PERSUASIVE COMMUNICATION AND ADOPTION OF ROUTINE IMMUNIZATION OF CHILDREN AGED 0-5 YEARS IN BOMET COUNTY

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Persuasive Communication and Adoption of Routine Immunization of Children Aged 0-5 Years in Bomet County

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Health Communication of the Jomo Kenyatta University of Agriculture and Technology

2021

DECLARATION

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

Signature…… Date……..

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This thesis has been submitted for examination with our approval as university supervisors.

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DEDICATION

I dedicate this work to my beloved son, Roy Munene, who got lost in line of duty. May God keep him safe and bring him home soonest.

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ACRONYMS AND ABBREVIATIONS

BCG	Bacille Calmette-Guerin
CDC	Centre for Disease Control and Prevention
DPT	Diphtheria, Tetanus and Pertussis Vaccine
DVI	Division of Vaccines and Immunization
ELM	Elaboration Likelihood Model
EPI	Expanded Program of Immunization
FIC	Fully Immunized Child
GAVI	Global Alliance for Vaccines and Immunizations
GVAP	Global Vaccine Action Olan
Hep	Hepatitis B
Hib	Haemosphilus Influenza type B
HIS	Health Information System
HIV	Human Immunodeficiency Virus
KDHS	Kenya Demographic and Health Survey
KEPI	Kenya Expanded Programme on Immunization
LMICs	Low and Middle-income Countries
MOH	Ministry of Health
MR	Measles Rubella
NGOs	Non-governmental Organizations
OPV	Oral Polio Vaccine
PCV	Pneumococcal Conjugate Vaccine
SPSS	Statistical Package for Social Science
UHC	Universal Health Coverage
UNICEF	United Nations Children Fund
VPDs	Vaccine Preventable Diseases
WHO	World Health Organization

OPERATIONAL DEFINITIONS

A fully immunized child (FIC) is one who has received Bacillus Calmette Guerin (BCG) against Tuberculosis at birth, three doses of polio and pentavalent (diphtheria-tetanus-pertussis-hepatitis B (Hep), Haemosphilus influenza type B (Hib) vaccine at 6, 10 and 14 weeks of age and a measles vaccine at 9 months of age.

Immunization/Vaccination is the process where by whereby the child a child is made immune or resistant to an infectious diseases by being given vaccine. These terms are used interchangeably

Adoption Adoption means that a person does something differently than what they had previously. In this case, the person acquire and perform a behavior (immunization).

Communication This is an exchange of facts, ideas, opinions, or emotions by two or more person

Channel The medium being used to transmit a message

Immunization/vaccination Immunization of children is the process whereby the child is made immune or resistant to an infectious disease, by being given vaccines. These terms are used interchangeably.

Message The content that is being communicated

Receiver	The person or audience who the message is directed to
Sender	Source of the message or the person who originates the message. The person or source sends the message to the receiver
Support	Perception and actuality that one is cared for, has assistance available from other people and most popularly, that one is part of a supportive social network. These supportive resources can be emotional (nurturance), informational (advice), or companionship (sense of belonging); tangible (financial assistance) or intangible (personal advice). Support can come from many sources, such as spouse, family, friends, neighbors and governmental organizations.
Vaccine	Vaccine is a product that stimulates the child's immune system to produce immunity to a specific disease, protecting the child from non-communicable and communicable vaccine preventable diseases.

