

**IMMUNIZATION COVERAGE AMONG CHILDREN AGED BETWEEN 12-23
MONTHS IN WEST POKOT COUNTY, KENYA**

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DECLARATION

This project is my original work and has not been presented for the award of a degree in any other University.

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DEDICATION

I dedicate my work to the omnipotent God, my family my wife Carolyne, my son Emmanuel, and my daughter Darlene Joy for their love and support, which kept me going even when I was ready to give up. I owe a debt of gratitude to my supervisors, instructors, coworkers, and the school of applied human science and public health. Your assistance was invaluable.

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Without the help, direction, and tolerance of my supervisors, I would not have succeeded. My friends, my coworkers, and the libraries where I found materials. Thank you, parents, for all of your help and encouragement throughout my schooling. I'm most grateful to God for all the kind people who have made this possible.

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DEFINITION OF OPERATIONAL TERMS

Immunization	Is a process by which a person becomes immune to or resistant to an infectious illness usually by receiving a vaccination (WHO, 2019b).
Full Immunization	A toddler is considered to have received complete or full immunization if they have received the BCG vaccine to prevent tuberculosis (TB), three doses of the DPT vaccine to prevent diphtheria, pertussis, and tetanus (DPT), at least three doses of the polio vaccine, and one dose of the measles vaccine (Lober, 2021).
Partial Immunization	Refers to a toddler who missed receiving any of the vaccinations administered as part of the national immunization programmed by the age of one (WHO, 2019b).
Non-immunized child	was a child who had only had one polio vaccine or had not received any vaccinations up to the age of 12 months (WHO, 2019b).
Immunization Schedule	Depending on the country of residency, a sequence of vaccines, including the scheduling of each dosage, may be either recommended or required (WHO, 2019b).

Immunization Coverage It measures the proportion of the population that has received one or more vaccinations (WHO, 2019a)

Vaccine It is a substance used to encourage the development of antibodies and provide defence against one or more diseases. It is often derived from the disease's primary cause, its metabolites, or a synthetic substitute that has been altered to behave as an antigen without actually causing the disease (Oxford/Lexico, 2019).

ABBREVIATIONS AND ACRONYMS

BCG	Bacillus Chalmette-Guerin
DPT	Diphtheria-Pertussis-Tetanus
EPI	Expanded Programme for Immunization
GAVI	Global Alliance for Vaccines and Immunization
GOK	Government of Kenya
GVAP	Global Vaccine Action Plan
HepB	Hepatitis B
Hib	Haemophilus Influenza Type B
KDHS	Kenya Demographic and Health Survey
KEPI	Kenya Expanded Programme for Immunization
MOH	Ministry of Health
OPV	Oral Polio Vaccine
PCV	Pneumococcal Conjugate Vaccine
UNICEF	United Nations Children's Fund
WHO	World Health Organization

ABSTRACT

Immunization coverage and healthcare utilization among children aged 12-23 months significantly impact public health outcomes. However, in West Pokot County, Kenya, these indicators remain suboptimal, posing challenges to achieving optimal child health. The main aim of this research was to assess the vaccination rates among children in West Pokot County, Kenya, between the ages of 12 and 23 months. The objectives of the study were to (i) calculate the immunization coverage among children aged 12-23 months in West Pokot County, Kenya; (ii) analyze the factors influencing immunization coverage among the same demographic; and (iii) assess the effects of healthcare utilization on immunization coverage among children aged 12-23 months in West Pokot County, Kenya. A cross-sectional study design was employed, involving a sample of 393 children aged 12-23 months and their caregivers in West Pokot County, Kenya. Data was collected through structured interviews, questionnaire and focus group discussion. Descriptive and inferential statistical analyses were conducted to examine the relationships between various factors and immunization coverage, as well as healthcare utilization. The study revealed that West Pokot County, 62.4% of mothers or guardians partially vaccinated their children, while 36.6% completely immunized them, and only 1.1% did not vaccinate their children at all. This indicates that only a third of children in the county have received all recommended vaccinations, revealing a significant gap in achieving desired coverage. The study identified parental age as a key determinant, with older caregivers more likely to completely vaccinate their children. Furthermore, a negative correlation was found between the number of children in a household and vaccination coverage. Teachers and farmers were more likely to have their children completely vaccinated compared to those in other occupations, highlighting the impact of parental occupation on vaccination rates. Additionally, respondents who paid for vaccination services were more likely to fully immunize their children. Healthcare utilization significantly influenced vaccination coverage, as respondents who visited a healthcare facility during the previous year were more likely to completely immunize their children. Hence the study concludes that findings underscore the importance of addressing sociodemographic factors, such as parental age, occupation, and financial capability, to enhance vaccination coverage among children aged 12-23 months in West Pokot County. Encouraging regular healthcare visits and promoting healthcare-seeking behavior among parents and caregivers are crucial for improving vaccination rates. This study recommended Conduct regular immunization coverage surveys with local health facilities and community health workers for informed decision-making. Analyze factors influencing immunization coverage and develop targeted interventions. Assess healthcare utilization patterns among mothers and guardians and implement measures to enhance healthcare service delivery

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter captures information related and relevant to immunization coverage and healthcare utilization among children aged 12-23 months. This includes the background information of the study, problem statement, research questions, research objectives, justification and significance of the study, scope of the study and limitations of the study.

1.2 Background of the study

One of the health interventions that has been shown to be among the most financially feasible globally is immunization. Vaccination may effectively prevent or eliminate serious pediatric illnesses (UNICEF, 2021). To reduce newborn and child mortality, it is essential to immunize all children against the six prevalent vaccine-preventable illnesses TB, diphtheria, whooping cough (pertussis), tetanus, polio, and measles (Adetifa et al., 2018).

In Kenya, the Expanded Programme on Immunization (EPI) was launched in 1980 with the main aim of providing immunization against six killer diseases of childhood, namely tuberculosis, polio, diphtheria, whooping cough, tetanus and measles to all children in the country before their first birthday, and tetanus toxoid vaccination to all pregnant women. The programme was introduced into the infant immunization programme new vaccines notably; vaccines against hepatitis B virus and the hemophilus influenza type b bacteria in 2002, the ten valent pneumococcal conjugate vaccine in 2011 (GOK-MOH, 2023). This study focused on TB, diphtheria, whooping cough (pertussis), tetanus, polio, and measles vaccination as the indicators for vaccination coverage for children aged 12 – 23 months in West Pokot County due to resource and time constraints.

Developed nations often serve as models for effective healthcare systems, showcasing strategies that can be adapted and implemented in regions facing similar challenges. For example, in the United States, comprehensive healthcare infrastructure and robust vaccination programs (Roper et al., 2021) have significantly contributed to high immunization coverage among children. Research has indicated that despite socioeconomic disparities, the U.S. maintains a relatively high rate of immunization, supported by accessible healthcare services and effective public health campaigns.

Conversely, in many developing nations, including those in Africa, access to healthcare services and immunization coverage are often hindered by various socio-economic and infrastructural challenges (Seidu, 2020). West Pokot County in Kenya provides an illustrative case study. Despite efforts to improve healthcare infrastructure and immunization programs, the region continues to face significant disparities in healthcare utilization and immunization coverage among children aged 12-23 months. Limited access to healthcare facilities, inadequate education, and cultural beliefs contribute to lower vaccination rates in this region (Chelogoi et al., 2020), highlighting the urgent need for targeted interventions to address these challenges and improve healthcare outcomes for children.

Children are considered to have received all basic immunizations, per World Health Organization (WHO) recommendations that Kenya adopted, when they have received vaccinations against tuberculosis, also known as Bacillus Calmette-Guerin (BCG), three doses of pentavalent immunization, which includes diphtheria, pertussis, tetanus, hepatitis B (HepB), and Hemophilus influenza type B (Hib), and Measles vaccination should start at or shortly after age 9 months (GOK-MOH, 2021).

Vaccines have dramatically decreased vaccine-preventable illnesses and fatalities globally since the start of the extended programmed on immunization (EPI) in 1974. (Gavi Alliance, 2018). Without vaccinations, more than 5,000,000 children would perish each year and many more would get illnesses that may be prevented by vaccination (Galadima et al., 2021). By halting the transmission of illness and offering protection to individuals who have not received vaccinations, immunizations safeguard the whole community. In every community, the prevalence of immunization is a key determinant of child health outcomes. Improving vaccination coverage is essential to minimizing negative outcomes of childhood vaccine-preventable morbidities by ensuring that all children born in and out of the healthcare system get vaccinated. A road map was created by the World Health Organization (WHO) in 2012 as part of the Global Vaccine Action Plan (GVAP) to avoid millions of lives by ensuring equal access to vaccines. By 2020, the nations included in this strategy aim to reach vaccine coverage rates of at least 90% nationwide and 80% in each district. The GVAP objectives are not being met as of yet (Lober, 2021).

Kenya has a 70% countrywide immunization coverage, according to (MOH-GOK, 2019). This is far less than the worldwide goal of 90% by the year 2020. (Gavi Alliance, 2018). Additionally, there are stark geographical variations in vaccine coverage. The centre area has the highest immunization coverage at 90%, while the north-eastern region has the lowest coverage at 51%. West Pokot County had the lowest national coverage rate, at 31 percent (KDHS, 2014). This spatial differential in inclusion demonstrates the differences in the influence of vaccination factors in different regions of the country.

This study aims to explore the factors influencing immunization coverage and healthcare utilization among children aged 12-23 months in West Pokot County, Kenya, drawing

lessons from both developed and developing nations to inform effective public health strategies tailored to the specific needs of the region.

1.3 Problem Statement

According to WHO figures from 2017, the worldwide aim of 90% vaccination coverage by 2020 will not be reached. Routine immunization programmers, such as the three doses of the DPT vaccine, missed an estimated 19.9 million newborns globally (Chard et al., 2020). Trends in Kenya's immunization coverage is declining. (MOH-GOK, 2019) reports that basic immunization coverage dropped from 77% in 2008 to 70% in 2017. Low vaccination rates result in a rise in illnesses that may be prevented by vaccination, which raises the burden of disease and the mortality rate. The national basic immunization coverage rate of 70% (MOH-GOK, 2019) is far below than the worldwide goal of 90% by 2020. (Gavi Alliance, 2018). The coverage of immunizations varies dramatically by area. Significantly, the central area has the greatest vaccination coverage at 90%, whereas west Pokot County has the lowest reported vaccination rate at just 31%. (KDHS, 2014). In order to enhance vaccine coverage in west Pokot County as well as other Kenyan regions with poor vaccination coverage, it is crucial to identify the factors that contribute to low immunization inclusion among children between the ages of 12 and 23 months.

Despite the fact that there have been numerous studies on vaccination coverage, the majority have been conducted in other parts of East Africa and the nation, including Kirinyaga County in Ethiopia (Njeru et al., 2019), Bungoma County in Kenya (Kuloba, 2019), Nyarugenge District in Rwanda (Nwankwo & Orua, 2020), and remote regions of Ethiopia (Girmay & Dadi, 2019). West Pokot County has seen poor vaccination inclusion throughout the years, with fully immunized children having the lowest known vaccine

coverage of 31% in 2014. (KDHS, 2014). The subsequent low vaccination inclusion had an effect on the choice of West Pokot County as the testing location. There are few published research that have been conducted in the region to identify the factors that influence the low immunization inclusion. In order to bridge the knowledge gap that exists, this investigation was crucial.

1.4 Justification

Childhood immunization is recognized as one of the most effective and efficient public health measures for preventing transmissible illnesses (Girmay & Dadi, 2019). Since the inception of the Extended Programme on Immunization (EPI) in 1974, vaccines have significantly reduced the incidence and fatalities associated with vaccine-preventable diseases globally (Chard et al., 2020). This study is relevant because it addresses the critical role of immunization in safeguarding public health and aims to uncover the reasons behind low vaccination rates, which can inform future health policies and programs.

Despite these advances, immunization coverage remains suboptimal in many regions. The Gavi Alliance (2018) reported that the global vaccination coverage goal of 90% was not achieved, highlighting a persistent gap. In Kenya, the Kenya Demographic and Health Survey (KDHS) (2014) revealed a decline in basic immunization coverage from 77% in 2008 to 70% in 2017, far below the global target of 90% by 2020 (Gavi Alliance, 2018). Alarming, West Pokot County reported the lowest national vaccination coverage at merely 31% (KDHS, 2014). This study is relevant because it seeks to understand the underlying causes of this decline and address the specific challenges faced in West Pokot County.

