on morbidities related to vaccine preventable diseases in a County where there has been a lot of intervention on immunization services. The main objective of the study was to investigate utilization of immunization services among children aged under five in Kirinyaga County, Kenya. The specific objectives were to assess the level of utilization of immunization services, establish the social-demographic factors associated with immunization services, determine health service factors influencing immunization services and assess family factors associated with utilization of immunization services. A descriptive cross-sectional study was conducted in the community among 388 participants in the five sub-counties of Kirinyaga County. This was done through systematic random sampling of every 9th household. The respondents were interviewed through structured questionnaires. Children immunization record card was assessed for data entry. Data was analyzed by Social Statistical Package for Social Scientists (SPSS). Descriptive findings were presented in tables and bar graphs while inferential statistics used chi-square test to measure association between independent and dependent variables. P-values equal to or less than 0.05 were considered statistically significant. The results showed that utilization of immunization services was not in compliance with the National Child Immunization Schedule that ensures maximum protection from vaccine preventable diseases. Measles 2 vaccine the last antigen in the schedule administered at 18 months had 58%. A confidence interval of 95% was adopted thus setting significant thresholds at 0.05 implying any threshold less than 0.05 was significant in affecting utilization of childhood immunization. The results indicated that socio-demographic factors such as age, gender, educational level, income levels had p values(p<0.005) and were all significant factors that affected timely utilization of childhood immunization. Religion was found to have no effect on utilization and had p values (p>0.005) The health service factors such as waiting time, stock out of vaccine, rescheduling of vaccine and return dates had p values (p<0.05) and were all significant factors that affect Utilization of immunization services negatively. Distance was found to have no effect on utilization (p>0.05) The study established that family factors had a strong statistical significant relation with utilization of immunization services such as myths and misconception, side effects, parity, sick children and lack of information and had p values (p<0.05). Birth order (p>0.005) was found to have no effect on utilization of immunization services. The Conclusion was that the levels of performance antigens was below the recommended target by WHO of 85%. It was recommended that health education program be carried out to improve utilization of immunization services and door to door campaign to trace and immunize defaulters.
CHAPTER ONE: INTRODUCTION

1.1 Background of the Study
Global Immunization Data by WHO and UNICEF (2013) reports that, immunization at present prevents mortalities approximating 2 to 3 million annually for under five years. Etana and Deresa (2012) in their study confirmed that following continuous National immunization day’s campaigns carried out by WHO since 1967, immunization has been regarded as the key strategy to curb communicable diseases which are number one killer of children aged under five.

The worldwide Immunization Vision and Strategy was launched in Geneva UNICEF and WHO (2005). Kenya which has 47 counties Kirinyaga being one of them was included. These governments dedicated themselves to fight vaccine preventable diseases a cause of mortality of over 2 million children every year, two-thirds being children aged under five Cana van et al. (2014)

Global immunization vision and strategy aims at immunizing many children against emerging diseases with newly introduced vaccines and to integrate other key health interventions with immunization for example issue of dewormers, nets and provision of vitamin A in a hope to increase uptake of immunizations.

According to Cana van, et al. (2014) immunization of children aged under five should be a global priority for attainment of millennium development goal number four of reducing under-five mortality by two-thirds by 2015. This was not achieved and has been included in envision 2030 SDGs now being in goal number 3 ‘ensure
healthy lives and promote wellbeing for all at all ages’. The SDGs are to sustain the remarkable successes of MDGs that led to reduction of under five children mortality.

At present the immunization schedule is as follows: BCG is given at birth, Polio vaccine given at birth or within 2 weeks after birth, 3 doses of polio given at 6 weeks, 10 weeks and 14 weeks, 1 dose of IPV given at 14 weeks, 3 doses of pentavalent vaccine are administered at 6 weeks, 10 weeks and 14 weeks. Pneumococcal vaccine is administered at 6 weeks, 10 weeks and 14 weeks. Rotavirus vaccine is administered at 6 weeks and 10 weeks. At 6 months’ vitamin A is given. Measles 1 and 2 vaccine is administered at 9 and 18 months respectively (WHO, 2013).

Etana and Deresa (2012) clarifies that immunization is a very effective approach for curbing the under-five killer diseases which are vaccine preventable, however the highest percentage of childhood illnesses and a death in Ethiopia is as a result of vaccine preventable diseases.

In Kenya, in every nine children, one child dies annually from vaccine preventable diseases, before they attain the age of five. Most lives will be saved with increased utilization of immunization services. (CDC, 2012). The death rate of children 0 to 59 months in Kenya was at 73/1000 live births (WHO and UNICEF, 2012).

Children less than 59 months who died in Kenya in 2010 were 188,928. Koskei, et al. (2014) points out that most children do not access immunization services therefore demonstrating equity gaps. In Kirinyaga county under five mortality is at 48/1000 live births (CHIS, 2014)
1.2 Problem Statement

Immunization by administration of vaccines has been confirmed as the most successful approach that can effectively be employed to prevent childhood diseases. In Kenya, the Ministry of Health has provided an immunization compliance schedule for all children below 5 years.

The WHO and UNICEF (2014) states that mortalities due to vaccine preventable diseases were 1.5 million children worldwide. Africa under five mortality stands above 180/1000 live births (WHO, 2014). Kenya under five mortality stands at 73/1000 live births (CDC, 2014). In Kirinyaga under five mortality is at 48/1000 live births (CHIS, 2014). It is important to note that a substantial number of children deaths and illnesses in Kenya is related to diseases prevented through vaccinations.

In Kirinyaga County, children vaccinated were reported to be at 85% (CHIS, 2014). Statistics showed mortalities and morbidities reported to be related to vaccine preventable diseases among children under five years were 403 and 33218 respectively. Pneumonia 11%, diarrhea 34%, eye and ear infections 18%, 191 cases of TB confirmed (CHIS, 2014).

This shows there is no correlation between the immunization coverage and mortalities and morbidities related to vaccine preventable diseases. It is due to this information of statistics of public health concern, that utilization of immunization services required assessment. Koskei, et al. (2014) noted that despite governments initiative to improve childhood immunization by availing vaccines and training of health workers, immunization services was not accessed by all children thus demonstrating equity gaps.
1.3 Justification of the Study

It is documented that 19.3 million children did not receive full vaccination and remained at risk of VPDs (GAVI, 2010). Statistics on morbidity (33218) and mortality (403) among children less than five years related to VPDs in Kirinyaga shows figures of public health concern. (CHIS, 2014).

There is limited information about the quality of vaccination services for this key population in Kirinyaga County as there is no documentation. Immunization is regarded as a key child survival intervention and so the study purposed to find out how it is being utilized. The study generated baseline information that can be used in advocacy for policy implementation towards improving immunization considered essential for child survival for this key population.

1.4 Research Questions

1. What is the level of utilization of immunization services among under five children in Kirinyaga County?

2. What are the social-demographic factors associated with utilization of immunization services among children aged under five in Kirinyaga County?

3. What are the health service factors influencing utilization of immunization services among under five in Kirinyaga County?

4. What are the family factors associated with utilization of immunization services among under five in Kirinyaga County?

1.5 Null Hypothesis

Utilization of immunization services is not determined by social demographic, health services and family factors in Kirinyaga County.
1.6 Research Objectives

1.6.1 Main Objective

To investigate the utilization of immunization services among children aged under five in Kirinyaga County.

1.6.2 Specific Objectives

1. To assess the level of utilization of immunization services among under five in Kirinyaga County.
2. To establish the social-demographic factors associated with utilization of immunization services among children aged under five in Kirinyaga County.
3. To determine the health service factors influencing utilization of immunization services among under five in Kirinyaga County.
4. To assess family factors associated with utilization of immunization services among under five in Kirinyaga County.

1.7 Significance of the study

To identify gaps in relation to provision of immunization services and interventions put in place to ensure successful utilization of immunization services that ensures ‘reach every child strategy’ for proper control and elimination of Vaccine Preventable diseases which are leader killer and disabling diseases of young children.

1.8 De-Limitations and Limitations of the Study

1.8.1 Delimitation of the Study

It focused on vaccination services for children below and up to 59 months.
1.8.2 Limitations of the Study

Recall bias was a limitation for respondents without child record cards on immunization for they could not remember the actual dates the child was immunized; this was overcome by checking immunization scars. Smooth data collection for this research work was hindered by inadequate finances due to lack of funding. However, the researcher used the available resources appropriately to make sure that the objectives of the research were met.

1.9 Theoretical Framework

Immunization is a key strategy that prevents mortalities and morbidities related to vaccine preventable diseases among under five children, a key population that has lowered body immunity. Various theories on socio-demographic, health service and family factors variables by more than 3 authors have revealed interrelated factors that influence the outcome of utilization of immunization services.

For example theories on utilization of immunization services by authors (Abdul 2010), Abdi, et al.( 2014), Samra, et al.(2015) revealed that age was a significant factor for the parents /care givers choice to utilize immunization services. Educational background was found to influence utilization of services by authors, Lillian, et al.(2013), Abdul(2010), Quian li, et al.(2013) and Abdi et al.(2013). Stock out of vaccines affected use and continuity of utilization of services leading to partial and non-immunized children putting them at risk of diseases. This was revealed by studies on immunization services conducted by authors Favina, et al. (2012) and Abdul (2010). Myths and misconceptions were found to be associated with utilization of services by authors, Robert, et al. (2011), Hussein and Alemayu
(2013). The researcher was prompted by these theories to investigate whether the same factors affected utilization of services in the study area.

1.10 Conceptual Framework

A model consisting of independent and dependent variables where independent variables determine the outcome of the dependent variable. The conceptual framework for this study consists of utilization of immunization services (dependent variable) and social-demographic factors, health service factors and family factors as (independent variables) as shown in (figure 1.1)
The framework was adopted from (Andersen & Newman 1973) but the variables in the study are on immunization.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction
This chapter reviews literature from diverse sources linked to immunization services and factors that are associated with its utilization. It reviews international, regional and local studies with an aim to identify study gaps related to immunization services and factors associated with its utilization.