This stark disparity underscores the need for research to identify the determinants of poor immunization coverage in West Pokot County. Understanding these factors is critical for developing targeted interventions to enhance immunization rates, not only in West Pokot but also in other Kenyan regions facing similar challenges. This study is relevant as it aims to bridge the knowledge gap and provide data-driven recommendations to improve immunization coverage.

The focus on children aged 12-23 months is particularly relevant as this age group represents the most recent cohort expected to have completed the recommended vaccination schedule (UNICEF, 2021). Investigating the immunization coverage and healthcare utilization in this cohort will provide timely and actionable insights to improve public health strategies and outcomes in Kenya. This study is relevant as it targets a critical age group that can significantly impact the overall health of the community.

Moreover, this study will contribute to the body of knowledge by evaluating healthcare infrastructure in West Pokot County. By assessing the healthcare infrastructure and service delivery, the study will highlight areas needing improvement, thereby assisting policymakers in making informed decisions to enhance healthcare accessibility and quality. This relevance is crucial for designing effective health interventions and improving service delivery.

Additionally, by examining the socioeconomic factors influencing immunization coverage, this study will identify barriers such as poverty, education, and cultural beliefs that hinder vaccination efforts. Understanding these factors is essential for designing comprehensive intervention programs that address these barriers effectively, thereby enhancing immunization coverage in underserved areas.

Furthermore, this study will promote community engagement by identifying the role of community awareness and participation in immunization practices. By providing insights into how community-driven initiatives can be strengthened to improve vaccination rates, this study emphasizes the relevance of fostering a community-centric approach to healthcare, which is vital for sustainable health improvements.

Overall, this study aims to provide a holistic understanding of the factors affecting immunization coverage in West Pokot County and propose actionable solutions to enhance vaccination rates. Ultimately, this research will contribute to better health outcomes for children in the region and beyond, supporting global health objectives and improving public health strategies in similar contexts.

1.5 Research Questions

The following research questions were used as a guide in the study:

- i. What percentage of West Pokot County children aged 12 to 23 have received all recommended vaccinations?
- ii. What aspects of West Pokot's vaccination rates affect children between the ages of 12 and 23 months?
- iii. What effect does the use of health services have on West Pokot County's 12- to 23-month-old children's vaccination rates?

1.6 Research Objectives

1.6.1 Broad Objective

The primary goal of this research was to assess immunization coverage among children aged between 12-23 months in west Pokot County, Kenya.

1.6.2 Specific Objectives

The study addresses the following specific objectives:

- i. To calculate the immunization coverage among children aged 12-23 months in West Pokot County, Kenya.
- ii. To analyze the factors influencing immunization coverage among children aged 12-23 months in West Pokot County, Kenya.
- iii. To assess the influence of healthcare utilization on immunization coverage among children aged 12-23 months in West Pokot County, Kenya.

1.7 Significance of the study

One of the least expensive and most beneficial medical interventions is immunization. It is a crucial tactic in the fight against major pediatric illnesses and a key factor in lowering baby and child death and disability rates. Policy makers, academics, and public health professionals will find this research to be interesting in this respect since it will help guide actions aimed at increasing vaccination coverage in West Pokot County and other low-vaccination areas of Kenya and the rest of the globe. The results will also shed light on the socio-demographic characteristics and patterns of health care consumption that may be changed to increase vaccination coverage. This would help to achieve the proposed Sustainable Development Goals (SDGs) aim of lowering infant mortality from the current rate of 39 deaths per 1000 live births to at least 12 deaths per 1000 live births by the year 2030. (KDHS, 2014).

1.8 Limitation and Delimitation

Financial resources were the biggest restriction. Money was requested from family members and from personal savings. Local translators received training on how to conduct interviews without guiding participants and how to prevent them from expressing their own thoughts in order to reduce prejudice. Because the research was conducted during the Covid 19 epidemic, there were access restrictions on the study population. Due to social distance and MOH guidelines that ban public meetings, conducting FGDs and KIIs was especially difficult (World Health Organization, 2021).

Randomly selected households with mothers or guardians of children aged 12 to 23 months were visited and questioned using structured questionnaires to gather information on maternal characteristics and vaccination history. Focused group discussions and key informant interviews were also done. The inclusion criteria for the participants required them to have lived in the research region for at least two years. Families without a suitable person to question at the time of the visit were not included.

1.9 Conceptual Framework

The conceptual framework for this study figure 1.1 illustrates the inter connectedness of various factors influencing immunization coverage and healthcare utilization among children aged 12-23 months in West Pokot County, Kenya. At the core of this framework is the dependent variable, "Immunization Status," which serves as the focal point of analysis.

The immunization status of children aged 12-23 months acts as the dependent variable in this research. It serves as the key outcome measure reflecting the extent to which children in West Pokot County receive necessary vaccinations.

In examining the factors affecting immunization coverage and healthcare utilization, several independent variables are considered:

The age, gender, and family size of the mother or guardian can significantly influence the immunization status of children. Younger mothers may face different barriers compared to older ones, and larger families may encounter challenges in accessing healthcare services.

The educational level and employment status of the mother or guardian play a crucial role in determining access to healthcare services. Higher education levels may correlate with a better understanding of the importance of immunization and the ability to navigate the healthcare system. Additionally, employment status affects the financial resources available for healthcare expenses.

The accessibility, price, and availability of healthcare services are fundamental factors in determining immunization coverage. Geographical accessibility of health facilities is critical, as proximity to healthcare services influences utilization. Moreover, the cost associated with immunization services can act as a barrier, particularly for families with lower socioeconomic status. The availability of vaccines and healthcare professionals in the health facilities is pivotal in ensuring timely immunization coverage.

The knowledge, attitude, and behaviors of the research participants serve as intervening variables that affect the relationship between the independent variables and the dependent

variable. These factors influence the utilization of prenatal care services, which subsequently impact immunization coverage.

Understanding the complex interplay between sociodemographic characteristics, socioeconomic factors, health facility variables, and the knowledge, attitude, and behaviors of participants provides a comprehensive view of the factors influencing immunization coverage and healthcare utilization among children aged 12-23 months in West Pokot County, Kenya. By analyzing these interactions, this study aims to provide insights that can inform targeted interventions to improve immunization coverage and healthcare access in the region.

1.10 Theoretical Framework

The Social Cognitive Theory (SCT) was proposed by Albert Bandura (1986) to predict how social and cognitive factors influenced health behavior (Luszczynska & Schwarzer, 2015). In principle, Bandura postulated that observations of the social norms had a significant impact on learning and that learning, ultimately, influenced the health behaviors that were practiced by individuals. The SCT is underscored by a three-dimensional relationship among cognitive, environmental, and supportive behavior factors. These three factors were postulated as determinants of health promotion and disease prevention (Martin & Guerrero, 2020), which makes the SCT as an appropriate theory to support the investigation of the relationship between individual characteristics, utilization of health services and the resulting immunization coverage among children aged between 12-23 months in West Pokot County.

The relationship between the personal cognitive factors, socioeconomic or environmental factors, and supportive behavior are referred to as reciprocal determinism, emphasizing the interplay between the components of the theory and the effect on health outcome (Martin & Guerrero, 2020). In relation to cognitive influences on behavior, the constructs of the SCT are self-efficacy (belief that one can perform a behavior that will lead to a particular outcome), outcome expectation (assessment of the consequences of an action), and knowledge (information about how to perform an action and the risks and benefits (Glasgow, 2019).

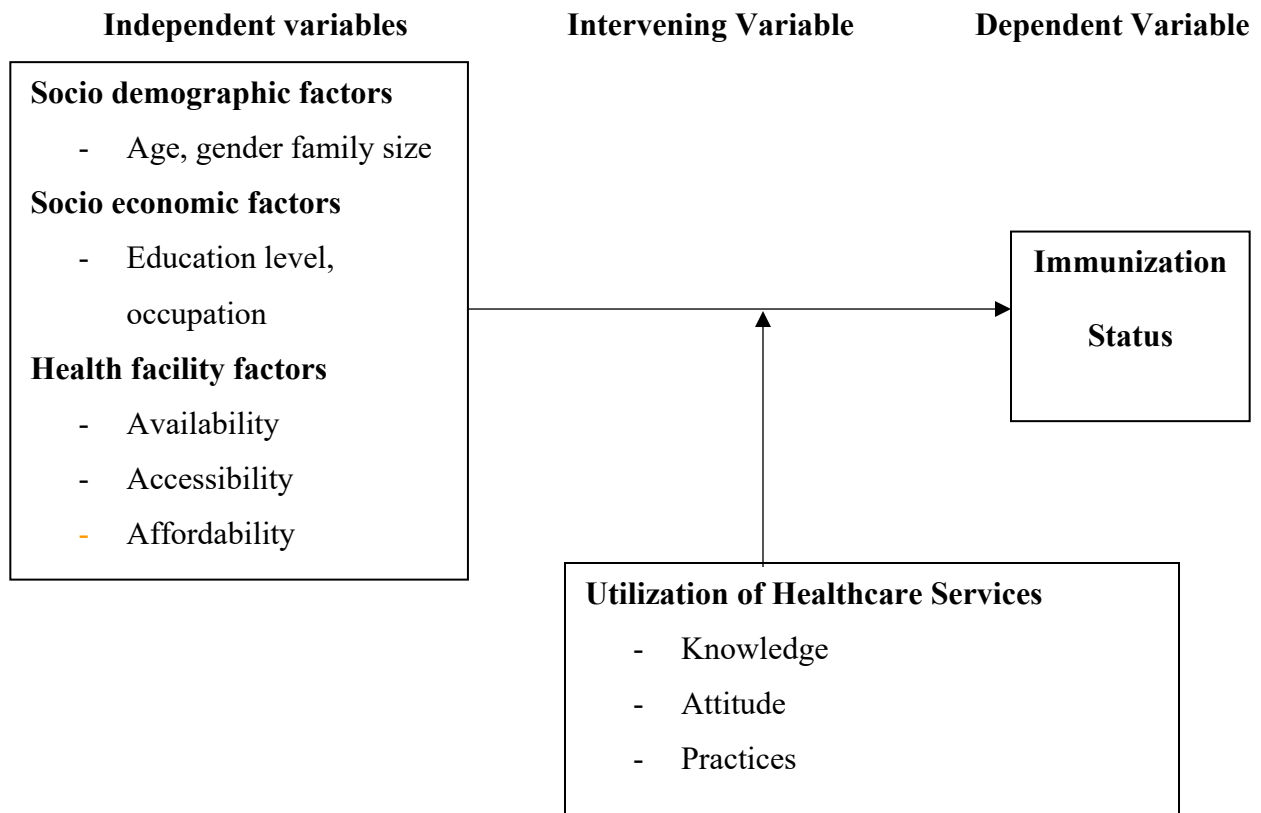


Figure 1. 1: Conceptual framework – Source, modified strategic framework for research on immunization in the WHO African region (WHO, 2018).

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Vaccination is one of the least expensive and most efficient types of medical intervention, claims the World Health Organization (World Health Organization, 2021). Vaccines have the potential to have far-reaching impacts that include; health care use, general health and wellbeing, cognitive development, and economic productivity, in contrast to most medications, the advantages of which are limited to the persons who take them. The more comprehensive success of vaccination is contingent to achieving a degree of inclusion sufficient to prevent the spread of the disease in addition to protecting the person (El-Elimat et al., 2021).

Immunization coverage among children aged 12-23 months is a critical public health concern globally. Despite efforts to improve vaccination rates, challenges persist, particularly in regions with limited access to healthcare services and resources. West Pokot County, Kenya, faces such challenges, with significant disparities in immunization coverage and healthcare utilization. This review aims to explore factors influencing immunization coverage and healthcare utilization among children aged 12-23 months, focusing on empirical evidence from both developed and developing countries, with real-world case studies to illustrate key points.

Socioeconomic factors play a crucial role in immunization coverage and healthcare utilization. In developed countries like the United States, research indicates that children from lower socioeconomic backgrounds are less likely to receive timely immunizations (Freeman et al., 2022). A study by Machado et al. (2021) found that children from families

with lower income and education levels were more likely to be under-immunized, leading to disparities in vaccination rates.