Immunization is a public health involvement aimed at reducing deaths and illnesses among young children. Etana and Deresa (2012) points out that it is an important means of controlling diseases, and has been considered a key economic health intervention.

International studies by Abdul (2010), Gupta and Samra, et al. (2015) shows that utilization of immunization services depends on awareness and knowledge on importance of immunization, the frequency of utilization of a health facility, the age of mothers/caregivers, income levels, fear of side effects and educational background. Qian, et al. (2013) in their study found out that utilization of immunization services was not dependent on family size, care givers age or whether the child was a boy or a girl in contrast to other studies.

Regional studies on utilization of immunization services by Abdi, et al. (2014), Sembuche (2010) has revealed that educational background, marital status employment status, residential area, religious belief, place of delivery mothers/caregivers age, awareness on benefits of vaccination, few technical staff, in
accessible health facilities and frequency in vaccine stock out hinder effective utilization of services in that region.

Local studies by Mutua, et al. (2011), Onsuma, et al. (2015), Onyango, et al. (2012) and Tove, et al. (2012) revealed mixed association between individual assets and one’s financial spending, , place of delivery , ethnicity, mothers educational background, age of the mother, number of children a mother had and utilization of immunization. Cana van (2014) did not find any significant reasons that accounted for maximum utilization of immunization services and recommended individual country to examine its economic situation, historical perspective and own political climate in order to fully utilize immunization services.

2.2 Utilization of Immunization Services Among Children Aged Under Five
Yihunue, et al. (2015) studied childhood immunization in Ethiopia for 12-24 months old children and found that fully immunized children were 24.3%. This utilization was below the set national target of 66%. The study concluded that there was need to utilize health care facilities so as to get proper information on childhood immunization. This information will prompt them utilize immunization services and help ensure their children are fully immunized in full compliance with the National child immunization schedule.

The study further recommended intervention programs such as regular outreaches in far to reach areas in all administrative regions for easy access to vaccinations by all children and this will increase utilization rate. They also suggested that community health workers be recruited and trained on maternal and child health so that they can
reach large communities with immunization communication messages thus enhance high utilization rate.

Cana van, et al. (2014) used data on demographic and health survey of named African countries- Rwanda, Uganda, Kenya, Burundi, Tanzania, and Ethiopia and checked on rates of fully immunized child for BCG, polio and DTP as per WHO recommendations for under five years. The observation was that utilization of immunization services varied significantly by country. The study revealed that majority of children in all countries, had been administered with at least one dose of the vaccines recommended by WHO.

In Ethiopia, Tanzania, and Uganda less than 50% were partially immunized, they pointed out that high utilization of immunization services depended on hospital deliveries in contrast to home deliveries. Social-demographic factors were found not to consistently influence complete vaccination status across countries. The survey carried out by Canavan, et al. (2014) therefore revealed that no single factor can be consistently be singled out to account for complete vaccination status. They recommended the need for each country to examine its own political stability and economic status to ensure children are fully immunized.

Ozcirpici, et al. (2014) studied immunization services for young children in Gaziantep, Turkey using two descriptive cross-sectional studies. He compared the two studies, one prior to shifting to modern medicine and the other and year after switching. However, vaccination levels dropped significantly to 84.0% after
transition. They observed that individual personalities of care providers and community perception on care provided contributed to this drop.

Onsuma, et al. (2015) studied maternal health and children immunization status in Kenya and found that majority of children vaccinated for BCG 94%, poliomyelitis 77%, DPT 91% and measles 74%. This clearly shows that those children who were started on BCG did not complete the schedule and also there is no information as to whether the 74% vaccinated against measles were fully immunized.

The conclusion was that parents who had lower than secondary education were not able to follow up their children to full immunization. Health education on importance of immunization was seen to play a key role in increasing uptake of immunization services. They recommended intensified health education to enable parents understand the benefits of immunization and to trace and immunize defaulters of immunization and particularly the urban informal settlement mostly inhibited by population with no or lower education. The study pointed out that the government pay particular attention to rural areas like Nyanza and Western Kenya to enhance increase in utilization levels.

Onyango, et al. (2012) noted that children aged 2 to 59 months suffered severe pneumonia in western Kenya. He conducted a study on the risk factors associated with pneumonia and came to a conclusion that lack of timely vaccinations, co-morbidity, infection of lower and upper respiratory tract and delay in seeking prompt treatment as associated factors. The study recommended more health education on importance of timely vaccinations, train community health volunteers
on KEPI and equip them with knowledge on immunization to be able to educate the community on adherence with immunization schedule for pneumonia control.

Tove, et al. (2012) studied the integration of different health services as a way of raising immunization uptake. The integration of routine vaccination and hygiene interventions in Homa Bay District revealed good results. The study concluded that health education on benefits of immunization during vaccination visits and distribution of health products such as bed nets was found to increase the level of vaccines uptake. The study also recommended use of Community Health Workers (CHWs) to support vaccination and other health services in poor setting such as slums as this would promote vaccination uptake.

2.3 Social Demographic Factors Associated with Utilization Of Immunization Services Among Children Aged Under Five

Lilian, et al. (2013) observed that utilization of immunization services highly depended on mothers /caregivers level of education. In Kaptembwo, the high uptake of immunization services was dependent on mothers /caregivers level of education. Those who had achieved high school education were 81.6% higher than those who had primary school education 76.7% and no education 42.9%. Ghei, et al. (2010) noted that inadequate information on benefits of immunization lead to failure to return for follow up doses

Abdul (2010) carried out a study to find out the reason why children did not complete immunization schedule in Bangladesh and found out that educational background, home visits by health workers, accessibility to the health facility and age of the mother/caregiver played key role in completion of immunization
Abdul (2010) recommended that, to ensure no defaulters on immunization, health workers should regularly visit households with children under five years, give health education and vaccinate defaulters. They also suggested that outreach sites be put in place in order to encourage parents/caregivers who have competing priorities access immunization easily and this would reduce defaulter rate. Another suggestion was to capacity build the health workers and equip them with knowledge on KEPI and communication skills to enable them give the right message on immunization and be able to convince mothers/caregivers to timely take their children to health facilities for immunization.

Qian Li, et al. (2013) carried out a cross-sectional survey in East China to find out the compliance levels on all vaccinations among children aged under five and the associated factors. The study was carried out on 1426 mothers who had no permanent residence the results revealed low utilization of immunization services and non-compliance with National Child Immunization Schedule. Compliance levels were higher with parents with high level of education and those who visited health facilities regularly. They also observed that those families who were well up were able to ensure their children were fully immunized. The recommendation was that there is need to invest in social demographic aspects in order to improve sustainable health services.

Samra, et al. (2015) conducted a study in Bangladesh to evaluate the impact of occupation on utilization of immunization services and found that educated mothers knew the importance of immunization but due to pressure of work they were less likely to take their children for timely immunization as compared to unemployed
parents/care givers. This shows a gap on adherence with the National child immunization schedule. Samra, et al. (2015) points out that females get married at an early age hence are not able to ensure full immunization for their children unlike elderly females. This is a gap in the service that is likely to affect herd immunity. In addition, first born children are valued a lot and are given priority in Bangladesh. They recommended that the government invest in education, for knowledge acquired will enable them understand the importance of immunization thus improving vaccination status in the country.

Abdi, et al. (2014) carried out studies in Ethiopia to assess levels of utilization of immunization services among children aged 12-24 months and the factors that influenced it. The survey revealed ever vaccinated 74.6% and fully immunized 36.6% indicating low utilization of services. The factors identified to influence utilization were low and no educational background, home visits by health workers, age of the caregiver, place of delivery and residential area. They recommended that in order to increase utilization of immunization services, parents should be encouraged to seek delivery services from health facilities for it is here that they get proper information on vaccination schedules thus reducing the incidents of missed opportunities, delivery in the health facility should be promoted, outreach services by health workers should be strengthened and greater utilization of health services by mothers be encouraged.

Rammohan (2012) points out that, even if a mother has low or no education and the father is educated up to secondary school level, the child will get all vaccinations as required because he has understanding of the benefits of immunization. The study
therefore recommended support for male education for them to acquire knowledge on children development and benefits of utilizing health facilities.

Mutua, et al. (2011) noted that a fully immunized child aged between 12-24 months resident in informal settlements of Nairobi was influenced by household assets and expenditure, place of delivery, ethnicity, educational level and age. The study concluded that children resident in the slums were not routinely vaccinated and called for a way forward to ensure all children access vaccinations. The study recommended that programs involving parents of low income be established. These programs should prioritize health education and immunization campaigns at the community level to help improve utilization of immunization services. Wide spread awareness on hospital delivery to be created among the slum dwellers as this is associated with higher likelihood of utilizing immunization services especially for vaccinations administered at birth.

2.4 Health Service Factors Influencing Utilization of Immunization Services Among Children Aged Under Five

Favina, et al. (2012) noted that stock out of vaccines lead to missed opportunities for parents/caregivers were unlikely to go back for subsequent vaccinations. This is because some parents have missed work, have postponed key priorities, and have travelled long distances. This is one reason that compromises adherence to the National immunization schedule, long waiting hours without being served forces some mothers not to return their children for the successive vaccinations.

Lilian, et al. (2013) found that hospital delivery was significant in full utilization of immunization services as the parents/caregivers had a chance of acquiring
knowledge through health education given on the benefits of immunization while in hospital. This concurred with Rutachinzibwa (2010) in a study that demonstrated that hospital deliveries influenced high utilization of immunization services than home deliveries. These findings are similar to Ghei, *et al.* 2010 in their study in India where mothers/caretakers in proximity to health facility (less than one kilometer) stood a chance of 2.11 times to get their children fully immunized than those who could not access health facilities due to long distance.

Lilian, *et al.* (2013) observed that mothers/caretakers who were given a return date for subsequent vaccinations and growth monitoring by health workers stood a high chance of their children receive all vaccinations.

Lilian, *et al.* (2013) pointed that the level of uptake of immunization services was dependent on mothers/givers given a return date for subsequent vaccinations, availability of immunization card, affordability of services, and availability of vaccines and avoidance of frequent change of residence. The study recommended the need to reinforce information, education and communication skills of the staff providing services for provision of quality care, intensify surveillance both active and passive, accelerated defaulter tracing in order to reduce dropouts of immunization.

Abdul (2010) carried out a study to find out the reasons why young children do not complete immunization schedule in Bangladesh. The reasons given were shortage of vaccines, lack of information on rescheduled vaccination days, lack of knowledge on
importance of immunization and costing of services. The conclusion was that lack of information on rescheduled vaccination days lead mothers/caregivers to be turned away upon visiting the health facilities to come for vaccination on a particular day. This was cited as one reason for dropouts.

Etana and Deresa (2012) carried out a study on children aged 12-24 months to identify risk factors linked to uptake of immunization in central Ethiopia. Results demonstrated low immunization coverage, fully vaccinated 34.5% and unvaccinated 23.7%. The main reasons were lack of knowledge on immunization and lack of information on return dates for subsequent vaccinations. They recommended interventions at the community level through intensified health education on the benefits of immunization and need to seek skilled antenatal care and deliveries.

Gianluca, et al. (2015) noted that factors that lead to failure to complete all the vaccinations according to National child immunization schedule guidelines was low utilization of antenatal clinics, low perception on immunization, many children in the family, inaccessible health facilities, inadequate knowledge on immunization and retention of child health card in the health facility. The study concluded that some children were partially immunized and some did not get timely vaccinations according to their target age thus showing a gap in utilization that necessitates intervention. It was then suggested that to improve utilization of immunization services, health education on antenatal clinic attendance should be emphasized for it’s during the clinic visits that mothers are taught the importance of immunization services.
2.5 Family Factors Associated with Utilization of Immunization Services Among Children Aged Under Five

Robert, *et al.* (2010) in Pakistan, noted that certain anti-vaccine proponents had formed anti-vaccine movements visible in social media websites such as twitters and face book. The vaccine opponents’ purported vaccine related adverse effects, infections and even death. Roberts, *et al.* (2010) further pointed out that vaccinations were linked to deliberating diseases such as autism by some people even without scientific basis. They claimed that multiple vaccines could overload immune systems and even cause allergy.

The study revealed that some people believed that governments and scientists were holding key evidence of actual harms caused by vaccines and according to them these could be schemes by large pharmaceutical companies to enrich themselves. Some people claimed that vaccines contained harmful additives and argued that occasional resurfacing of certain diseases and endemics for example measles and pertussis is a “time testimony” that vaccination does not work. The study recommended continues campaigns on the importance of vaccination and same time create right attitude towards vaccinations.

Gupta, *et al.* (2015) carried out studies to determine factors connected with utilization of immunization services in India in order to strategize interventions to improve uptake of all antigens. They carried out a cross-sectional study among 198 under five children. The results revealed low utilization of immunization services below the recommended target by WHO of 85%. Some children were partially immunized and others not immunized. The study recommended that there was need
to push immunization coverage to 100% in order to minimize deaths related to vaccine preventable diseases through health. Education.

Charles, et al (2010) noted that despite the benefits of immunization, there are persons who for no reason will not accept immunization for their children or relatives. Women who frequent health facilities stand a higher chance to get their children immunized. Charles, et al. (2010) confirmed that in Sub-Saharan Africa low vaccine uptake may be associated with lack of access to proper information leading to low community knowledge on immunization.

Hussein and Alemayehu (2013) carried out an evaluation review on immunization services and the related logistics in Oromia Regional State, Eastern Ethiopia. The study revealed that among under five children, 24.2% were not immunized, 22.9% fully immunized and 52.9% partially immunized. They observed that most parents/guardians were unaware of benefits of immunization and so they never returned their children to the health facilities for subsequent vaccinations. In their conclusion, inaccessible availability of services, false contraindications, myths and misconceptions were key determinants to low utilization of services.

They recommended that health workers be available in the health facility whenever the mother takes the child for immunization for their absence would mean missed opportunities that leads to drop outs. During these contacts the health workers should give health education on benefits of immunization and this understanding will help minimize defaulters thus raising coverage.
2.6 Gaps in Immunization

Empirical literature in different regions have reviewed findings of immunization uptake but have not addressed whether fully immunized children were in compliance with the national child immunization schedule hence creating a research gap in. The study findings have not provided evidence based information on the impacts of factors associated with utilization of immunization.

The studies have not mentioned utilization of the newly introduced vaccines which have played a key role in reducing morbidities related to vaccine preventable diseases among under five children and these include; pneumococcal vaccines, measles rubella and rotavirus vaccines.

None of the studies has ascertained whether the vaccines were maintained in a cold chain to ensure potency.
CHAPTER THREE: MATERIALS AND METHODS

3.1 Introduction
This chapter has highlighted methodological details appropriate to the study.

3.2 Research Design
The scientific design adopted was descriptive cross sectional study and it was chosen because it is a one time study that provides a snapshot of health related characteristics of variables in a population at that particular time, such characteristics are immunization status, disease frequencies, numbers, distributions, with characteristics of affected people.

3.3 Variables
For the purpose of the study the dependent variable were the utilization of immunization services. The independent variables included social demographic, health service and family factors.

3.4 Location of the Study
Kirinyaga County borders Embu County to the East and south, Murang’a County to the West and Nyeri to the North West. Administratively, the County has 5 sub counties: Kirinyaga East, Kirinyaga West, Kirinyaga central, Kirinyaga North and Kirinyaga south. The County has a total population of 590,635. It covers an area of 1,479 km², most of which lies on the southern slope of Mount Kenya, while the southern part (Mwea), are plains that are part of the Tana River basin.

The County lies on the windward side of Mount Kenya and receives adequate rainfall. The main economic activities in Kirinyaga County are agricultural based and include rice farming, small scale tea farming, coffee farming and horticulture.
The population growth rate is projected at 1.6% (CHIS, 2014). In Kirinyaga county health service delivery is offered from level 1 to level 4 hospitals. In total it has 238 health care facilities inclusive of public health facilities, faith based institutions and private health facilities. On average the population can access a health facility within a radius of about 5km. It is worth noting that communicable diseases, non-communicable diseases and violence / injuries are contributing to the high disease burden in the county.

3.5 Study Population.
Children aged under five years in Kirinyaga County

3.6 Inclusion and exclusion criteria

3.6.1 Inclusion Criteria
Children under five years who have lived for at least five years in Kirinyaga County who consented to participate in the study

3.6.2 Exclusion Criteria
Children under five years living in Kirinyaga County who were not in households at the time of study.

3.7 Sample Size Determination
Total under five populations in the County is 64851. A sample size of 422 respondents was used. This was determined by using, Fisher et al 1998 formula for a population greater than 10,000 as follows

\[ n = \frac{z^2pq}{d^2} \]

where \( n \) = sample size
\( p \) = estimated proportion with particulars at 50% or 0.5
q= accurate level at 0.5

d= level of precision at 0.05

z= confidence level at +/- 1.96

n= 1.96²*0.5* 0.5/ 0.05²

= 0.9604/0.0025

= 384

For non-responses 10% of 384 = 422.

To cater for attrition, 10% of the total sample was added (38) to cater for the participants who were likely to decline or drop out of study thus affecting analysis and create bias.

3.8 Sampling techniques

The study adopted a systematic random sampling. Total households in each sub-county (N) were divided by households with under five in each sub county (n) to get the sampling interval of 9. To get the participating households systematic sampling of every 9th household that met the criteria of having children under five were visited until the required sample size was attained in each sub-county. Simple random sampling started with tossing a coin to direct on start direction. The kth skip was determined by :-

\[
\frac{N}{n} = \frac{\text{Total households in each sub county}}{9} = 9.
\]

Households with children under five
Table 3.1: Population description of children aged under five in the County-64851

<table>
<thead>
<tr>
<th>Sub-county</th>
<th>Sub-county households</th>
<th>Households with children under five.</th>
<th>Population of children under five years</th>
<th>Sampling Interval</th>
<th>Sample Size</th>
<th>County Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kirinyaga East</td>
<td>43430</td>
<td>4828</td>
<td>15995</td>
<td>9</td>
<td>105</td>
<td>25%</td>
</tr>
<tr>
<td>Kirinyaga West</td>
<td>33006</td>
<td>3667</td>
<td>12222</td>
<td>9</td>
<td>80</td>
<td>19%</td>
</tr>
<tr>
<td>Kirinyaga Central</td>
<td>36480</td>
<td>4053</td>
<td>13921</td>
<td>9</td>
<td>89</td>
<td>21%</td>
</tr>
<tr>
<td>Kirinyaga North</td>
<td>29532</td>
<td>3281</td>
<td>10717</td>
<td>9</td>
<td>72</td>
<td>17%</td>
</tr>
<tr>
<td>Kirinyaga South</td>
<td>31268</td>
<td>3474</td>
<td>11996</td>
<td>9</td>
<td>76</td>
<td>18%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>173716</td>
<td>173716</td>
<td>64581</td>
<td>422</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
3.9 **Research Instruments**

Data was collected with the help of structured and semi-structured questionnaires from respondents. Assessment of social demographic, health service and family factors was done. The child health record card was assessed for immunization data record.

3.10 **Pre-Testing of research instruments**

This ensured reliability of research methods and was conducted in the neighboring Embu West Sub-County by the principal investigator and the 5 research assistants. Research assistants were trained for 2 days and each administered 5 tools. This was done to ensure reliability of research instruments.