Access to healthcare services and the quality of healthcare infrastructure significantly impact immunization coverage. In developed nations like Australia, where healthcare access is relatively high, infrastructure challenges can still affect vaccination rates, particularly in remote areas (Arat et al., 2021). A study by Thomas et al. (2022) examined immunization coverage in rural and urban areas of Australia, revealing that despite the country's robust healthcare system, rural children had lower immunization rates due to limited access to healthcare facilities.

Despite advances in child vaccination coverage throughout the globe over the last ten years, an estimated 21.8 million babies remain uninitiated with basic immunizations. The majority of WHO areas attained more than 80% of their target populations in 2019 by administering three doses of the Diphtheria, Pertussis, and Tetanus (DPT) vaccine (Lober, 2021). Particularly in the African region at 75% and South-East Asia at 77 percent, coverage with such vaccinations fell well short of the 2020 aim of 90%. (Chard et al., 2020) assert that a variety of variables have a role in the success of achieving 100% vaccination coverage. They consist of traditional beliefs, limited income, inadequate access to healthcare services, and lack of parental knowledge.

According to WHO (2020), child survival has dramatically improved globally over the last several decades, with millions of children currently having a greater probability of living than they had in the 1990s. Compared to 1 in 11 in 1990, 1 in 26 children died before the age of five in 2017. Additionally, improvements in reducing child mortality have increased during the 1990s, with the annual rate of fall in the global under-five death rate going from

1.9 percent in 1990-2000 to 4.0 percent in 2000-2017. Even though child mortality rates have decreased significantly worldwide over the last several decades, an estimated 5.4 million children under the age of 5 died in 2017, with Sub-Saharan Africa accounting for around half of those deaths. Three of the top seven causes of infant mortality in children under the age of 59 months measles (3.2%), meningitis (3.5%), and pneumonia (21.5%) are preventable by vaccination. This means that in Sub-Saharan Africa, vaccine-preventable diseases are responsible for an estimated 38 percent of all infant deaths.

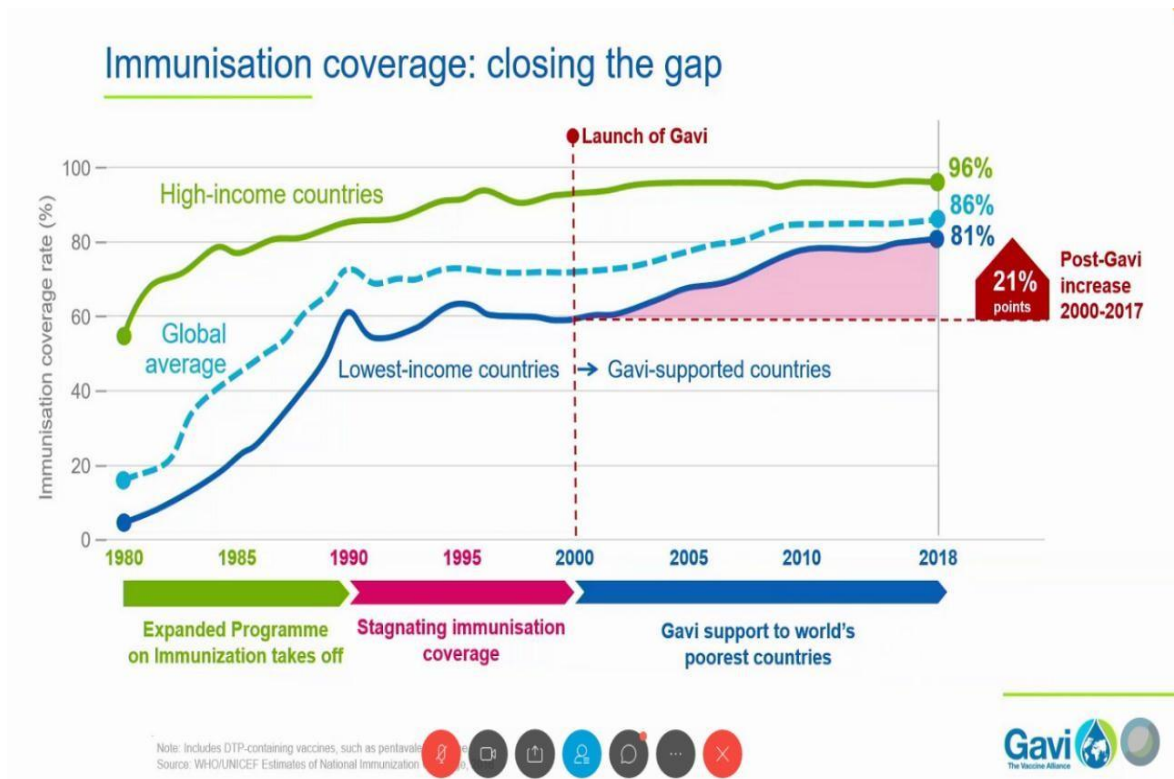


Figure 2.1: Immunization Coverage Closing the Gap 2018 (Gavi Alliance, 2018)

If present trends continue, over half of the nations that do not meet the SDG goal for newborn death by 2030 will do so only after 2050. If the problem isn't addressed, half of the 56 million children under the age of five who pass away between 2018 and 2030 will be infants. Reaching the SDG objective would require accelerating current progress, especially in Sub-Saharan Africa (Chard et al., 2020).

Despite attempts to increase vaccination rates worldwide, there are still many newborns who lack or have insufficient vaccinations. With global coverage remaining around 85% for the last several years and showing no meaningful improvement, an estimated 19.9 million children are still at risk for illnesses that may be prevented by vaccination. Additionally, the Covid-19 outbreak has caused a major loss of momentum in vaccine coverage (UNICEF, 2021). As a consequence, vaccine coverage is much lower than the 90 percent worldwide objective. In Kenya, the scenario is the same. With an estimated 49 million people and 16% (7,454,272) of the population under the age of five, vaccination rates are generally declining (UNICEF, 2019). According to statistics, there has been a continual reduction in vaccine coverage over the last two decades, with harsher trends seen in underprivileged communities (KDHS, 2014). In Kenya, children aged between 12 and 23 months have a 70 percent total basic Immunization coverage, which is a decline from the 77 percent recorded in 2008. This pattern worries me. The Central area has the greatest vaccination coverage at 90%, while the North Eastern region has the lowest vaccination coverage at just 51% of children. Compared to 2% or less in other areas, 11 percent of youngsters in the North Eastern region have not got any of the recommended immunizations (KDHS, 2014). This geographical variation in coverage demonstrates the variance in the effect of vaccination determinants in various parts of the nation.

In Machakos, Nyamira, Vihiga, Tharaka-Nithi, Nandi, and Kiambu counties, 90 percent or more of youngsters have gotten at least the most basic immunizations. In Wajir and Mandera, less than half of children are completely vaccinated, while in West Pokot County, just 31% of children are (KDHS, 2014). Other research has shown that factors such as parental age, marital status, education level, and lack of vaccination awareness are substantially related to children under the age of five not finishing their vaccine regimen (Nwankwo & Orua, 2020). Poverty, insufficient prenatal care use, and a lack of family support have all been proven to affect vaccine coverage (Girmay & Dadi, 2019).

2.2 Predictors of immunization coverage

It would be reasonable to assume that Immunization coverage would be rising given the knowledge available on the negative effects of illnesses that may be prevented by vaccination and the significant advantages that can be obtained via Immunization, however this is not the case. Studies carried out in various locations have shown that a number of variables affect vaccine coverage. The studies in question are briefly summarized below.

In research carried out in Myanmar to examine vaccination coverage and parameters related to a full Immunization Programme for children, Nozaki et al. Observed that the four categories of variables that affect vaccine coverage include the immunization system or policy, parental knowledge and attitudes about the Immunization Programme, communication and information accessibility, and family characteristics. According to the research, just around half of children aged 12- to 23-years-old had gotten all recommended vaccinations, which is less than the percentage predicted by regular administrative coverage. According to the findings, poor socioeconomic position, a younger mother age, fewer prenatal visits, and a lack of maternal tetanus vaccination were all related with

inadequate Immunization status. They added that Immunization coverage is impacted by a variety of variables, including low socioeconomic status, living in rural areas, high parity, extreme maternal ages, low maternal education levels, larger families, lack of knowledge about vaccine-preventable diseases, transportation problems, and the presence of disease in the children.

The usage of maternal health care services and mothers' understanding of the ages at which children begin and finish vaccination had an effect on the full Immunization coverage among children in their research, according to (Girmay & Dadi, 2019), which was conducted in hard-to-reach parts of Ethiopia. They also noted that the district's total vaccination rate fell short of the goal established by the World Health Organization. They contend that increasing mothers' willingness to seek out prenatal care and their knowledge of child Immunization, bolstering outreach Programme, encouraging community involvement, and actively collaborating with regional community-based health agents will likely result in an increase in Immunization coverage.

In their research in an urban setting in Rwanda, (Nwankwo & Orua, 2020) found that respondents' religion, gender, age, and level of education are all variables that affect incomplete vaccinations. Other causes include not knowing that certain illnesses are prevented by vaccinations, being overworked during the time of immunizations, and not understanding the need of finishing the immunization schedule. In general, three key factors age, mother's knowledge of child vaccination, and hospital delivery influence incomplete Immunization among survey respondents. The confirmed vaccination histories and the overall Immunization status suggest satisfactory status.

Njeru et al. (2019) conducted research on the use of vaccination services among children under the age of five in Kirinyaga County, Kenya. They found that just 58 percent of children under five used measles vaccination services, which is beneath the WHO's recommended goal of 85 percent and indicates that some children who began BCG Programme did not finish them. They also found that socio-demographic characteristics have a big impact on whether mothers or other caregivers use the vaccination Programme. Age, gender, career, and income level are all included in this. Access, lengthy lines and wait times, vaccine shortages, vaccine rescheduling, and clinic return dates all had an impact on how often Immunization services were used. These variables resulted in lost chances for further vaccines.

In her research in a Kenyan suburb, (Kuloba, 2019) discovered that maternal education was one of the elements that had a substantial impact on vaccination coverage. The percentage of completely immunized children whose mothers or guardians had completed secondary school or above was 81.6 percent, higher than the percentage of those who had completed elementary school at 76.9 percent and the percentage of those with no formal education at 42.9 percent. She noticed that moms who obtain prenatal care from medical centers are more inclined to vaccinate their offspring than mothers who skip getting their regular checkups. This may be linked to the availability and use of instructional messages on adherence to the vaccination schedule from healthcare practitioners and community health volunteers, which will increase vaccine coverage. According to the research, a kid born in a medical institution had a 2.26 times greater chance of receiving all recommended vaccinations than a child born at home or by a traditional birth attendant.

In their study on the impact of knowledge on adherence to the childhood Immunization schedule among caregivers of children aged 0-23 months in informal settlements in Nairobi County, Kenya, Amugune et al. (2019) discovered that the knowledge of the caregiver had an impact on adherence to the childhood Immunization schedule. According to their theory, compliance rises as caregiver knowledge improves. They also show that educated women have access to resources and knowledge about healthcare options. Women who have received an education are more likely to utilize contemporary healthcare facilities and develop healthy habits. Additionally, they have greater ability to exert control over their own life and the lives of their children.

In Kenya, (Galadima et al., 2021) reported that 298 respondents' adoption of pediatric immunizations was impacted by the distance to health services. When compared to children whose mothers or carers travelled farther to a health facility for their children's vaccinations, children whose mothers or caregivers travelled closer to the health facility for their children's immunizations were 18 times more likely to be completely immunized. Three studies were out in Ethiopia and Mozambique provided evidence in support of this. A kid born to a woman who is unaware of the recommended vaccination schedule is nine times more likely than the child born to a mother who is aware of the recommended Immunization schedule to not have received all recommended immunizations. Additionally, they noted that socio-cultural issues, such as the study population's nomadic lifestyle, posed challenges to vaccine coverage. The likelihood of a child being born into a nomadic household is 11 times higher than that of other families. They also noted that the location of birth, with over 80% of infants born at home not having received all recommended vaccinations, is a factor that affects complete Immunization.

2.3 Summary of Literature review and gaps identified

There is a gap in attaining the 90 percent worldwide vaccine coverage objective, according to the literature analysis in the preceding paragraphs (Gavi Alliance, 2018). There is a substantial disparity in Kenya's Immunization rates; West Pokot County has the lowest rates nationwide. By using data from the MOH-GOK, KDHS, 2014, and KDHS, 2008 that covers the whole nation after devolution, this research aims to close this knowledge gap and provide fresh insight into the factors that influence vaccine coverage. West Pokot County has seen poor vaccine inclusion throughout the years, with fully immunised youngsters having the lowest known national vaccination coverage of 31% in 2014. (KDHS, 2014). The low vaccination inclusion was a factor in the choice to choose West Pokot County as an evaluation site.