3.11 **Validity**

To ensure that the findings measure what is to be measured, research assistants were trained for 2 days. Scientific research methods were applied to design the data collection tools as well as the selection of the samples. This included using critically assessed instruments and following scientific sampling techniques to minimize information bias. By selecting children aged under five, it ensured unbiased information as they are supposed to have completed all immunizations. Selecting respondents with children above this age would lead to giving incorrect data.

3.12 **Reliability**

The instrument was reliable as it produced the same results every time it was repeatedly used to measure a concept or trait from the same respondents even by other researchers. Pretesting of research instruments was done to evaluate for reliability.
3.13 Data collections Techniques

The questionnaires were administered to respondents who could read and write to fill in and assistance provided to those who could not read and write by interpreting the questionnaires. Assessment of social demographic, health service and family factors was done. The child health record card was assessed for immunization data recording and verbal recall from respondents who did not have record booklets was also considered as valid information. The exercise took a period of 25 days.

3.14 Data management and Analysis

The raw data collected was edited, cleaned, sorted, coded and analyzed using statistical package for social scientists (SPSS) version 20. Descriptive data was presented using frequencies, percentages, means and standard deviation. The analyzed data was presented using tables, pie charts and frequency diagrams. Inferential statistics was carried out to determine the association between the dependent and independent variables using Pearson chi-square. The null hypothesis of chi square test is that no relationship exists on the categorical variables in the population, they are independent.

3.15 Logistical and Ethical Considerations

Approval was sought from Kenyatta University Graduate School, Kenyatta University Ethical review committee, National commission for science, technology and innovation (NACOSTI).

Permissions were granted by County director of health, County secretary board, County commissioner and County director of education Kirinyaga County. Informed consent was sought from parents/ caregivers. The research ensured that confidentiality, dignity, respect and participants rights were respected. As such,
participation was voluntary with participant’s respondents having a right to withdraw their participation at any stage of the study; therefore, the rights of service of participants were not compromised. Permission for community entry was granted by the administration who are gate-keepers of the community: Feedback of the study findings was communicated to the community through organized forums for shared benefits.
CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter contains the results and presentations of the study findings. This study sought to assess immunization services for children 0 to 59 months in Kirinyaga County. This study was pegged on four specific objectives; to assess the level of utilization of immunization services among under five; to establish the socio-demographic factors associated with utilization of immunization services among under five; to determine health service factors influencing utilization of immunization services among under five; and to assess family factors associated with utilization of immunization services among under five in Kirinyaga County.

The participants in the study were issued with questionnaires to obtain data to be analyzed in this study. Descriptive studies including percentiles and frequencies were used. Data analysis was conducted using SPSS version and the findings presented using frequency tables, percentiles, pie charts and bar graphs. Chi-square test of independence was done for the inferential statistics. Of the 422 target participants, only 388 managed to participate in the study and the questionnaires returned on time. This represented a total response rate of 100% (Table 4.1).
4.2 Demographic Information of the Respondents

4.2.1 Socio-Demographic Information of the Respondents

The study participants were requested to provide their background information as well as their demographic details in the questionnaires. The demographic characteristics targeted by the study included the respondent’s gender, age, marital status, highest educational level, occupation, religion and income and this information is shown in (Table 4.1)

Table 4.1: Demographic characteristics of the Respondents

<table>
<thead>
<tr>
<th>Demographics characteristics</th>
<th>n = 388</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-responses</td>
<td>36</td>
<td>9</td>
</tr>
<tr>
<td>Male</td>
<td>44</td>
<td>11</td>
</tr>
<tr>
<td>Female</td>
<td>308</td>
<td>79</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 – 20 years</td>
<td>81</td>
<td>21.</td>
</tr>
<tr>
<td>20 – 30 years</td>
<td>174</td>
<td>45</td>
</tr>
<tr>
<td>30 – 40 years</td>
<td>82</td>
<td>21</td>
</tr>
<tr>
<td>Over 40 years</td>
<td>51</td>
<td>13</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>74</td>
<td>19</td>
</tr>
<tr>
<td>Self – employed</td>
<td>146</td>
<td>38</td>
</tr>
<tr>
<td>Not – employed</td>
<td>160</td>
<td>41</td>
</tr>
<tr>
<td>Others student*</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Income level (Kshs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 2000</td>
<td>171</td>
<td>44</td>
</tr>
<tr>
<td>2001 – 4000</td>
<td>70</td>
<td>18</td>
</tr>
<tr>
<td>4001 – 6000</td>
<td>99</td>
<td>26</td>
</tr>
<tr>
<td>6001 – 8000</td>
<td>45</td>
<td>12</td>
</tr>
<tr>
<td>8001 – 10,000</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non- responses</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>Widows and widowers</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Single</td>
<td>169</td>
<td>44</td>
</tr>
<tr>
<td>Married</td>
<td>182</td>
<td>47</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>361</td>
<td>93</td>
</tr>
<tr>
<td>Muslim</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>Primary</td>
<td>161</td>
<td>42</td>
</tr>
<tr>
<td>Secondary</td>
<td>169</td>
<td>44</td>
</tr>
<tr>
<td>College</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>University</td>
<td>12</td>
<td>3</td>
</tr>
</tbody>
</table>
4.3 Utilization of Immunization Services Among Children Aged Under Five

The objective of the study was to determine the level of utilization of immunization services among under five in Kirinyaga County. To achieve this, the researcher utilized the child health immunization record card and recall to ensure accuracy of data collected. Table 4.2 shows the utilization of immunization services in Kirinyaga County.

It shows children who received immunizations at birth - Bacillus calmette Guerin and birth polio, immunizations given at 6, 10 and 14 weeks which are multiple vaccine (pentavalent, pneumococcal, polio and rotavirus vaccines) and immunizations given to children at 9 and 18-59 months (measles 1 and measles 2 vaccines). (Table 4.2)

Table 4.2: Utilization of Immunization Services in Kirinyaga County among children aged under five

<table>
<thead>
<tr>
<th></th>
<th>Immunized on time (n)</th>
<th>Immunized late (n)</th>
<th>Total Immunized (n)</th>
<th>Not immunized (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>At Birth</td>
<td>338 87</td>
<td>16 4</td>
<td>354 91</td>
<td>34 9</td>
</tr>
<tr>
<td>At 6 weeks</td>
<td>336 87</td>
<td>18 4</td>
<td>354 91</td>
<td>35 9</td>
</tr>
<tr>
<td>At 10 weeks</td>
<td>329 85</td>
<td>21 5</td>
<td>350 90</td>
<td>39 10</td>
</tr>
<tr>
<td>At 14 weeks</td>
<td>315 81</td>
<td>3 1</td>
<td>318 82</td>
<td>70 18</td>
</tr>
<tr>
<td>At 9 months</td>
<td>296 76</td>
<td>15 4</td>
<td>311 80</td>
<td>77 20</td>
</tr>
<tr>
<td>At 18- 59 months</td>
<td>195 50</td>
<td>31 8</td>
<td>226 58</td>
<td>162 42</td>
</tr>
</tbody>
</table>
4.4 Social-Demographic Factors Associated with Utilisation Of Immunisation Services.

4.4.1. Effects of Religion on Utilization of Immunization Services

The researcher deemed important that the respondents indicate their religion and whether religion in anyway affected their utilization of immunization services.

The majority of the respondents, (97%) were Christians and out of them 3% were members of a religion called kabonokia while 3% were Muslims. This implies that majority of the residents of Kirinyaga County are Christians with only a few Muslims. The respondents were then asked to indicate whether their religion affects their utilization of immunization services. The figure below indicates the results.

The pie chart below shows that majority of the respondents (97%) said that religion did not affect their utilization of immunization services while the remaining 3% indicated that their religion does not allow them to utilize any medical services. When asked to indicate why they do not believe in utilizing immunization services, these respondents (kabonokia religion) stated that Jehovah heals and that is why their religion bars them from utilizing health facilities for immunization and any other medical problem.

(Figure 4.1)
Figure 4.1: Effect of Religion on Utilization of Immunization Services.

4.4.2 Effects of Income on Utilization of Immunization Service

Majority of the respondents, (67.0%) indicated that their income level affects their decision to take their children for timely immunization, 32.2% were not affected and non-response 0.8%. This implies that income plays a major role in influencing the decision by parents to utilize immunization services. (Figure 4.2).

(Figure 4.2)

Figure 4.2: Effect of income on utilization of immunization services

The chi-square test of independence tested the hypotheses that there is no statistical difference between Utilization of immunization services and social demographic factors. A confidence interval of 95% was adopted which implied that the significant threshold was set at 0.05. Any p-value found to be less than the threshold was, therefore, subject to rejection of the hypothesis.

Various socio-demographic factors were subjected to a chi-square analysis test to determine whether they significantly affected the decision by respondents to utilize immunization services. These factors were gender, age, educational level, occupation, religion and income. The results displayed in the table below shows that
Gender ($X^2 = 68.093, p=0.001$), age ($X^2 = 212.920, p=0.002$), educational level ($X^2=423.442, p=0.001$), and income ($X^2=233.410, p=0.003$) were statistically significant. However, religion ($X^2=23.508, p=0.707$) was not statistically significant (Table 4.3)
Table 4.3: Social demographic factors associated with utilization of immunization services

<table>
<thead>
<tr>
<th>DEMOGRAPHIC CHARACTERISTICS VS IMMUNISATION SERVICES</th>
<th>n=388</th>
<th>%</th>
<th>Df</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-responses</td>
<td>36</td>
<td>9.3</td>
<td>2</td>
<td>$X^2=68.09, P=0.001$</td>
</tr>
<tr>
<td>Male</td>
<td>44</td>
<td>11.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>308</td>
<td>79.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 – 20 years</td>
<td>81</td>
<td>20.9</td>
<td>3</td>
<td>$X^2=212.9, P=0.003$</td>
</tr>
<tr>
<td>20 – 30 years</td>
<td>174</td>
<td>44.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 – 40 years</td>
<td>82</td>
<td>21.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 40 years</td>
<td>51</td>
<td>13.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>74</td>
<td>19.1</td>
<td>3</td>
<td>$X^2=233.41, P=0.001$</td>
</tr>
<tr>
<td>Self – employed</td>
<td>146</td>
<td>37.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not – employed</td>
<td>160</td>
<td>41.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others student*</td>
<td>8</td>
<td>2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income level (Kshs)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 2000</td>
<td>171</td>
<td>44.1</td>
<td>4</td>
<td>$X^2=233.41, P=0.002$</td>
</tr>
<tr>
<td>2001 – 4000</td>
<td>70</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4001 – 6000</td>
<td>99</td>
<td>25.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6001 - 8000</td>
<td>45</td>
<td>11.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8001 &gt; 10, 000</td>
<td>3</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>361</td>
<td>93</td>
<td>2</td>
<td>$X^2=23.51, P=0.707$</td>
</tr>
<tr>
<td>Muslim</td>
<td>19</td>
<td>4.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
<td>2.1</td>
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<td></td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>21</td>
<td>5.4</td>
<td>4</td>
<td>$X^2=423.44, P=0.001$</td>
</tr>
<tr>
<td>Primary</td>
<td>161</td>
<td>41.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>169</td>
<td>43.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>25</td>
<td>6.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>12</td>
<td>3.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.5 Health Service Factors Influencing Childhood Immunization

The objective of the study was to identify the influence of health service factors on childhood immunization in Kirinyaga County. The respondents were provided with a variety of statements on a Likert Scale where they were given five choices to select from where 1= Very Great Effect, 2= Great Effect, 3= Moderate Effect, 4= Low Effect and 5= No effect. Their responses are as displayed in (Table 4.4).

Table 4.4 shows majority of the respondents’ opinions on effects of health service factors. The mean average of 2.79 implies that the responses were skewed towards great effect.

7.2% (n=28) agreed that long waiting time had a very great effect on utilization of immunization services. Majority 46.1% (n=179) agreed that it had a great effect, 29.9% (n=116), moderate effect 4.6% (n= 18) and little effect 10.6% (n=41) indicating that it had no effect on their utilization of immunization services. The respondents also indicated that rescheduling of vaccines had a great effect (m=2.52) with 4.9 % ( n= 19) stating that it has a very great effect, 54.9% (n= 213) great effect, 29.9% ( n= 116) moderate effect, 0.8% (n= 3) little effect and the remaining 8.2% (n= 32) indicating that it had no effect at all. Return date was also found to have a great effect with (m=2.48) on utilization of childhood immunization where very great effect made up of (9.8%) (n= 38), great effect 47.9% (n= 186), moderate effect 29.9 %,( n= 116), little effect 1.8% (n= 7) and no effect was 7.7% (n= 30). However, Distance was found to moderate effect (m=3.52) with majority of the respondents 34.3% (n= 133) stating that it had a little effect while 8.8% (n= 34) indicated that it has a very great effect, 16.0% (n= 62) indicated that it has a great effect, 14.2% (n= 55) indicating that it has a moderate effect and the remaining
25.3% (n= 98) stating that it has no effect on their decision to utilize immunization services. It can therefore, be deduced that distance is not an important factor to influence utilization of immunization services in Kirinyaga County. (Table4.4)

**Table 4.4: Parameters of health Services factors on utilization of immunization services**

<table>
<thead>
<tr>
<th>Parameters of health Services factors</th>
<th>No. &amp;% n=388</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VGE</td>
<td>GE</td>
</tr>
<tr>
<td>Long waiting time</td>
<td>No.</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>28</td>
</tr>
<tr>
<td>Stock out of vaccines</td>
<td>No.</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>5.9</td>
</tr>
<tr>
<td>Rescheduling of vaccines</td>
<td>No.</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>4.9</td>
</tr>
<tr>
<td>Return date</td>
<td>No.</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>9.8</td>
</tr>
<tr>
<td>Distance to health facility</td>
<td>No.</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>8.8</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>7.32</td>
</tr>
</tbody>
</table>

**4.5.1 Health Service factors influencing utilization of immunization services**

Health Service factors were identified as some of the possible reasons for the decision by parents and guardians to utilize immunization services and a chi-Square analysis was done to show the association, the table below shows the findings.

The chi-square test of independence tested the hypotheses that there is no statistical difference between Utilization of immunization services and health Services factors.
A confidence interval of 95% was adopted which implied that the significant threshold was set at 0.05. Any p-value found to be less than the threshold was, therefore, subject to rejection of the hypothesis.

Table 4.5 displays the results from the chi-square test analysis on various health factors on utilization of immunization found to be significant. Long waiting time ($X^2 = 352.709, p=0.001$), Vaccines out of stock ($X^2 = 233.147, p=0.002$), Rescheduling of vaccines($X^2=206.86, p=0.001$), Return date($X^2 = 199.964, p=0.001<$), Distance to health facility($X^2 = 303.450, p=0.077$) was found not to be statistically significant. (Table 4.5)

**Table 4.5: Health service factors influencing childhood immunization**

<table>
<thead>
<tr>
<th></th>
<th>No. &amp;% N=388</th>
<th>Mean</th>
<th>Df</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VGE GE ME LE NE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long waiting time</td>
<td>7.2 179 116 18 41</td>
<td>2.65</td>
<td>2</td>
<td>$X^2=352.70, P==0.001$</td>
</tr>
<tr>
<td></td>
<td>28 46.1 29.9 4.6 10.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock out of vaccines</td>
<td>23 150 141 14 49</td>
<td>2.78</td>
<td>4</td>
<td>$X^2=233.14, P=0.002$</td>
</tr>
<tr>
<td></td>
<td>5.9 38.7 36.3 3.6 12.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rescheduling of vaccines</td>
<td>19 213 116 3 32</td>
<td>2.52</td>
<td>3</td>
<td>$X^2=206.86, P=0.001$</td>
</tr>
<tr>
<td></td>
<td>4.9 54.9 29.9 0.8 8.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return date</td>
<td>38 186 116 7 30</td>
<td>2.48</td>
<td>4</td>
<td>$X^2=199.96, P=0.001$</td>
</tr>
<tr>
<td></td>
<td>9.8 47.9 29.9 1.8 7.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to health facility</td>
<td>34 62 55 133 98</td>
<td>3.52</td>
<td>3</td>
<td>$X^2=303.45, P=0.077$</td>
</tr>
<tr>
<td></td>
<td>8.8 16 14.2 34.3 25.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>7.32 40.72 28.04 9.02 12.9</td>
<td>2.79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.6 Family Factors Associated with Childhood Immunization

The objective of the study was to identify the family factors associated with childhood immunization in Kirinyaga County. The respondents were given a range of parameters on a likert scale that employs questionnaires used in scaling responses in a research. It measures intensities of either positive or negative response where 1=Very great effect, 2=Great effect, 3=Moderate effect, 4=Low effect and 5=No effect. Table 4.6 displays the opinions of the respondents on the effects of family factors on utilization of childhood immunization.

An average means of 2.761 shows that most of the responses agreed that family parameters affected utilization of immunization services. This can be seen in the statement, ‘Rate the effect of myths and misconception on childhood immunization’ had a mean = 2.64, very great effect of 5.7% (n= 22), great effect of 29.6% (n= 115), moderate effect of 57.2% (n=222), little effect of 2.8% (n=11), no effect of1.8%(n=7). This is also evident in the statement, Rate the effect of lack of information on childhood immunization’ which had a mean of 2.18, very great effect of 5.9% (n=23) great effect of 67.0 % (n=260), moderate effect of 22.7% (n=88). This implies that the respondent’s believe that lack of information greatly impacts on childhood immunization. However, there were cases where the respondents’ opinions were skewed towards little effect as seen in the statement, ‘Birth order which had a mean=4.03 with majority of the respondents 49.5% (n=192) indicating that it has no effect, little effect of 18.3% (n=71), moderate effect of 17.3% (n=67), great effect of 6.7% (n=26) and very great effect of 5.7% (n=21). The results were not highly dispersed and appear that the respondent’s views on family factors were aligned in the same direction. (Table 4.6).
Table 4.6: Parameters of Family Factors on utilization of immunization services

<table>
<thead>
<tr>
<th>Statement</th>
<th>No. &amp; %</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=388</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VGE</td>
<td>GE</td>
</tr>
<tr>
<td>Myths and misconception.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>22</td>
<td>115</td>
</tr>
<tr>
<td>%</td>
<td>5.7</td>
<td>29.6</td>
</tr>
<tr>
<td>Side effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>10</td>
<td>160</td>
</tr>
<tr>
<td>%</td>
<td>2.6</td>
<td>41.2</td>
</tr>
<tr>
<td>Birth order</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>21</td>
<td>26</td>
</tr>
<tr>
<td>%</td>
<td>5.4</td>
<td>6.7</td>
</tr>
<tr>
<td>parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>38</td>
<td>82</td>
</tr>
<tr>
<td>%</td>
<td>9.3</td>
<td>21.1</td>
</tr>
<tr>
<td>Sick children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>20</td>
<td>228</td>
</tr>
<tr>
<td>%</td>
<td>5.2</td>
<td>58.8</td>
</tr>
<tr>
<td>lack of information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>1223</td>
<td>260</td>
</tr>
<tr>
<td>%</td>
<td>5.9</td>
<td>67.0</td>
</tr>
<tr>
<td>Average</td>
<td>5.014</td>
<td>38.84</td>
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</tr>
</tbody>
</table>

4.6.1 Family Factors associated with Utilization of Immunization Services

Family factors were identified as some of the possible reasons for the choice of utilization of childhood immunization and a chi-Square analysis was done to show the association.