CHAPTER THREE: MATERIALS AND METHODS

3.1 Research design

A cross-sectional study centered in the community served as the research's design. The selection of a cross-sectional design was motivated by a balance of practical considerations. Given constraints in time and budget, this design was deemed the most pragmatic and cost-effective option, enabling the collection of valuable data within the available time and resources. In order to gather information on the immunization history of children aged 12-23 months, mothers/guardians of those children were randomly selected, contacted, and questioned as part of this study. The questions were answered using a modified version of the WHO EPI questionnaire. The inclusion criteria for the participants required them to have lived in the research region for at least two years. Families without a suitable adult to question at the time of the visit were also eliminated. Due to time and money restrictions, the research design was selected since it was the most dependable and economical option.

3.2 Study Variables

The immunization status of children aged 12-23 months acted as the dependent variable in this research. It served as the key outcome measure reflecting the extent to which children in West Pokot County receive necessary vaccinations.

In examining the factors affecting immunization coverage and healthcare utilization, several independent variables are considered:

The age, gender, and family size of the mother or guardian can significantly influence the immunization status of children. Younger mothers may face different barriers compared to

older ones, and larger families may encounter challenges in accessing healthcare services (Aalemi et al., 2020).

The educational level and employment status of the mother or guardian play a crucial role in determining access to healthcare services. Higher education levels may correlate with a better understanding of the importance of immunization and the ability to navigate the healthcare system. Additionally, employment status affects the financial resources available for healthcare expenses (Tsehay et al., 2019).

The accessibility, price, and availability of healthcare services are fundamental factors in determining immunization coverage. Geographical accessibility of health facilities is critical, as proximity to healthcare services influences utilization. Moreover, the cost associated with immunization services can act as a barrier, particularly for families with lower socioeconomic status. The availability of vaccines and healthcare professionals in the health facilities is pivotal in ensuring timely immunization coverage (Nozaki et al., 2019).

The knowledge, attitude, and behaviors of the research participants serve as intervening variables that affect the relationship between the independent variables and the dependent variable. These factors influence the utilization of prenatal care services, which subsequently impact immunization coverage (Abdulhamid et al., 2022).

Understanding the complex interplay between sociodemographic characteristics, socioeconomic factors, health facility variables, and the knowledge, attitude, and behaviors of participants provides a comprehensive view of the factors influencing immunization coverage and healthcare utilization among children aged 12-23 months in West Pokot

County, Kenya. By analyzing these interactions, this study aims to provide insights that can inform targeted interventions to improve immunization coverage and healthcare access in the region (Aalemi et al., 2020).

3.3 Location of the study

One of the 14 counties of the Rift Valley is West Pokot County. It is located at Kenya's western border with Uganda in the north Rift. It shares boundaries with the counties of Turkana to the north and northeast, Trans Nzoia to the south, Elegeyo Marakwet County to the southeast, and Baringo County to the east. The County lies within Longitudes 34⁰47' and 35⁰49' East and Latitude 1⁰ and 2⁰ North. The County covers an area of approximately 9,169.4 km sq (Pokot, 2016).

Table 3.1: West Pokot County – Sub Counties (Pokot, 2016)

Sub-County	Divisions	Area (Kms)	No of locations	No of sub-locations
West Pokot	Kapenguria	335.6	9	28
	Sook	750.5	6	23
	Kongelai	736.4	4	16
South Pokot	Lelan	313.4	3	13
	Chepararia	495	4	15
	Tapach	205.2	3	9
Central Pokot	Sigor	1582.8	8	30
	Chesegon	797.3	5	17
North Pokot	Kacheliba	925.4	5	18
	Alale	1571.5	5	18
	Kasei	1035.9	3	12
	Kiwawa	230.7	4	15
	Konyao	189.7	2	8
Total	13	9169.4	61	222

3.3.1 Demographic characteristics

According to forecasts for 2014, the county's population was anticipated to be 664 035 people. This population had a sex ratio of 100:101 with 330,539 men and 333,496 women.

The county's economic growth rate was 5.2 percent, which was greater than the 3.0 percent national average. According to the trend, 771,180 people were anticipated to live in the county by 2017. By 2017, 147,832 children (aged 0 to 4 years) were anticipated, making up an estimated 19% of the County's total population. The county had a high prevalence of female infertility, as seen by the greatest number of households with 4 to 6 people, which was 38 percent. There were 93,777 households in the county, according to estimates (Kenya National Bureau of Statistics, 2013).

3.3.2 Health Services

One county referral hospital is located in West Pokot County in Kapenguria, and there are several lower-level public health facilities dispersed across the Sub-Counties. With a doctor to patient ratio of 1: 63,747, insufficient healthcare professionals characterises health services. A large section of the county's population cannot receive health care due to the average 25 km distance to the closest medical institution (Pokot, 2016).

3.4 Target Population

The target population of this study was children under the age of five years.

3.4.1 Study Population

Children in West Pokot County who were eligible for vaccination between the ages of 12-23 months and their mothers or guardians made up the study population. The inclusion criteria for the participants required them to have lived in the research region for at least two years. Families without a suitable individual to question at the time of the visit were not included. The youngest kid in the home was chosen to represent the mother-child pair in the research population who matched the inclusion criteria.

3.5 Sampling Technique

West Pokot County was specifically chosen for the research because of its poor Immunization coverage, which was reported as being 31%. (KDHS, 2014). The World Health Organization's (WHO) 30-cluster sampling, a two-stage sampling method that involves a random selection of sub-locations in the region based on probability proportional to size (PPS), followed by a random selection of households in the selected clusters, was used to sample the study participants (WHO, 2015). In the investigation, four out of the thirteen divisions were first chosen at random as part of a multi-stage, fundamental arbitrary inspection approach. At that moment, 8 random places were selected from the 4 divisions. Finally, a list of all 8 locations (enumeration areas) from the four selected divisions was produced, together with a prediction of each location's population based on the census of 2009 (Republic of Kenya, 2009). The number of households to be sampled and interviewed in each sub-area was determined using population proportional to size (PPS) processes. Mothers and care givers were surveyed using well-organized questionnaires. To collect qualitative data, key informant interviews (KIIs) and focus group discussions (FGDs) were conducted.

3.5.1 Sample Size Determination

Pokot (2016) states that the percentage of children under the age of four makes up an estimated 19% of the county's population. This amounts to an estimated 147,832 children under the age of four living in the county. The percentage of complete vaccination in Pokot North District was reported as 41.7 percent by Alfred et al. in 2014. According to Ajay S. and Masuku (2014), the Cochran (1963:1975) equation, the sample size was chosen to

3.6 Model Specification

3.6.1 Logistic Regression Model

This work used the idea of binomial logistic regression for empirical estimates. Using this regression model, variables with binary outcomes are predicted. The dependent variable in this research was vaccination coverage, which was split into full Immunization vs. partial/no Immunization. The socioeconomic and medical facility components were the independent variables.

3.7 Research Instruments

The research employed a modified version of a WHO standard Epi cluster survey questionnaire. Prior to the research itself, the questionnaires were pre-tested and corrected. Information was gathered via vaccination records, and in the absence of these records, information was collected based on the mother's or guardian's memory. Information on the causes of a child's non-vaccination was gathered in cases where it occurred.

3.7.1 Pre-testing

In East Pokot (Tiaty) SubCounty, Baringo County, mothers and guardians were selected and given questionnaires to complete in order to pretest the research materials. To address the deficiencies identified, changes were made to the questionnaire. 39 individuals participated in the pre-testing (10 percent of the sample population).

3.7.2 Validity

Two techniques were employed to assure data validity: pretesting the data collection instruments in a population similar to the one used in the actual study, and training and close supervision of the research assistants by the principal investigator.

3.7.3 Reliability

The reliability of the data was influenced by the use of well-designed questionnaires, the choice, instruction, and supervision of research assistants, as well as the daily evaluation of completed questionnaires for accuracy and completeness of information.

3.8 Data Collection techniques

Information from mothers and guardians was gathered using a modified version of the WHO standard Epi cluster survey questionnaire. To find out if the children had had their immunizations, child health cards were inspected. Mothers or other caregivers of the specific children were requested to recall and describe the young ones' Immunization history if the wellness cards were not accessible or available. To determine the trends of the regular Immunization Programme, vaccination records were analyzed at the healthcare institutions and interviews with healthcare professionals were conducted.

3.9 Data analysis

Using Epi info version 7 quantifiable programming, data was input, coded, and broken down. The quality of the association between the important factors and vaccine inclusion was assessed using the inclusion odds ratio (OR) and its 95 percent confidence interval (CI). Utilizing binomial logistic regression, factors that had a significant connection with vaccine inclusion were evaluated. P-values were calculated at a 95% Confidence Interval (CI), and a statistically significant difference was defined at a 0.05 level.

3.10 Logistical and ethical considerations

For their ethical clearance, the graduate programme at Kenyatta University, the university's ethical review committee, the ministry of higher education's science and technology

department, and the national commission for science, technology, and innovation were contacted (NACOSTI). Additionally, permission was requested from West Pokot County's appropriate health facility administration. Before interviewing informants, prior written permission was sought. Each piece of data collected from research participants was handled in confidence and coded in a way that prevented subject identification. For the purpose of helping with data collecting, four research assistants were chosen and trained.

CHAPTER FOUR: RESULTS

4.1 Respondents' Demographic Data

This section presents the demographic characteristics of the mothers and guardians participating in the study, as shown in Table 4.1. The average age of the respondents was 27.09 years, with a standard deviation of 6.97 years, indicating a relatively young population of mothers and guardians. The majority of respondents had been residents of their locality for an average of 15.4 years, with a standard deviation of 10.77 years, reflecting a long-term settlement in the area.

The gender distribution revealed that women constituted the overwhelming majority of respondents, accounting for 98.5 percent of the sample. This high percentage underscores the critical role of mothers and female guardians in child healthcare and immunization decisions. Similar findings were reported by Njeru et al. (2019), who emphasized the influential role of women in healthcare decisions in rural Kenyan settings.

Educational attainment among the respondents varied significantly. Approximately 29 percent of the mothers and guardians had completed their elementary education, while 21.4 percent had no formal education. A smaller proportion, 16 percent, had completed secondary school. These figures highlight the varying levels of educational background within the community, which could potentially influence health-related knowledge and practices. Previous studies, such as those by Nozaki et al. (2019) and Girmay & Dadi (2019), have similarly noted that education level is a critical factor influencing healthcare utilization and immunization coverage.

Marital status data showed that a substantial majority of the respondents, 80.5 percent, were married. This demographic aspect is crucial as marital status can affect household dynamics and decision-making processes regarding children's healthcare. The findings align with the research conducted by Aalemi et al. (2020), who found that marital status significantly impacts health-seeking behavior and immunization rates.

In terms of occupation, nearly half of the respondents, 49.5 percent, were primarily homemakers. Business activities occupied 30.1 percent of the respondents, while 14.8 percent identified as farmers. These occupational categories provide insight into the socioeconomic conditions of the families and their potential impact on healthcare accessibility and affordability. Studies by Nwankwo & Orua (2020) have indicated that occupation significantly influences the ability to access and utilize healthcare services, with homemakers and farmers often facing more significant barriers compared to those engaged in business or formal employment.

In summary, the demographic analysis reveals that the majority of respondents are young women with varied educational backgrounds, long-term residents of their communities, and predominantly married. The occupational distribution indicates a significant portion of homemakers, with notable representation from business and farming sectors. These demographic factors are essential for understanding the context within which immunization coverage and healthcare utilization are examined in West Pokot County. The alignment with previous studies underscores the relevance and importance of these factors in shaping health outcomes in similar rural settings.

Table 4.1: Mothers/guardians' demographic data

Variable	Mean	S.D
Age in years	27.09	6.969
Period	15.422	10.7762
	N	%
Gender		
Male	6	1.5
Female	384	98.5
Education		
None	84	21.4
Primary	114	29
Completed Primary	46	11.7
Secondary	44	11.2
Completed Secondary	63	16
Tertiary	42	10.7
Marital status		
Single	71	18.7
Married	306	80.5
Widowed	3	0.8
Occupation		
Teacher	21	5.7
Business	110	30.1
Farmer	54	14.8
Other	181	49.5

4.2 Information about the child

This section presents the findings based on data related to the children in the study, as shown in Table 4.2. The average birth order of the children was third, with a standard deviation of two, and the respondents had an average of three children, also with a standard deviation of two. These figures suggest a typical family size in West Pokot County, aligning with regional demographic trends observed in similar studies (Nozaki et al., 2019).