The chi-square test of independence tested the hypotheses that there is no statistical difference between Utilization of immunization services and family factors. A
confidence interval of 95% was adopted which implied that the significant threshold was set at 0.05. Any p-value found to be less than the threshold was, therefore, subject to rejection of the hypothesis.

Family factors were subjected to a chi-square test to determine whether they were statistically associated with childhood immunization and according to the results, all the family factors except for birth order were found to be statistically significant with:

- Rate the effect of myths and misconception on childhood immunization ($X^2=211.73, p=0.002$),
- Rate the effect of side effects of childhood immunization ($X^2=220.179, p=0.001$),
- Rate the effect of parity on childhood immunization ($X^2=401.26, p=0.001$),
- Effect of sick children on childhood immunization ($X^2=235.996, p=0.001$),
- Rate the effect of lack of information on childhood immunization ($X^2=95.742, p=0.001$)

Birth order ($p=0.065>0.005$) was found not to be significant. (Table 4.7).
Table 4.7: Family factors associated with utilization of immunization services

<table>
<thead>
<tr>
<th>Statement</th>
<th>No. &amp; % n=388</th>
<th>Mean</th>
<th>Df</th>
<th>P-Value</th>
</tr>
</thead>
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<tr>
<td>Myths and misconception.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>22</td>
<td>5.7</td>
<td>3</td>
<td>2.64</td>
</tr>
<tr>
<td>%</td>
<td>115</td>
<td>29.6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>222</td>
<td>57.2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>2.8</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>1.8</td>
<td>3</td>
<td>(X^2=211.73, P=0.002)</td>
</tr>
<tr>
<td>Side effects</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>10</td>
<td>2.6</td>
<td>2</td>
<td>2.64</td>
</tr>
<tr>
<td>%</td>
<td>160</td>
<td>41.2</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>196</td>
<td>50.5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1.3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1.5</td>
<td>2</td>
<td>(X^2=220.7, P=0.001)</td>
</tr>
<tr>
<td>Birth order</td>
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<td></td>
</tr>
<tr>
<td>No.</td>
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<td>4.03</td>
</tr>
<tr>
<td>%</td>
<td>26</td>
<td>6.7</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>67</td>
<td>17.3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>71</td>
<td>18.3</td>
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</tr>
<tr>
<td></td>
<td>192</td>
<td>49.5</td>
<td>4</td>
<td>(X^2=216.2, P=0.065)</td>
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<td>Parity</td>
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<td>No.</td>
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<td>2</td>
<td>2.87</td>
</tr>
<tr>
<td>%</td>
<td>82</td>
<td>21.1</td>
<td>2</td>
<td></td>
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<tr>
<td></td>
<td>169</td>
<td>43.6</td>
<td>2</td>
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<td></td>
<td>61</td>
<td>15.7</td>
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<td></td>
</tr>
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<td></td>
<td>23</td>
<td>5.9</td>
<td>2</td>
<td>(X^2=401.26, P=0.001)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>20</td>
<td>5.2</td>
<td>3</td>
<td>2.29</td>
</tr>
<tr>
<td>%</td>
<td>228</td>
<td>58.8</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>118</td>
<td>30.4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1.3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>(X^2=235.99, P=0.001)</td>
</tr>
<tr>
<td>Lack of information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>23</td>
<td>5.9</td>
<td>2</td>
<td>2.18</td>
</tr>
<tr>
<td>%</td>
<td>260</td>
<td>67.0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>88</td>
<td>22.7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>(X^2=95.74, P=0.001)</td>
</tr>
<tr>
<td>Average</td>
<td>5.014</td>
<td>38.84</td>
<td>2.761</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
This chapter presents the study findings, inferences and recommendations drawn from the data collected and analyzed. The broad objective of the study was to assess the utilization of immunization services among children aged under five in Kirinyaga County. The response rate of the study was 100%, which was adequate to make inferences out of the targeted population.

5.2 Utilization of Immunization Services Among Children Aged Under Five.
The study findings revealed that utilization of immunization services cumulatively for under five years for measles 2 the last antigen in the schedule low at 58%, below the recommended target by WHO of 85%. Immunization uptake reveals high utilization of immunizations given at birth and at 6 weeks while utilization in subsequent visits showed a significant decline and at the same time showing ascending tread of zero cases (not immunized) and can be inferred that immunization was not accessible by all participants.

Non-compliance with the stipulated National Immunization Schedule was clearly demonstrated. Partial immunization was evident in that not all children started immunizations at birth completed all the immunizations recommended by WHO. Delaying or refusing some or all of the immunizations puts a child’s life and health at risk of contracting VPDs, for the immune system is more vulnerable without vaccinations. This goes a long way to explain the cases of morbidity and mortality rates as reported by (CHIS, 2014).
Zero vaccine doses (not immunized) were evidenced in all antigens. The findings are supported by Karanja and Kembich (2013) whose study in a Peri-urban area in Kenya revealed that utilization of first antigens was highly utilized followed by a declining trend in subsequent visits: BCG 99.8%, 1st Pentavalent 98.5%, 3rd Pentavalent 90.5% and measles 74%.

The study findings concur with Favina, et al. (2012) who noted that stock out of vaccines lead to missed opportunities and long waiting hours without being served forced mothers/ caregivers not to return their children for successive vaccinations leading to non-compliance with the immunization schedule and dropouts leading to partial immunization.

The outcome of the study on utilization levels has similar findings with an assessment study carried out by Hussein and Alemayehu (2013) on factors associated with utilization of immunization services and revealed that among children aged under five 52.9% were partially immunized, 22.9% fully immunized, and 24.2% not immunized.

This study found that majority of children had not received all vaccine doses recommended by WHO evidenced by the high utilization of the immunizations given at birth at 91%. This was then followed by significant decline that showed measles 2 the last antigen in the schedule at 58%. There was a drop rate of 33%. These findings concur with that of Canavan, et al. (2014) whose study on demographic and health survey data of some African countries revealed that majority of children had not received all vaccine doses recommended by WHO meaning that not all those children who were started on BCG completed schedules.
This study found gaps on immunization similar to those of Koskei, *et al.* (2014) who in his study on utilization of immunization found that immunization services was not accessed by all children demonstrating equity gaps despite efforts by the government to improve immunization services.

The study findings are supported by Gavi, (2010) where it is documented that 19.3 million children did not receive all the doses recommended by WHO and remained susceptible to vaccine preventable diseases.

The trend shows that majority of those children who started immunization did not complete the schedule and were partially immunized meaning that they were not fully protected from VPDs hence susceptible to contracting diseases. This study finding is also supported by Gupta *et al.* 2015 in a study in India which found out fully immunized 74%, partially immunized 14% and not immunized 11%. The immunization schedule was therefore not adhered to as stipulated by KEPI Standards and Guidelines and it’s important in ensuring maximum protection from VPDs (KEPI, 2013).

The study findings revealed noncompliance with the National Child Immunization Schedule and this was evidenced by high percentages of children immunized late and those not immunized in all antigens. This was caused by negative influences of socio-demographic, health service and family factors.

When the schedule is not followed the threshold protective levels are not constantly maintained allowing the microorganism to resurface and cause disease. Large proportion of children were not immunized and this is a dangerous trend because these children are not protected and if a child contracts a vaccine preventable disease
it can spread to people who are not immune causing morbidities and mortality in the community. This also reflects negatively on herd immunity.

Measles 2 uptake was at 58% which is below WHO standards which is set at 85%. The cause of the low utilization was due to the fact that measles 2 was introduced in 2013 to be given at 18 months and the parents/caregivers back in their mind knows that immunization ends at 9 months and the other reason is that health workers also forget to give them return dates. This is similar to a study carried out by Etana and Deresa (2012) in central Ethiopia who found measles coverage at 35.5% below WHO standards.

5.3 Socio-Demographic Factors Associated with Utilization of Immunization Services.

Majority of respondent utilizing immunization services were women, aged between 20 – 30 years, are of secondary level of education, are self-employed or not employed, are married or single and have an average monthly income of between 4000 – 6000. These observations are consistent with Abdi, et al. (2014), Sembuche, et al. (2010) who revealed that employment status and educational background influenced utilization of immunization services in an area. Those with higher education had adequate knowledge on importance of immunization and concurs with studies carried out by Mutua, et al. (2011), Onsuna, et al. (2015), Onyango, et al. (2012) whose findings revealed mixed relationship between, ethnicity, individual assets, expenditures, educational background, place of delivery, age of mother, number of children a mother had and utilization of immunization. The study also concurs with a study carried out by Lillian, et al. (2013) who observed that
utilization of immunization services highly depended on mother’s/caregivers level of education.

The findings of the study Concurs with Samia, et al. (2015) who carried out a study in Bangladesh to assess the impact of employment on utilization of immunization services and found that pressure of work and lack of time the employed parents/caregivers were not able to take their children for timely immunization services as compared to unemployed counterparts.

The study findings also concur with Ghei, et al. (2010) in India that respondents with high level of education were more likely to immunize their children than those who had low education. In this study, income levels were low hence affecting the respondents’ decision to utilize immunization services. The study findings were similar to a study carried out by Mutua, et al (2011) in Nairobi who recommended that programs activities targeting mothers of low economic status be established to help improve immunization services.

The study findings also concur with a study carried out by Samra, et al. in Bangladesh as regards age as a factor influencing immunization and found that, females marry early hence are less likely to immunize their children due to fear of unknown.

5.4 Health Service Factors Influencing Utilization of Immunization Services

The study established that health service factors greatly influenced childhood immunization in Kirinyaga county. This was indicated by the mean average of 2.79. The respondents’ opinion on all health service parameters influencing childhood immunization was skewed to great effect except for distance, This showed that these
factors influence the decision by respondents of Kirinyaga County to take their children for timely immunizations. Distance as a factor was not a hindrance to immunization because health care facilities are many and less than 7km apart.