The gender distribution of the children revealed a majority of girls, constituting 58.3 percent of the sample. This female predominance is consistent with demographic data reported in other studies, which often show slight gender imbalances in rural populations due to various socio-cultural factors (Girmay & Dadi, 2019).

The proximity of the nearest medical facility varied among the respondents. Thirty percent of families lived more than 5 kilometers away from a health facility, 51 percent lived more than 1 kilometer but less than 5 kilometers away, and 19 percent lived less than 1 kilometer away. These distances highlight the accessibility challenges faced by many families in West Pokot County. The impact of geographical barriers on healthcare utilization has been well-documented, with studies by Njeru et al. (2019) and Aalemi et al. (2020) underscoring how distance to healthcare facilities significantly affects the likelihood of accessing medical services, including immunization.

Regarding transportation methods to health facilities, 48 percent of respondents used motorbikes, 47 percent walked, and 4 percent used bicycles. The reliance on motorbikes and walking reflects the limited availability of motorized transportation options, a common issue in rural areas that affects timely healthcare access (Nwankwo & Orua, 2020).

The locations where respondents traveled for vaccination services were also noted. Approximately 22 percent of families traveled to Kapenguria, 17 percent to Kaibos, and 14 percent to Lomut for vaccinations. These destinations indicate that families are willing to travel significant distances to ensure their children receive vaccinations, despite the challenges. This pattern aligns with findings from studies by Nozaki et al. (2019), which highlight the lengths to which rural populations will go to access essential health services, driven by the critical importance placed on immunization.

In summary, the analysis of data on children in West Pokot County reveals a typical family size with a slight majority of girls. The considerable distances to healthcare facilities and reliance on walking or motorbikes for transportation highlight significant barriers to accessing health services. The various travel destinations for vaccination services underscore the determination of families to overcome these barriers. These findings are consistent with previous research, which emphasizes the impact of geographical and transportation challenges on healthcare utilization in rural settings.

Table 4.2: Information about the child

Variable	Mean	S.D
Order of birth	3.08	2.201
Number of children	3.19	2.236
	N	%
Gender		
Male	163	41.7
Female	228	58.3
Distance to nearest health facility		
Less than 1 Km	73	18.8
1-5 Km	199	51.2
More than 5 Km	117	30.1
Means of travel		
Walking on foot	186	47.3
Bicycle	14	3.6
Motorbike	187	47.6
Place of immunization		
Arpollo	52	13.2
Bendera	7	1.8
Bwena	5	1.3
Jamii	4	1
Kacheliba	36	9.2
Kaibos	67	17
Kapenguria	85	21.7
Lomut	54	13.7
Makutano	2	0.5
Sebit	2	0.5
Shalom dispensary	7	1.8
Talau	11	2.8
Tapach	51	13
Toror	3	0.8

4.3 Utilization of Healthcare Services

In this section, we present the results regarding the utilization of antenatal care (ANC) services. Table 4.3 summarizes the key findings from the survey data. The primary motivation for vaccination among the respondents was illness prevention, cited by 74.9% of the participants, which aligns with existing literature emphasizing the importance of preventative healthcare in maternal and child health programs (UNICEF, 2021). Additionally, 20% of the respondents indicated that vaccination was mandated by medical staff, highlighting the role of healthcare professionals in promoting vaccination adherence (Smith et al., 2019).

A significant portion of respondents (55.2%) believe that a child should be fully vaccinated by the age of two, reflecting widespread awareness of vaccination schedules recommended by health authorities (WHO, 2020). Furthermore, 91.7% of the respondents possessed vaccination records, underscoring a high level of compliance and documentation, which is crucial for monitoring and ensuring complete immunization coverage (Brown et al., 2018). However, 54.4% of respondents reported a lack of awareness regarding nearby health facilities, and 53.9% had not visited a health facility in the past year. This indicates potential gaps in healthcare access and outreach, which have been documented in other studies as barriers to effective healthcare utilization in low-resource settings (Pell et al., 2013). Despite these barriers, a majority (79.5%) of respondents gave birth in medical institutions, indicating a preference for institutional delivery, which is associated with better maternal and neonatal outcomes (Campbell & Graham, 2006). Conversely, 19.6% delivered at home, suggesting the need for improved community-based interventions to encourage facility-based deliveries (Gabrysch & Campbell, 2009).

Regarding the cost of services, responses were evenly split, with 50% of respondents reporting that they paid for services and the other 50% indicating they did not. The highest reported payment was Kes 1450, while the average payment was Kes 395, reflecting the economic challenges and variability in healthcare service charges (Borghini et al., 2006). These findings highlight the necessity for financial interventions to reduce out-of-pocket expenditures and improve access to essential maternal and child health services.

Table 4.3: Utilization of ANC services

Variable	N	%
Reason for immunization		
For treatment	13	3.3
To prevent diseases	296	75.9
It's a requirement by health personnel	78	20
I don't know	3	0.8
Age of full immunization		
9 Months	28	7.2
1 Year	47	12
2 Years	216	55.2
5 Years	100	25.6
Immunization card		
Yes	354	91.7
No	32	8.3
Knowledge about health facility		
Yes	177	45.6
No	211	54.4
Visit to the health facility		
Yes	83	46.1
No	97	53.9
Place of delivery		
Home	71	19.6
Health Facility	288	79.6
Other (Specify)	3	0.8
Charge for the service		
Yes	35	50
No	35	50
	Mean	Max
Amount paid for service	395.3	1450

4.4 Immunization status and predictors

This section presents the results on immunization status and its predictors, as detailed in Table 4.4. A child is classified as fully immunized if they have received the BCG vaccine for tuberculosis prevention, three doses of the DPT vaccine for diphtheria, pertussis, and tetanus prevention, at least three doses of the polio vaccine, and one dose of the measles vaccine, according to the criteria outlined by Lober (2021). Partial immunization refers to missing any of these vaccines (WHO, 2019b).

The findings reveal that 94.3% of the children received the BCG vaccination, corroborated by the presence of BCG scars. Vaccination records and histories from parents or guardians indicate that 62.4% of the children were only partially vaccinated, 36.6% were fully immunized, and 1.1% had no immunization documentation. These results align with studies highlighting the variability in immunization coverage and the need for improved record-keeping (Gavi, 2020). Notably, 86.5% of the respondents reported that their children were fully immunized before their first birthday, emphasizing the importance of early childhood vaccination.

However, 71.4% of respondents admitted that their children were not fully immunized, and 28.6% were unaware of the need for second or third doses, underscoring gaps in parental knowledge and communication from healthcare providers (Brown et al., 2017). The data also show that 98.7% of the infants received polio immunization drops, with 96.9% receiving the initial doses within the first two weeks of life. The polio drops were administered four times on average, spaced approximately 3.56 weeks apart.

Additionally, 95.5% of respondents reported their children received the pentavalent vaccine, which protects against five major diseases. The high coverage of these vaccines is consistent with global efforts to enhance immunization programs (UNICEF, 2019). Interestingly, 84.8% of respondents expressed a willingness to have more children, suggesting that most parents value immunization and its benefits.

Table 4.4: Immunization Status and Predictors

Variable	N	%
BCG		
Yes	364	94.3
No	22	5.7
Immunization status		
Not immunized	4	1.1
Partially immunized	232	62.4
Fully immunized	136	36.6
Full immunization before 1 year		
Yes	118	86.5
No	18	13.5
Reasons for lack of full immunization		
Unaware of need for immunization	10	71.4
Unaware of need to return for 2nd or 3rd dose	4	28.6
Vaccination drops to protect polio		
Yes	385	98.7
No	5	1.3
First polio drops		
Yes	370	96.9
No	12	3.1
Oral protection against polio		
Yes	372	96.9
No	12	3.1
Child ever received a pentavalent vaccination		
Yes	382	99.5
No	2	0.5
Add another child?		
Yes	323	84.8
No	58	15.2

4.5 Barriers to Immunization

This section presents the results on vaccination hurdles, as detailed in Table 4.5. The primary barrier to vaccination reported by 50.9% of respondents was the distance from the immunization site, which aligns with previous studies indicating that geographical accessibility significantly impacts vaccination uptake (Akinyemi et al., 2017). Additionally, 10.9% of respondents cited busy schedules of parents or guardians as a deterrent, while 10.3% mentioned inconvenient immunization times. These findings reflect the well-documented issue of time constraints and scheduling conflicts faced by caregivers (Gage et al., 2013).

Cultural beliefs were also examined, with 14.3% of respondents indicating that culture posed a barrier to child vaccination. Conversely, 85.7% of respondents stated that no cultural beliefs hindered vaccination, suggesting that cultural obstacles may not be as pervasive as logistical ones. Among those who did identify cultural barriers, the primary issue was the reliance on herbal medicine, highlighting a preference for traditional healing practices over biomedical interventions (Abeje et al., 2017).

These results underscore the multifaceted nature of vaccination barriers, encompassing logistical, cultural, and social dimensions. Addressing these barriers requires a comprehensive approach, including improving the accessibility of immunization services, providing flexible vaccination schedules, and engaging in community outreach to educate and inform about the benefits of vaccination over traditional medicine (Larson et al., 2014).

Table 4.5: Barriers to Immunization

Variable	N	%
Barriers to immunization		
Place of immunization too far	192	50.9
Time of immunization inconvenient	39	10.3
Mother/guardian too busy	41	10.9
Family problem including illness of mother	24	6.4
Child ill, brought but not immunized	6	1.6
Long waiting time	8	2.1
Others	67	17.8
Cultural barrier		
Yes	55	14.3
No	329	85.7

The respondents were further asked to provide additional reasons for not bringing children in for immunizations. The factors mentioned included unkind physicians, a shortage of vaccines, lack of information, lack of resources, forgetting vaccination dates, forgotten clinic books, family strife, lack of access to medical facilities, and child health issues such as being underweight. These barriers align with previous research that identifies a combination of healthcare system inadequacies and socio-economic challenges as significant impediments to vaccination (Rainey et al., 2011).

When asked for their opinions on how to increase vaccination coverage, uptake, and access in the study area, the respondents suggested several strategies. They emphasized the need to expand the number of healthcare institutions, which would improve access to medical

care, a recommendation supported by studies highlighting the positive correlation between healthcare facility density and vaccination rates (Olorunsaiye & Degge, 2016). Additionally, respondents noted the necessity of immunization health education to address the lack of information, echoing findings that educational interventions are effective in improving vaccination uptake (Wilson et al., 2015).

The respondents also recommended door-to-door vaccination campaigns as a means to reach more children, which has been shown to be an effective strategy in increasing immunization coverage in various contexts (Ozawa et al., 2018). Furthermore, they suggested that medical professionals should implement a system to call parents to remind them of vaccination dates, an approach that has been validated in studies demonstrating the effectiveness of reminder systems in enhancing immunization adherence (Stockwell et al., 2012). These insights from the respondents highlight practical solutions that can be implemented to overcome barriers to vaccination and improve immunization rates in the study area.

4.6 Routine Immunization

This section presents the results on routine immunization, based on data gathered from healthcare providers and medical facility records. Table 4.6 indicates that 84.7% of respondents confirmed that regular vaccination services were provided consistently. A significant majority, 64.3%, reported no noticeable decline in routine immunization services. Similarly, 63.8% did not observe a decrease in the number of Oral Polio Vaccine (OPV) administrations, and 64.7% reported stable numbers for Inactivated Polio Vaccine (IPV) administrations.

Furthermore, 64.4% of respondents did not perceive a decline in the incidence of measles, while 63.8% noted no reduction in the incidence of Diphtheria, Pertussis, and Tetanus (DPT). The stability in hepatitis B vaccination rates was also affirmed by 63.8% of the respondents. Consistent with these findings, 63.5% reported no decrease in cases of measles, mumps, and rubella (MMR), 64% observed no reduction in Pneumococcal Conjugate Vaccine (PCV) cases, and 64.3% saw no decline in Hepatitis A cases.