The results showed that all health service factors except for distance had a negative statistical significant effect on the respondents’ choice to take their children for immunization services. These results imply that there was a statistical threshold that links health services factors to utilization of immunization services. These findings are supported by Abdi, et al. (2014) and Sembuche, et al. 2010 who found that inadequate health care providers, place of delivery, knowledge on importance of vaccination, inaccessible health facilities, and stock out of vaccines significantly affect the level of utilization of immunization services in a region. It can be deduced that health service factors have a significant effect on the respondent’s choice to utilize immunization services.

The findings of this study showed that stock out of vaccines affected utilization of childhood immunization negatively evidenced by delays for those children who were immunized late and those not immunized who failed to return to the health facility for missed immunizations. These observations concur with studies carried out by Favina, et al. (2012) and Lillian, et al. (2013) who found that stock out of vaccines hindered effective utilization of services for it leads to missed opportunities for parent/caregivers were unlikely to go back for subsequent vaccine doses. This is because some parents/caregivers have missed work, have postponed key priorities, and have travelled long distances. The same study concurs with study findings that long waiting hours significantly affected childhood immunization. These delays without being served forces some mothers not to return their children for subsequent
vaccinators. This leads to non-compliance with National Child Immunization Schedule, partial immunization and drop outs thus subjecting the children to infection with VPDs.

The study findings found that lack of information affected utilization of immunization services and concurs with a study carried out by Abdul, (2010) whose findings revealed that lack of information on rescheduling vaccination days due to shortage of vaccines or heavy workload, lack of knowledge on importance of immunization, costing of services, child sickness were reasons for incomplete immunization. The study findings found that distance was not a significant factor in utilization of immunization services. These findings differed with a study conducted by Abdi et al (2014) that revealed distance as a significant factor in the utilization of immunization services. The study found out that lack of information adversely affected utilization of immunization services and these findings are similar to a study done by Etana and Deresa (2012) which revealed that the reason for low immunization coverage was due to lack of information on return date for subsequent vaccinations.

The health service factors generally have contributed to inconsistence use of services leading to non-compliance with the National child immunization schedule, for instance children immunized late for BCG were (39.9%), partial immunization evidenced by BCG- measles dropout (33%), and not immunized (48.6%).
5.5 Family Factors Associated with Utilization of Immunization Services

Family factors were identified to play a major role on utilization of childhood immunization services where majority of the respondents agreed that all health service factors except for birth order impacted a lot on childhood immunization with their opinions skewed to great effect. This implies that family factors influenced the decision by respondents to take their children for timely immunization services. Results from inferential statistics conducted at 95% confidence interval showed a statistical significance (p=0.001<0.05) on family factors and utilization of immunization services. Individual chi-square results of family factors showed that all family factors except for birth order had a statistically significant negative effect on utilization of childhood immunization services.

A study carried out by Hussein and Alemayehu (2013) in Ethiopia supported the study findings that lack of information on the importance of immunization, most mothers never returned their children to the health facilities for subsequent vaccinations due to fear of side effects, and this is one of the reasons that leads to partial immunization among children. According to study findings, this is a cause contributing to non-compliance with the National immunization schedule a danger that may lead to contracting VPDs.

The study found out that side effects following administration of vaccines influences utilization of immunization services. The study findings are similar to a study done in India by Gupta et al (2015) which revealed that immunization coverage was low due to fear of side effects and recommended need to adopt strategies to improve services. This study found out that birth order did not influence the respondents’ choice to utilize immunization services and it differs from a study conducted by
Samra et al (2015) which revealed that first born children in Bangladesh are given priority. The study findings were also similar to a study carried out in Bangladesh by Abdi (2010) that children sickness was a significant factor in utilization of immunization services.

The study found out that myths and misconceptions affected utilization of immunization services. These findings are similar to a study conducted by Robert, et al. (2010) which showed myths and misconceptions as significant factors in immunization services. The study finding concur with a study carried out by Charles et al. (2010) that lack of access to information hindered utilization of immunization services.

The study findings found parity to influence utilization of immunization and concurred with findings of a study conducted by Onsuma, et al. (2015) which showed that the number of children a mother had influenced utilization of immunization services

5.6 Summary of The Findings

Immunizations at birth and at 6 weeks were highly utilized. The subsequent immunizations followed a declining trend. It was low compared to the National target. Socio-demographic factors were significant factors that affected immunization services. Health service factors and family factors were also established to be barriers to immunization. There is there for need for community health education on benefits of immunization to help improve the services.
5.7 Conclusion

I. The level of utilization of immunization services for performance antigens was 82% and 58% below the recommended target by WHO of 85% meaning it was not accessed by all children.

II. Social demographic factors that influenced utilization of immunization services positively were high level of education, while formal employment, income levels, and age groups influenced the services negatively.

III. The health service factors that influenced utilization of immunization services positively was distance to the health facility while long waiting time, stock out of vaccines rescheduling of vaccines, lack of information and return dates influenced the services negatively.

IV. The Family factors that influenced utilization of immunization services positively was birth order while myths and misconceptions, side effects, parity, sick children and lack of information influenced the services positively.
5.7 Recommendations

I. The CHMT to ensure health workers give health education to the community emphasizing on benefits of immunization and need to adhere and complete the National Child Immunization schedule, intensify door to door campaigns strategy to trace and vaccinate defaulters of immunization.

II. The National government to ensure policy on basic and post primary education for the community, The Ministry of culture and social services to boost respondents income levels by encouraging the community to start funded income generating activities that will empower them financially enabling them to seek timely immunization services.

The County health management team to make plans of opening the health facilities over the weekends to enable the employed access immunization services they are unable to during working days, and to provide efficient quality care to enable all age groups access services equitably.

III. The County government of health to employ adequate health workers to address the issue of long waiting time, the Ministry of health to purchase and stock all the health facilities with adequate vaccines to eliminate concerns about stock outs of vaccines that leads to rescheduling of vaccines and return dates.

IV. The CHMT to ensure health promotion officers engage not only with mothers, but also with community leaders to address family concerns such as lack of information, side effects, effects on parity, demystify myths and misconceptions and equip the public with proper information to help deal with these issues and probably increase compliance levels.
5.8 Further Research

To assess the status of cold chain maintenance to ascertain potency of vaccines in health facilities.
REFERENCES


Center for Disease Control, Under five Mortality, 2015.

County Health Information System (CHIS), (2014). Health Sector Strategic and Investment Plan, Kirinyaga County.


National policy guidelines on immunisation, KEPI 2013.


Ozcirpici, B., Neriman, A; Ferhat, C; Hakan, T. & Servet, O. (2014). Vaccination coverage of children aged 12-23 months in Gazientep, Turkey, comparative results of two studies carried out by lot quality technique: what changed after family medicine


Rutachunzibwa, T. (2010). Factors affecting implementation of under-five immunization activities in karagwe district, Tanzania


APPENDIX I.

QUESTIONNAIRE

INFORMED CONSENT

My name is Margaret Wangui Njeru. I am a Master student from Kenyatta University. I am conducting a study on Utilization of Immunization Services among children aged under five in Kirinyaga County, Kenya. The information will be used by the Ministry of Medical Services to improve access and quality of Immunization Services that will help control, eliminate and eradicate communicable diseases.

Explanation of the procedure to the respondent

Participation in this study will require that I ask you some questions in relation to the study and also scrutinize the mother child health booklet to assess on the immunization status of your child.

You have the right to refuse participation in this study. You will get the same care and information on importance of immunization services from us whether you agree to join the study or not and your decision will not deter us from providing you with information of immunization today in your home setup or that you will get from any other health worker at any other time.

You may refuse to respond to any questions and you may stop an interview at any time. You may also stop being in the study at any time without any consequence to the services you receive from this visit or any other visit now or in the future.
Discomforts and risks

Some of the questions you will be asked may be embarrassing or make you uncomfortable. If this happens, you may refuse to answer these questions if you choose. You may stop the interview at any time. The interview may take half an hour and then you resume your daily routine.

Benefits

If you participate in this study you will help us to understand the immunization status of your child. If any gap in the immunization schedule is identified, the child will be referred to a health center for immunization of that particular antigen and this will improve the health of the child and reduce the risk of contracting a communicable disease. Permission for community entry was sort from the administration who are the gate keepers of the community. Feedback of the study findings will be communicated to the community through organized forums.

Rewards

There will be no financial rewards but you will benefit from health information that will enable you safeguard your child’s health.

Confidentiality

The information you provide us will be kept strictly anonymous and confidential. Your name will not be recorded on the questionnaire. The questionnaire will be kept in a locked cabinet for safe keeping at Kenyatta University. Everything will be kept private.
Contact Information

If you have any questions you may contact Dr. Albert Gachau on 0720 600 460 or Dr. Priscilla Kabue on 0722 466 297 or the Kenyatta University Ethical Review Committee Secretariat on chairman.kuerc@ku.ac.ke, secretary.kuerc@ku.ac.ke, secretariat.kuerc@ku.ac.ke

Participant’s statement

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will get the same care and information on childhood immunization whether I decide to leave the study or not and my decision will not change the care and information that I will receive from the visit by health workers today or that I will get from any other health worker at any other time

Name of Participant......................................................................................................

Signature or Thumbprint

Date

Investigators statement
I, the undersigned, have explained to the volunteer in a language s/he understands, the procedures to be followed in the study and the risks and benefits involved.

Name of Interviewer.........................................................................................................................

Signature or Thumbprint Date

PART A: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Gender

Male

Female

What is your age range

10 - 20 yrs.

20 – 30 yrs.

30 – 40 yrs.
Over 40 yrs.  

Marital status

Married

Single

Window

Widower

Your highest professional qualification

None

Primary school level

Secondary school level
What is your occupation?

Employed

Self-Employee

Not Employed

Others specify

What is your religious belief?

Christian

Muslim

Others
Does in any way religion affect utilization of immunization services?

Yes

No

If the answer in question 7 above is yes, describe how it will affect immunization?

What is the level of your income?

0 – 2,000

2,001 – 4,000

4,001 – 6,000

6,001 – 8,000 monthly

8,001 – And over monthly

Does your income affect you taking your child for immunization?

Yes

No
### PART B: Table 1.2 - UTILIZATION OF IMMUNIZATION SERVICES

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### KEY
- Greater than
- TCA – To come again (return date)
- PCV10 – Pneumococcal vaccine
- D.O.B – Date of birth
- BOPV – Birth Oral Polio vaccine
- Wks – Weeks
- Mths - Months
PART C: HEALTH SERVICE FACTORS INFLUENCING CHILDHOOD IMMUNIZATION

To what extent do the following health service factors influence childhood immunization?

Use the five-point scale to respond to factors below where

1. Very great effect
2. Great effect
3. Moderate effect
4. Low effect
5. No effect.

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PART D: FAMILY FACTORS ASSOCIATED WITH CHILDHOOD IMMUNIZATION

To what extent do the following family factors relate to childhood immunization?

Use the five-point scale to respond to factors below where

1. Very great effect
2. Great effect
3. Moderate effect
4. Low effect
5. No effect.

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APPENDIX II.

APPROVAL FROM KENYATTA UNIVERSITY

KENYATTA UNIVERSITY GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke  
P.O. Box 43844, 00100

Website: www.ku.ac.ke  	NAIROBI, KENYA

Tel. 8710901 Ext. 57530

Our Ref: Q139/27683/2014  
DATE: 10th April, 2017

Director General,  
National Commission for Science, Technology & Innovation  
P.O. Box 30623-00100,

NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MARGARET WANGUI NJERU – REG. NO. 0139/27683/2014

I write to introduce Ms. Margaret Wangui Njeru who is a Postgraduate Student of this University. She is registered for M.P.H degree programme in the Department of Population and Reproductive Health.

Ms. Njeru intends to conduct research for an M.P.H. Proposal entitled, "Utilization of Immunization Services among Children Aged under Five in Kirinyaga County, Kenya".

Any assistance given will be highly appreciated.

Yours truly,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

08 MAY 2017
Kenyatta University
Ethics Review Committee
Moi Library 1st Floor, Office No. 25

Fax: 8711242/8711575
Email: chairman.kuerc@ku.ac.ke
secretary.kuerc@ku.ac.ke
secretariat.kuerc@ku.ac.ke

Website: www.ku.ac.ke

Our Ref: KU/ERC/APPROVALNOL.1 (78) Date: 28th July, 2017

Margaret Wangui Njeru
Kenyatta University P.O.
Box 43844 - 00100
NAIROBI
Dear Margaret

APPLICATION PKU/687/I762 "UTILIZATION OF IMMUNIZATION SERVICES AMONG CHILDREN AGED UNDER FIVE IN KIRINYAGA COUNTY, KENYA"

1. IDENTIFICATION OF PROTOCOL
The application before the committee is with a research topic "Utilization of Immunization Services Among Children Aged Under Five in Kirinyaga County, Kenya" received on 11th July 2017 and discussed on 28th July 2017.

2. APPLICANT
Margaret Wangui Njeru

3. SITE
Kirinyaga County, Kenya

4. DECISION
The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines AND APPROVED that the research may proceed for a period of ONE year from 28th July, 2017.

5. ADVICE/CONDITIONS
   i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.
   ii. Serious and unexpected adverse events related to the conduct of the study are reported to this committee immediately they occur.
   iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.
FROM:\n\nTO: Margaret Wangui Njeru
Clv Population and Reproductive Health Department

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of revised Research Proposal as per our recommendations raised by the Graduate School Road of 211 January, 2017 on titled "Utilization of Immunization Services among Children Aged under Five in Kirinyaga County, Kenya".

You may now proceed with your Data collection, subject to clearance with the Director Ethics Office, Kenyatta University and the Director General National Commission for Science, Technology, and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School

Thank you

Julia Gitu
FOR: DEAN, GRADUATE SCHOOL
CC. Chairman, Population and Reproductive Health

Department Supervisors:

1. Dr. Albel'1 l;ad1;m
   Clo Pathology Department
   Kenyatta University

2. Dr. Priscilla N. Kabue
   Clo Nursing Sciences 1
   Department
   Kenyatta University
APPENDIX III

NACOSTI

THIS IS TO CERTIFY THAT:
MS. MARGARET WANGUI WERU
of KENYATTA UNIVERSITY, 207-60100
Embu, has been permitted to conduct
research in Kirinyaga County

on the topic: UTILIZATION OF
IMMUNIZATION SERVICES AMONG
CHILDREN AGED UNDER FIVE IN
KIRINYAGA COUNTY, KENYA

for the period ending:
21st February, 2019

Permit No: NACOSTI/P/18/51518/21154
Date Of Issue: 21st February, 2018
Fee Received: Ksh 1000

______________________________
Applicant’s Signature

______________________________
Director General
National Commission for Science,
Technology & Innovation

Kalerwa
CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.

Serial No. A 17610

CONDITIONS: see back page
Margaret Wangui Njeru  
Kenyatta University  
P.O Box 43844-00100  
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Utilization of immunization services among children aged under five in Kirinyaga County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Kirinyaga County for the period ending 21st February, 2019.

You are advised to report to the County Commissioner and the County Director of Education, Kirinyaga County before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a copy of the final research report to the Commission within one year of completion. The soft copy of the same should be submitted through the Online Research Information System.

GPF Kalerwa  
GODFREY P. KALERWA MSc., MBA, MKIM  
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner  
Kirinyaga County.

The County Director of Education  
Kirinyaga County.
APPENDIX IV

APPROVAL FROM COUNTY DEPARTMENT OF HEALTH

KIRINYAGA COUNTY GOVERNMENT

COUNTY PUBLIC SERVICE BOARD

Telephone: 020-2054354
Email: kirinyagacounty2013@gmail.com
When replying please quote;

P.O.Box 260 - 10304 KUTUS

I0TH AUGUST 2017

Ref No: CGK/PSB/ADM/ATTACH/XVII/11

Student Coordinator

KIRINYAGA COUNTY

Dear Sir,

RE: RESEARCH AUTHORIZATION - MARGARET WANGUI NJERU

The above named person is a post graduate student at Kenyatta University. She is registered for M.P.H degree programme in the Department of Population and Reproductive Health. Her proposal is entitled "Utilization of Immunization Services among Children Aged under Five in Kirinyaga County, Kenya".

Please kindly accord her an opportunity to undertake research in Kirinyaga County. Students are allowed to undertake research with no pay and without charges.

KAMAU SECRETARY/CEO

PUBLIC SERVICE BOARD

Cc. Margaret Wangui Njeru

KIRINYAGA COUNTY GOVERNMENT
COUNTY DEPARTMENT OF HEALTH

Telegrams: "MEDICAL", KERUGOYA
Telephone: (060) 21 564, 21058
Fax (060) 21 564
E-mail: dmohkirinyaga@yahoo.com When replying please quote:

REF; CDH/RESNOL.11277

MARGARET WANGUI NJERU

RE; APPROVAL TO CONDUCT RESEARCH IN KIRINYAGA COUNTY – MARGARET WANGUI NJERU

We acknowledge the application for approval by the above named to conduct a research project titled "Utilization of Immunization Services among Children Aged under Five" in Kirinyaga County, Kenya.

This is a course project for M.P.H degree programme in the department of Population and Reproductive Health at Kenyatta University.

You are hereby granted approval to conduct this project in Kirinyaga County.

You are Expected to Submit the research findings to the County Department of Health with a final report being submitted before expiry of the approval period.

DR. ESBON GAKUO

COUNTY DIRETOR OF HEALTH

P.U. • Z4-10300.KERUGOYA

COUNTY DIRECTOR OF HEALTH KIRINYAGA
COUNTY
MINISTRY OF EDUCATION
STATE DEPARTMENT OF BASIC EDUCATION

Telephone: 060-21835/0202641217
Email kirinyaga@netai.com
When replying please quote
Ref. No. and date

REF.NO.MOE/CDE/KRG/GEN/09/85/191

16th March, 2018

Margaret Wangui Njeru
Kenyatta University
P O BOX 43844-01000
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on, "Utilization of immunization services among children aged under five in Kirinyaga County, Kenya."

I am pleased to inform you that you have been authorized to undertake research in Kirinyaga County for a period ending 21st February 2019.

MARGARET MWANGI
FOR: COUNTY DIRECTOR OF EDUCATION
KIRINYAGA

CC: COUNTY COMMISSIONER
KIRINYAGA

Vision: To have a globally competitive quality Education, Training and Research for Kenyans sustainable development.
THE PRESIDENCY
MINISTRY OF INTERIOR AND COORDINATION
OF NATIONAL GOVERNMENT

Telegram "COMMISSIONER" Kerugoya
Telephone. 21063 Kerugoya

COUNTY COMMISSIONER
KIRINYAGA COUNTY
P.O. BOX 1
KERUGUYA

ADM 1/23 VOL. II/9

15TH FEBRUARY 2018

Margaret Wangui Njeru
Kenyatta University
P.O. Box 43844-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

You have been authorized to conduct research on “Utilization of immunization services among children aged under five in Kirinyaga County” for a period ending 21st February 2019.

By a copy of this letter the Deputy County Commissioners, Kirinyaga County and County Director of Education are requested to accord you the necessary assistance.

LINET B. OBWOGE
FOR: COUNTY COMMISSIONER
KIRINYAGA COUNTY

C.C.

All Deputy County Commissioners
Kirinyaga County

County Director of Education
Kirinyaga County
APPENDIX V

LOCATION OF THE STUDY

Extracted from Oxford 360° atlas for secondary schools with counties approved by KIE 2011

Thank-you for your time and participation