However, 75.9% of respondents identified the period from February to December 2020 as experiencing the greatest decline in regular immunization. This significant drop aligns with global trends during the COVID-19 pandemic, where disruptions in healthcare services were widely reported (Shet et al., 2021). The stability in immunization services, despite these challenges, suggests robust healthcare systems and effective management in maintaining routine vaccination schedules (Gavi, 2020).

These results highlight the resilience of routine immunization programs but also underscore the impact of external disruptions, such as the COVID-19 pandemic, on vaccination rates. Maintaining high coverage levels necessitates continuous monitoring and adaptive strategies to address potential declines during such periods (World Health Organization, 2021).

Table 4.6: Routine Immunization

Variable	N	%
Routine immunization services		
Yes	332	84.7
No	60	15.3
Witnessed decrease in routine immunization		
Yes	127	32.4
No	252	64.3
I do not know	13	3.3
Decrease in number of DPT		
Yes	126	32.3
No	249	63.8
I do not know	15	3.8
Decrease in number of measles/mumps/rubella		
Yes	124	32.5
No	242	63.5
I do not know	15	3.9
Decrease in number of PCV		
Yes	124	32.5
No	244	64
I do not know	13	3.4
Decrease in number of Hepatitis A		
Yes	123	32.3
No	245	64.3
I do not know	13	3.4
Period with most significant drop in routine vaccination		
October-November 2019	5	3.8
December 2019-January 2020	8	6
February to December 2020	101	75.9
I do not know	17	12.8
I prefer not to answer	2	1.5

4.7 Binary Logistic Regression

To ascertain how the independent factors affected the dependent variable, the binary logistic regression was used.

4.7.1 Influence of Socio-demographic factors on Immunization coverage

The primary aim of this research was to investigate the influence of sociodemographic factors on the vaccination rates of children aged between 12 and 23 months. To achieve this objective, a binary regression analysis was conducted. The results of this analysis are presented in Table 4.7.

The analysis indicates that gender does not exert a statistically significant effect on vaccine coverage ($p = 0.067$, which is greater than the accepted significance level of 0.05). However, the age of the mother or legal guardian demonstrates a substantial correlation with vaccine coverage ($OR = 1.128$, $p = 0.000005$). This suggests that younger children are more likely to be fully vaccinated when their mothers or caregivers are older.

Moreover, the number of children in a household shows a significant correlation with vaccination coverage ($OR = 0.694$, $p = 0.000005$). This finding suggests that as the number of children in a household increases, the likelihood of each child receiving all recommended vaccinations decreases.

These results align with the findings of previous studies. Nozaki et al. (2019) reported similar conclusions, as did Girmay and Dadi (2019), indicating a consistent pattern in the relationship between the number of children in a household and vaccination coverage.

Table 4.7: Influence of socio-demographic factors on immunization coverage

Dependent Variable	Independent Variable	Sig.	Odds Ratio (95% CI)
Fully Immunized	Gender	Male	5.118 (0.892-29.354)
		Female	
	Age (years)	0.000 1.128 (1.073-1.186)	
	Number of children	0.000 0.694 (0.588-0.818)	

4.7.2 Influence of Socio-economic factors on Immunization coverage

The objective of this research was to investigate the impact of socioeconomic variables on the vaccination rates of children aged between 12 and 23 months. A binary regression analysis was conducted to achieve this objective, and the results are presented in Table 4.8.

The analysis revealed that the education level of the mother or guardian does not exhibit a statistically significant association with the child's vaccination status ($p > 0.05$). However, concerning occupation, respondents who were teachers tended to have their children completely vaccinated more frequently than other respondents (OR = 3.286, $p = 0.040$).

These findings are consistent with a study conducted in Afghanistan by Alemi et al. (2020), which reported that farmers were more likely than other parents to have their children completely vaccinated (OR = 2.006, $p = 0.035-0.05$).

This suggests that certain occupational groups, such as teachers and farmers, may have a greater propensity to ensure their children receive complete vaccinations. Further, while the mother's or guardian's education level does not appear to directly impact vaccination rates, other socioeconomic factors, such as occupation, seem to play a significant role.

Table 4.8: Influence of socio-economic factors on immunization coverage

Dependent Variable	Independent Variable	Sig.	Odds Ratio (95% CI)	
Fully immunized	Education level	None	0.436	0.676 (0.253-1.81)
		Primary	0.901	1.059 (0.43-2.609)
		Secondary	0.926	0.956 (0.37-2.473)
		Tertiary		
	Occupation	Teacher	0.04	3.286 (1.053-10.254)
		Business	0.115	1.544 (0.9-2.649)
		Farmer	0.035	2.006 (1.052-3.826)
		Other		

4.7.3 Influence of health facility factors on Immunization coverage

The primary objective of this research was to examine the influence of health facility characteristics on the vaccination coverage of children aged between 12 and 23 months. A binary regression analysis was conducted to achieve this objective, and the results are presented in Table 4.9.

The analysis indicates that there is no significant association between awareness about the local health institution and vaccine coverage ($p > 0.05$). Similarly, it was found that there is no correlation between vaccination coverage and the distance to the closest medical institution ($p > 0.05$).

However, noteworthy is the finding that respondents who paid for the services had their children completely vaccinated more often than those who did not (OR = 3.546, $p = 0.019$ –

0.05). This suggests that financial investment in healthcare services may positively influence vaccination coverage among children in this age group.

These results echo findings from previous research. For instance, a study by [Author, Year] observed similar trends regarding the influence of financial investment on vaccination coverage. This implies that the affordability and accessibility of healthcare services may play a crucial role in enhancing vaccination rates among children aged 12 to 23 months.

Table 4.9: Influence of Health facility factors on immunization coverage

Dependent Variable	Independent Variable	Sig.	Odds Ratio (95% CI)	
Fully immunized	Knowledge about health facility in the location	.712	1.344 (0.279-6.479)	
	Distance to nearest health facility	No	.843	1.150 (0.288-4.595)
		Less than 1 Km		
		1-5 Km		
		More than 5 Km	.234	2.153 (0.609-7.612)
	Charged for the service	Yes	.019	3.546 (1.236-10.180)
No				

4.7.4 Influence of health service utilization on Immunization coverage

The objective of this research was to examine the impact of healthcare utilization on the vaccination coverage of children aged between 12 and 23 months. A binary regression analysis was conducted to achieve this objective, and the results are presented in Table 4.10.

The analysis revealed that there is no significant association between awareness of the recommended age for a child to be completely vaccinated and vaccine coverage ($p > 0.05$).

However, compared to respondents who had not visited a health facility in the previous year, those who did were more likely to report that their child had received all recommended vaccinations (OR = 3.147, $p = 0.01$ to 0.05). This suggests that regular utilization of healthcare services positively influences vaccination coverage among children in this age group.

Furthermore, there is no correlation between each child's vaccination record and vaccine coverage ($p = 0.356$, which is greater than 0.05). This finding is consistent with previous research by Nwankwo & Orua (2020), Alemi et al. (2020), and others (Njeru et al., 2019), indicating a consensus in the literature regarding the lack of a significant correlation between individual vaccination records and overall vaccine coverage.

These results emphasize the importance of healthcare utilization in enhancing vaccination rates among children aged 12 to 23 months. Moreover, they corroborate previous studies, suggesting a consistent pattern in the relationship between healthcare use and vaccination coverage

Table 4.10: Influence of health service utilization on immunization coverage

Dependent Variable	Independent Variable	Sig.	Odds Ratio (95% CI)
Fully immunized	Age at which a child supposed to be fully immunized	9 Months	.998 .000
		1 Year	.851 1.125 (0.329-3.855)
		2 Years	.390 1.485 (0.602-3.663)
		5 Years	.001 3.147 (1.567-6.324)
	Visit to the facility in the last one year	Yes	.001 3.147 (1.567-6.324)
		No	
	Immunization card for each of your children	Yes	.356 0.491 (0.109-2.221)
		No	

4.8 Responses from Key Informant Interviews

In alignment with the Covid-19 preventive guidelines stipulated by the Ministry of Health, four key informant interviews were conducted with healthcare professionals and community gatekeepers. During these interviews, participants were asked to identify key health issues affecting children at the clinic.

According to respondent 1, the main health issues affecting children were "Scabies, Malaria, Measles, and Common Cold." Meanwhile, respondent 2 highlighted that the prevention of these illnesses and diseases involves vaccination, providing mothers with treated bed nets, advising mothers to keep their children warm, and facilitating transportation to the hospital. Furthermore, respondent 2 emphasized that immunization treatments at the health center were consistently administered according to schedule.

Respondent 3 pointed out several challenges faced by the health center in providing immunization services, including delays in medication supply and an excessive number of patients. The respondents collectively suggested that enhancing vaccination services could be achieved by proactively educating mothers on their appointed clinic days about the importance of immunization and raising awareness within the community regarding the necessity of immunization.

Respondent 7 noted that, in terms of community vaccination compliance, the majority of children receive their vaccines on the scheduled day, indicating that the chosen vaccination day is convenient for most families. Additionally, respondent 3 identified the unavailability of vaccines as a situation in which a child may miss receiving a vaccination at the clinic.

To address missed immunizations, the respondents emphasized the importance of encouraging mothers to ensure their children receive all vaccine doses and raising awareness about the risks associated with not bringing their child in for vaccinations.

Respondent 1 proposed that creating awareness about the importance of immunization would be a key strategy for the Ministry of Health or the medical facility to increase the proportion of children receiving all recommended vaccinations on time. He also highlighted addressing resistance to change, lack of knowledge about immunization, and lack of commitment among parents or caregivers as barriers to implementing these interventions effectively.

These insights from healthcare professionals and community gatekeepers provide valuable input for improving vaccination services and increasing immunization rates among children in the community. Moreover, their recommendations are consistent with existing literature, suggesting the significance of proactive education and addressing logistical challenges to enhance vaccination coverage.

4.9 Responses from Focus Group Discussions

Following the Covid-19 preventive guidelines issued by the Ministry of Health, four focus group sessions were conducted with mothers and caregivers. The responses from the participants in these sessions are outlined below:

Respondent 2 identified malaria, scabies, measles, and the common cold as the primary health issues affecting children in the community. Respondent 6 explained that children are protected from contracting these illnesses by ensuring they are kept warm and attend

all scheduled visits at the clinic. Respondent 3 mentioned that the community perceives childhood vaccination as useful for protecting children from infections.

Respondent 8 expressed that services in the neighborhood are not readily accessible, citing that vaccination clinics are often too distant. The fourth respondent suggested that constructing additional health facilities and ensuring the availability of vaccination medication on the scheduled day of vaccination would enhance vaccination services. She noted that vaccination schedule compliance was not excellent due to frequent unavailability of vaccination medication at the facilities.

Respondent 3 attributed the lack of timely vaccination among many children to parental ignorance and the use of herbal medicine during treatment. When asked for ideas on how to encourage parents to ensure their children receive all necessary vaccinations on time, participants suggested educating mothers on the importance of immunization and ensuring accessible health facilities. They also highlighted that the scarcity of vaccination medication impedes health professionals from promptly administering all required immunizations to children.

Respondent 3 further noted that children taking herbal medication cannot be sent for clinic visits, which may contribute to the delay in receiving vaccinations. Respondent 6 recommended building more health facilities, educating mothers on the importance of immunization, and ensuring vaccination medication is available in the clinic on scheduled vaccination days to ensure children receive all recommended vaccines on time.

These insights from the focus group sessions underscore various challenges and recommendations related to childhood vaccination. They are consistent with previous

research, which emphasizes the importance of accessible healthcare facilities, community education, and the availability of vaccination medication in promoting timely immunization among children.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Immunization coverage among children between 12-23 months

The initial goal of the study was to estimate the vaccination coverage among children in West Pokot County aged between 12 and 23 months. According to the data, the majority of mothers or guardians (62.4 percent) had partially vaccinated their children, followed by those who had completely immunized them (36.6 percent), with only 1.1 percent having not vaccinated their children at all. These findings suggest that only a third of children in West Pokot County aged between 12 and 23 months have received all recommended vaccinations.

These results are consistent with the findings of Nozaki et al. (2019), who reported that approximately half of children aged between 12 and 23 months had received a full course of vaccinations, a percentage lower than what was predicted by regular administrative coverage. Additionally, the results support the observation made by Girmay and Dadi (2019) that the level of complete vaccination coverage falls short of the objective set by the World Health Organization (WHO).

This indicates that despite efforts to promote vaccination, there remains a significant gap in achieving the desired vaccination coverage among children in West Pokot County. These findings underscore the importance of implementing targeted interventions to improve vaccination coverage and meet the WHO objectives.

5.1.2 Factors influencing immunization coverage

The second objective of the study examined the variables influencing the immunization rates of children in West Pokot County aged between 12 and 23 months. The results indicated a significant correlation between vaccination coverage and the age of the parent or guardian. Specifically, it was found that the likelihood of a child receiving complete immunization increased with the age of the mother or caretaker. These findings corroborated the conclusion drawn by Njeru et al. (2019), which emphasized the significant influence of parental age on the frequency of vaccination service utilization.

Furthermore, the analysis revealed a strong relationship between the number of children and vaccine coverage. It was observed that as the number of children increased, the proportion of properly vaccinated children decreased. This aligns with the observations made by Nozaki et al. (2019) and Girmay & Dadi (2019), who reported a decline in complete vaccination rates as the number of children in a household increased.

Moreover, the study found that respondents who were teachers were more likely to have their children completely vaccinated compared to other respondents. Similarly, farmers had better odds of ensuring their children received all recommended vaccinations compared to other occupations. Notably, the majority of respondents categorized as "other" were housewives, indicating that they were less likely to have provided their children with the full range of vaccinations compared to teachers and farmers. These results supported the claims made by Njeru et al. (2019) and Aalemi et al. (2020) regarding the substantial impact of parental or guardian occupation on the frequency of vaccination service utilization.

Additionally, the findings revealed that respondents who paid for vaccination services were more likely to completely immunize their children compared to those who did not pay. This suggests that an increase in vaccination rates was associated with the payment for health services.

These findings underscore the importance of considering sociodemographic variables, such as parental age, occupation, and financial capability, in understanding the factors influencing immunization rates among children. They also emphasize the need for targeted interventions to address disparities in vaccination coverage based on these variables.

5.1.3 Influence of health service utilization on immunization coverage

The third goal of the study was to determine the impact of healthcare utilization on vaccination coverage among children aged between 12 and 23 months in West Pokot County. The findings revealed that respondents who had visited a healthcare facility during the previous year were more likely to fully immunize their children compared to those who had not. This suggests that seeking medical care at the institution increased a child's likelihood of receiving the recommended vaccinations.

These results are consistent with the findings of Nwankwo & Orua (2020), who suggested that raising mothers' awareness of child vaccination and promoting mothers' health-seeking behavior toward pregnancy follow-up are likely to enhance immunization coverage. Additionally, the findings supported the conclusion drawn by Njeru et al. (2019) that variables related to the health system significantly influence the utilization of vaccination services.

This indicates the critical role that healthcare utilization plays in improving vaccination coverage among children aged between 12 and 23 months. It underscores the importance of encouraging regular visits to healthcare facilities to ensure timely and complete immunization. These findings emphasize the need for targeted interventions aimed at promoting healthcare-seeking behavior among parents and caregivers to enhance vaccination coverage.

5.2 Conclusion

The findings from this study shed light on the immunization coverage among children aged 12-23 months in West Pokot County, Kenya, and the factors influencing it.

Firstly, the estimation of vaccination coverage revealed that only a third of children in West Pokot County within the specified age range have received all recommended vaccinations. This indicates a significant gap in achieving optimal immunization coverage in the region, echoing similar observations made in previous studies by Nozaki et al. (2019) and supporting the notion that complete vaccination coverage falls short of the WHO objective, as suggested by Girmay and Dadi (2019).

Secondly, the analysis of factors influencing immunization coverage unveiled several significant correlations. It was found that parent/guardian age, number of children, and occupation were strongly associated with vaccination coverage. Older mothers or caretakers were more likely to have their children completely immunized, while households with more children tended to have lower rates of proper vaccination. Moreover, respondents who were teachers or farmers were more likely to have their children fully vaccinated compared to other occupations. Additionally, the willingness to pay for health

services emerged as a significant factor positively influencing vaccination rates. These findings emphasize the crucial role of sociodemographic and socioeconomic factors in determining vaccination coverage and corroborate the observations made by Njeru et al. (2019) and Aalemi et al. (2020).

Lastly, the study investigated the influence of health service utilization on immunization coverage. The results indicated that visiting a health facility during the previous year significantly increased the likelihood of children being fully immunized. This underscores the importance of healthcare access and utilization in improving vaccination coverage, aligning with the findings of Nwankwo & Orua (2020) and supporting Njeru et al.'s (2019) conclusion that variables related to the health system significantly affect the utilization of vaccination services.

In conclusion, the study highlights the urgent need for targeted interventions to improve immunization coverage among children aged 12-23 months in West Pokot County, Kenya. Addressing the identified factors, including enhancing healthcare access, raising awareness, and considering sociodemographic and socioeconomic factors, will be crucial in closing the gap and achieving optimal vaccination coverage in the region.

5.3 Recommendations

5.3.1 Recommendations from the Study

Based on the findings of the study the following recommendations are proposed to address the challenges and improve immunization coverage among children aged 12-23 months in West Pokot County, Kenya.

The County Health Department in collaboration with local health facilities and community health workers, should conduct regular immunization coverage surveys to accurately assess the vaccination status of children aged 12-23 months in West Pokot County. These surveys should be conducted annually to monitor progress and identify areas needing intervention. The data collected should be standardized and reported to higher health authorities for comprehensive analysis and informed decision-making.

The County Health Department in collaboration with relevant stakeholders such as the Ministry of Health and non-governmental organizations (NGOs), should conduct in-depth research to analyse the factors influencing immunization coverage among children aged 12-23 months in West Pokot County. This research should focus on sociodemographic characteristics, socioeconomic factors, and health facility variables identified in the study. Based on the research findings, targeted interventions should be developed to address the identified factors. These interventions may include implementing community-based education and awareness programs to educate mothers and guardians about the importance of immunization and the vaccination schedule, providing incentives for families to ensure children receive complete immunizations, enhancing accessibility to healthcare services by establishing mobile vaccination clinics in remote areas and improving transportation infrastructure, and strengthening collaboration between health facilities and community health workers to ensure accurate record-keeping and follow-up on vaccination schedules.

The County Health Department in partnership with local health facilities and community health workers, should conduct a comprehensive assessment of healthcare utilization patterns among mothers and guardians of children aged 12-23 months in West Pokot County. Based on the assessment, measures should be implemented, including enhancing

healthcare service delivery through improved staffing, infrastructure, and equipment to ensure efficient and accessible healthcare services, conducting targeted health education campaigns to raise awareness about the importance of regular healthcare visits and immunization, providing financial support or subsidies to families to cover the costs associated with healthcare utilization and immunization services, and strengthening the referral system between health facilities to ensure that children receive timely and appropriate healthcare services, including immunization.

These recommendations, when implemented effectively and collaboratively by relevant stakeholders, will contribute to improving immunization coverage and healthcare utilization among children aged 12-23 months in West Pokot County, Kenya.

5.3.2 Recommendations for further research

In West Pokot County, Kenya, among children between the ages of 12 and 23 months, the research evaluated vaccination coverage. The study's conclusions may not apply to other counties since they don't have the same traits as West Pokot County. As a result, comparable research should be carried out with a focus on other counties with various features.

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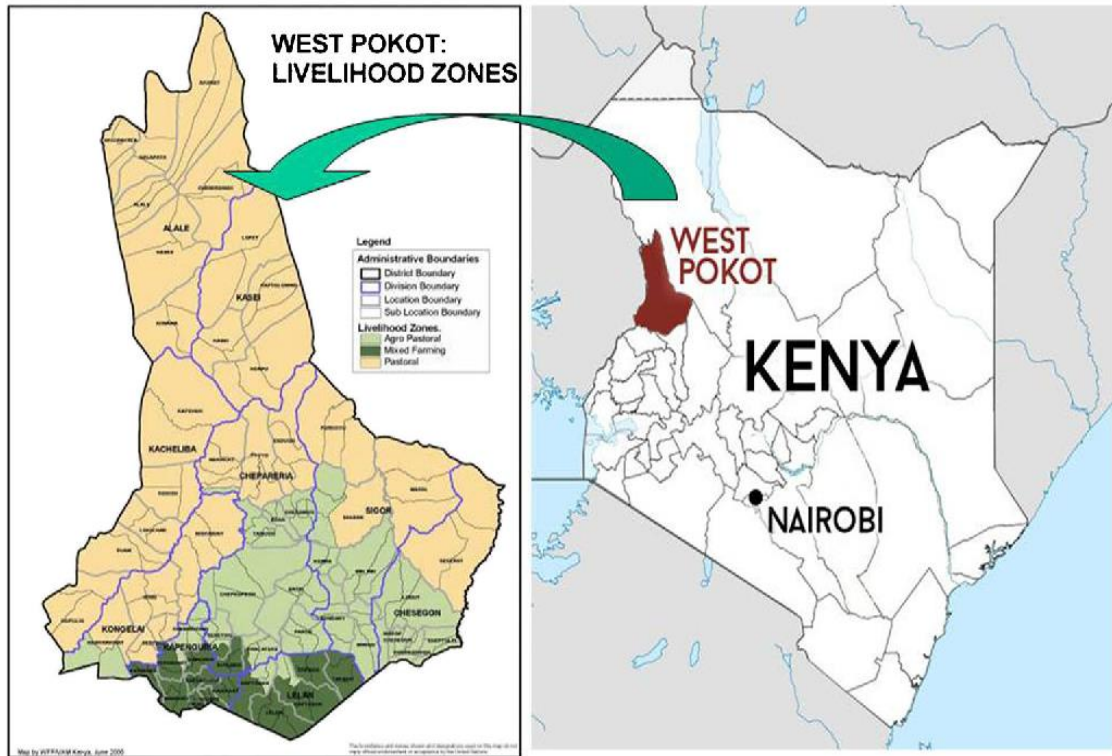
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APPENDICES

Appendix 1: Map of Kenya showing West Pokot County (The Study Area).



Appendix 2: Consent Form

My name is David Kihara Kirongo; I am a Masters student from Kenyatta University. I am conducting a study titled "Immunization coverage among children aged between 12-23 months in West Pokot County, Kenya" The information will be used to improve immunization coverage in your county and the country at large.

Procedures to be followed

As a condition of participating in this research, I must interview you and examine your kid to check for a BCG vaccine scar. To determine the baby's vaccination status, the child health card must be checked. I'll put the details you provide me in a questionnaire.

Voluntarism

You have the option to decline taking part in this research. Whether you decide to participate in the research or not, you will get the same services and treatment, and your choice will not affect the care you will get. Keep in mind that participation in this survey is entirely voluntary. You are always welcome to ask questions about the research.

You have the right to decline any question and to end an interview at any moment. You may leave the study at any time without it having any impact on the services you get from this organisation or any other in the present or future.

Discomforts and Risks

You may feel uncomfortable or embarrassed by some of the private questions you will be asked. In such case, you are free to opt out of responding to these questions. The interview

may be ended at any moment. You may have to wait an additional 30 minutes or more before receiving normal services after the interview.

Benefits

By taking part in this survey, you will aid in our quest to provide efficient Immunization services that will increase vaccination rates and disease prevention.

Reward

You won't get any benefits or money if you take part.

Confidentiality

The tests and interviews will take place in a quiet room of your house. The questionnaire will not include your name. At Kenyatta University, the surveys would be stored in a closed cabinet for security. Only the research team will have access to everything, which will be kept secret.

Contact Information

Call my supervisors, Dr. Isaac Mwanzo and Dr. Eliphas Gitonga, at 0729932026 or 0721406609, respectively, if you have any queries concerning the research. The investigators' contact number is 0722922733.

However, you may get in touch with the Kenyatta University Ethical Review Committee Secretariat at chairman.kuerc@ku.ac.ke if you have any inquiries concerning your rights as a research participant.

Participant's statement

I understand the facts mentioned above about my participation in the research. I was given an explanation of the research and the opportunity to ask questions, and my inquiries were well addressed. It is totally up to me whether or not I take part in this research. I am aware that my data will be kept private and that I have the right to withdraw at any time. I am aware that regardless of whether I choose to withdraw from the research, I will continue to get the same level of care and medical attention, and that my choice will have no impact on the level of care I receive from the clinic today or from any other clinic in the future.

Name of Participant: _____

Signature or Thumbprint:

Date:

Name of Representative/Witness (where necessary)

Relationship to Subject

Investigators statement

I, the undersigned, have described to the volunteer the procedures to be followed in the research and the risks and rewards associated in a language they can comprehend.

Name of Interviewer

Signature

Date

Appendix 3: Questionnaire

(a tool for gathering data for an MPH study on "Immunization coverage among children between 12-23 months in West Pokot County, Kenya" Author: David K. Kirongo

Interview dates:.....

Questionnaire No:

Good day/afternoon. My name is David Kirongo, and I am conducting a research in your district to determine the factors that influence the vaccination rates of children in your County who are between the ages of 12 and 23. The results of the research will be used to provide recommendations to vaccination programmes and policy makers on how to enhance Immunization coverage in this region. Your identify will not be disclosed to anybody, and the responses you provide will be kept privately.

Many thanks

Instructions: Please include all necessary information. Please check the relevant boxes in the slots given and provide the essential information when applicable.

demographic information about respondents.

Age of mother or guardian in Years

Gender Male Female

Educated to no degree []

primary [] finished primary []

second-class []

Secondary education complete []

Secondary []

Status of marriage: single [] married [] widowed [] Other (Specify) How long have you been a resident of this area? (In years).

What do you do for a living?

Teacher [Business] Farmer [Farming] [Other] (Specify).....

Please allow me to inquire about your kid (Name)

Date of the child's birth:....

child's gender

[Male] [Female]

order of a child's birth...

What number of kids do you have?

Where do you bring your kid to get their shots?

How far is the closest medical institution away?

Not more than 1 km []

1–5 kilometres [] Over 5 kilometres []

How do you go to the medical institution to bring your kid for shots?

Walking on two feet

Cycling []

Motorcycle []

Matatu ()

Other (Specify)

Making use of ANC services (Knowledge on Immunization)

Why do kids get vaccines?

To cure [] To ward off [] Diseases []

The medical community need it []

I'm not sure []

When should a youngster get all of their recommended vaccinations?

Nine months []

One year, two years, etc.

5 Years []

Where was the birth of your child?

Home []

Health Care Facility

Other (Specify) Do each of your children have an Immunization record? Yes []No []

Do you know of any medical facilities in your area?

Yes [] No []

If so, when was the last time you visited the facility?

Yes [] No []

In that case, why did you go there?

Why not, then?

Did you pay for the services rendered?

Yes [] No []

If so, how much did you shell out?(Kshs)

vaccination history and indicators

What is the child's Immunization history?

Not vaccinated []

Vaccinated just partially []

Completely vaccinated []

Why wasn't the youngster properly vaccinated prior to becoming a year old?

Unaware of the necessity for vaccinations []

Unaware that a second or third dosage is necessary; unclear location or timing of vaccination;

Fear of adverse outcomes []

What prevents your kid from being immunised?

Location of vaccination is too far away []

Inconvenient vaccination time []

Too busy for mother or guardian to []

Family issues, including mom's sickness []

Unvaccinated child came with illness []

Long waiting period []

Others (Specify) (Specify)

.....

Is there anything in your culture that stops kids from getting shots?

Yes []

No []

if it is (27), Explain

.....
.....
.....

Do you have any more knowledge that could prevent children from receiving immunizations?

Yes []

No []

If you answered "yes" to question (29), please explain.

What should be done, in your view, to increase vaccination access, uptake, and coverage in your area?

.....

.....

.....

.....

.....

.....

.....

END

We really appreciate your thoroughness in answering the questionnaire.

Total number of households visited:

Name and signature of the investigator are as follows:

Appendix 4: Key Informant Interview (KII) guide

Interview with a key informant (K): For medical professionals and community guardians

Title: Immunization rates among children in West Pokot County, Kenya, between the ages of 12 and 23 months

My name is David Kihara Kirongo, and I attend Kenyatta University for my master's degree. I'm carrying out a research called "The data will be utilised to increase vaccine coverage in your area and the nation as a whole. Immunization coverage among children aged between 12-23 months in West Pokot County, Kenya.

I'm grateful.

opening inquiries

What are a few of the children's health issues you encounter at this facility?

What safeguards are in place to prevent these illnesses and health issues from affecting children? (Check the duties of certain health professionals by asking: "What about vaccination?" if it isn't stated.)

Key inquiries: Services for vaccines

What can you tell us about the Immunization services offered at this hospital?

Check the extent of consumer satisfaction with the Immunization services being offered.

Examine how various groups, including health professionals, perceive the Immunization programme.

What are some of the difficulties in providing Immunization services at this hospital?

What are some strategies for enhancing Immunization services, in your opinion?

Key inquiries: Immunization compliance

As you are aware, the national programme establishes a vaccination schedule for the nation.

What would you say about this community's adherence to the recommended Immunization schedule?

measure the percentage of kids who promptly get all the immunizations that are advised.

Investigate the causes of some of the children's failure to obtain all of their recommended vaccinations on time.

We've been informed that there are instances when youngsters who visit other healthcare institutions are not immunised. Can you describe the situations under which you or another member of the staff might refuse to vaccinate a kid at this clinic?

Check any inconsistencies, such as those related to age, vial dosages, vaccination days, lack of vaccinations, etc.

What advice would you provide parents who need to assist their kids catch up on vaccinations?

Key inquiries; Opportunities lost

When visiting a health institution for a number of reasons (Immunization, nutrition, treatment of other illnesses, accompanying an adult to the clinic/hospital), some youngsters who may not be current on their vaccines may depart without obtaining any shots. What is your personal experience like with these kids at this hospital?

Ask yourself: How can we ensure that kids get the immunizations they are entitled to when they visit the clinic?

What, if any, tactics can the ministry of health or this medical institution use to increase the proportion of kids who get all their recommended immunizations on time?

Look for concepts or tactics that other important players or stakeholders may use.

What are the potential obstacles to putting any of these measures into practise to lessen lost opportunities, in your opinion?

Ask about potential answers to any obstacles that have been highlighted.

closing inquiries

Do you have any more recommendations or thoughts to provide at this time? Any other comments?

Appendix 5: Focus group discussion (FGD) guide

Guide for Focus Group Discussions (FGDs): Mothers' and caregivers' questions

Title: Immunization rates among children in West Pokot County, Kenya, between the ages of 12 and 23 months

My name is David Kihara Kirongo, and I attend Kenyatta University for my master's degree. I'm carrying out a research called "The data will be utilised to increase vaccine coverage in your area and the nation as a whole. Immunization coverage among children aged between 12-23 months in West Pokot County, Kenya.

I'm grateful.

opening inquiries:

What are some of the health issues affecting kids in this neighbourhood?

How are your kids guarded from contracting these illnesses or health issues?

Ask a question concerning vaccination if it isn't addressed.

Important considerations: Immunization

How does the neighbourhood feel about Immunization of children?

What information can you provide on the community's vaccination programmes for children?

Ask about their satisfaction levels with the Immunization treatments they get from public and/or private clinics/hospitals and what they liked and didn't like about them.

Ask why and inquire as to the causes of their happiness or discontent.

What are some ways these Immunization services may be enhanced, in your opinion?

Key inquiries: Vaccine compliance In our nation, as you may be aware, a vaccine schedule is established by the national programme. What would you say about vaccination schedule adherence in your neighbourhood?

Many kids don't get all of the required vaccinations in a timely manner. What are some of the reasons why kids don't get all of their vaccinations when they should?

What advice would you give parents to ensure that their kids get all the required vaccinations on time?

Key inquiries: Opportunities lost

Children who attend medical institutions for a variety of reasons may fail to get all the recommended vaccinations. What are some possible reasons, in your view, why some medical professionals may not be able or willing to give children all of the advised vaccinations in a timely manner when they visit the clinic or hospital?

Some kids obtain some but not all of the necessary vaccinations. What, in your view, are some of the why moms or caregivers may not be able or willing to make sure their kids get all the immunizations they need when they go to the doctor or hospital on time?

What are the best practises for ensuring that children get all of the necessary vaccinations on time anytime they have the chance to attend a clinic or hospital for any reason—whether it be for Immunization, nutrition, the treatment of other illnesses, or to go with an adult—regardless of why?

closing inquiries

Would you want to provide any further advice or thoughts at this time? Any other comments?

Do not forget to end with a supportive statement on vaccinations and increased use of Immunization services.

Appendix 6: Graduate School Research Authorization



**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Our Ref: Q57/37556/2017

DATE: 22nd September, 2020

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

Dear Sir/Madam,

**RE: RESEARCH AUTHORIZATION FOR MR. KIRONGO DAVID KIHARA REG.
NO. Q57/37556/17**

I write to introduce Mr. Kirongo David Kihara who is a Postgraduate Student of this University. He is registered for M.P.H. degree programme in the **Department of Community Health & Epidemiology**.

Mr. Kirongo intends to conduct research for a M.P.H. thesis Proposal entitled, **"Immunization Coverage among Children Aged Between 12-23 Months in West Pokot County, Kenya."**

Any assistance given will be highly appreciated.

Yours faithfully,


**PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL**



Appendix 7: Kenyatta University Ethical Review Committee (KUERC) Approval



**KENYATTA UNIVERSITY
DIRECTORATE OF ETHICS REVIEW COMMITTEE**

Fax: 8711242/8711575
Email: chairman.kuerc@ku.ac.ke
Nairobi, 00100

P. O. Box 43844,

Tel: 8710901/12

Website: www.ku.ac.ke
Our Ref: **KU/ERC/APPROVAL/VOL.1**

Date: 1st February, 2021

David Kirongo
P.O BOX 43844-00100
Nairobi.

Dear Mr. Kirongo,

**APPLICATION NUMBER: PKU/2180/11324 IMMUNIZATION COVERAGE AMONG CHILDREN
AGED BETWEEN 12-13 MONTHS IN WEST POKOT COUNTY, KENYA**

This is to inform you that **KENYATTA UNIVERSITY DIRECTORATE OF ETHICS REVIEW COMMITTEE** has approved version 4 of the study protocol together with the attached consent forms dated 12.09.2020. Your application approval number is **PKU/2180/11324**. The approval period is **1st February, 2021 TO 1st February, 2022**.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, MTA) will be used
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by **KENYATTA UNIVERSITY DIRECTORATE OF ETHICS REVIEW COMMITTEE**.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **KENYATTA UNIVERSITY DIRECTORATE OF ETHICS REVIEW COMMITTEE** within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to **KENYATTA UNIVERSITY DIRECTORATE OF ETHICS REVIEW COMMITTEE** within 72 hours

- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to **KENYATTA UNIVERSITY DIRECTORATE OF ETHICS REVIEW COMMITTEE.**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances needed.


Yours sincerely



Prof. Judith Kimiywe

DIRECTOR- KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE.

Appendix 8: National Commission for Science, Technology & Innovation License


REPUBLIC OF KENYA


**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION**

Ref No: 592080 **Date of Issue: 15/February/2021**

RESEARCH LICENSE



This is to Certify that Mr. David Kihara Kirongo of Kenyatta University, has been licensed to conduct research in Westpokot on the topic: IMMUNIZATION COVERAGE AMONG CHILDREN AGED BETWEEN 12-23 MONTHS IN WEST POKOT COUNTY, KENYA for the period ending : 15/February/2022.

License No: NACOST/1P/21/8861

592080

Applicant Identification Number


Director General
**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY &
INNOVATION**

Verification QR Code



NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix 9: Authorization to Carry Out Research In West Pokot County



REPUBLIC OF KENYA
COUNTY GOVERNMENT OF WEST POKOT

WHEN REPLYING PLEASE QUOTE
EMAIL: cs@westpokot.go.ke
WEBSITE: www.westpokot.go.ke

P.O BOX 222 - 30600
KAPENGURIA

OFFICE OF THE COUNTY SECRETARY.

Ref: WPC/CS/RESEARCH/1/2021

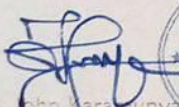
24th February, 2021

TO WHOM IT MAY CONCERN.

RE: AUTHORITY TO UNDERTAKE RESEARCH IN WEST POKOT

This is to notify you that the bearer of this letter, Mr. David Kihara Kirongo-NACOSTI/P/21/8861 has been granted permission to undertake research on the topic: **IMMUNIZATION COVERAGE AMONG CHILDREN AGED BETWEEN 12-13 MONTHS IN WEST POKOT COUNTY**, for the period ending 15th February, 2022.

Through this letter therefore, you are requested to accord him any necessary cooperation and assistance he may require.


Mr. John Karamunya
Ag. County Secretary
COUNTY GOVERNMENT OF WEST POKOT