ABSTRACT

An estimated two to three million annual deaths from Vaccine Preventable Diseases (VPDs) can be avoided through immunization. Currently, about 19.5 million infants miss out on routine immunization globally. Communication is becoming increasingly important has it has been found to improve adoption of health services including immunization in areas with such challenges. Studies have proved that areas that have considered the evolving nature of communications and communication strategies are fully and well-employed immunization, coverage is high. The main objective of the study was to determine persuasive communication factors influencing adoption of routine immunization of children age 0-5 years in Bomet County. The specific objectives were to establish the influence of message content, channel of communication, receiver characteristics, sender characteristics and the moderating influence of support systems on relationship between persuasive communication and adoption of routine immunization services. The study was premised on two theories: Elaboration Likelihood Model of communication and Diffusion of Innovation Theory. The study employed a mixed method research design in which interviewer administered questionnaires and Key Informant Interview guide were the tools used to collect data. Data collection procedure was cross-sectional facility based, targeting caregivers seeking services for children aged 0-5year, whose monthly average was found to be 1,747. The sample size was 384 and stratified random sampling method was applied to select the respondents in the five Sub-county health facilities (the five strata). The 384 study participants were allocated to the five Sub-counties proportionately and achieved response rate of 95.1%. Systematic random sampling method was used to pick the study participants at the health facility level. Data was trasformed according to the identified themes, edited then analyzed using SPSS tool. Both descriptive and inferential statistics were applied in the analysis. In particular, descriptive statistics was conducted using measures of central tendencies and measures of dispersion while inferential statistics was performed based on logistic regression model, which was the proposed model for the study. The study findings were presented using charts, graphs and tables. From the study finding, it was confirmed that, message content, channel of communication, sender and receiver characteristics had positive influence on adoption of routine immunization. Additionally, when support systems were introduced to the persuasive communication variables, the influence became more significant. The study recommended that routine immunization messages be made frequently available, targeted and tailored to the caregivers of children aged 0-5 years. Secondly, community should be involved in advocacy towards adoption of routine immunization, to create ownership and adoption sustainability. Additionally, health workers should be motivated towards good practice in Healthworker-client communication, specifically, persuasive communication to build trust from the caregivers. The researcher recommends comparative studies, comparing the well performing Counties with Bomet County. Additionally, studies be conducted to find other factors, other than persuasive communication, that may raise adoption of Routine Immunization to the World Health Organization recommended Fully Immunized Child rate of 95%.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

1.1.1 Global perspective

According to World Health Organization (WHO), an estimated two to three million annual deaths from Vaccine Preventable Diseases (VPDs) can be avoided through immunization. Approximately 19.5 million infants, who currently miss out on basic immunization, largely depends on collective capacity and resolve to improve the global vaccination coverage rate further from 86%, which had stalled over the past few years. Efforts are required to address the gaps in coverage rates for the different immunizations, as well as the variations in coverage rates that exist across regions and countries (WHO, 2017).

The VPD among children are tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus, viral hepatitis, haemophilus influenza, pneumonia, Rotavirus, and measles. These diseases are divided into three categories for their effective management. There are those diseases targeted for elimination, others for eradication and those that are for control. Vaccination being one of the most important and cost-effective public health services for children, significant progress has been made towards the development of effective national immunization programs and the major contributor to this success is the EPI, WHO, UNICEF and GAVI. EPI was launched in 1974 as a worldwide alliance of collaborating nations whose goal was to expand immunization services and coverage in order to save children from life-threatening, disabling vaccine-preventable diseases. The program has contributed to improvements in vaccination coverage. However, the proportion of children completing the recommended vaccination schedule has not increased as anticipated. Identification of factors resulting in the failure to vaccinate or to complete the vaccination schedule is important in order to achieve the EPI targets (UNICEF, 2016).

Despite the fact that 123 million children were immunized globally in 2017, millions more were still not reached by potentially lifesaving vaccines. Through targeted vaccine communication strategies, resulting to demand creation for immunization, the world is closer than ever to eradicating polio. Globally, there are only three countries remaining polio endemic; Afghanistan, Nigeria and Pakistan. Mortality from measles, a major child killer, declined by 85 per cent worldwide and by 89 per cent in Sub-Saharan Africa between 2000 and 2016 (Nyaku et al., 2017). The researcher further stated that maternal and neonatal tetanus, a disease with a fatality rate of 70 to 100 per cent among newborns, has been eliminated all but 14 countries as at March 2018. This gain has been attributed to vaccine communication strategies. The percentage of children receiving the diphtheria, tetanus and pertussis vaccine is used as an indicator to assess how well countries are providing routine immunization services. Global vaccine plan (GVAP) target of 90 per cent or greater coverage of DTP3 for children under one year worldwide, was not achieved in 2017, with approximately 20.8 million children failing to receive a single dose of measles-containing vaccine (WHO, 2018).

1.1.2 African perceptive

In developing countries, the disproportional rate of morbidity and mortality from vaccine preventable diseases (VPDs) among children under 5 years of age continues to generate discussions on the need for concerted efforts and innovative strategies to address factors militating against the achievement of universal access to immunization by year 2020, the year was the initially conceptualized target by the World Health Assembly's Global Vaccine Action Plan (GVAP) (WHO, 2014). In recognition of the less than desired gains achieved through the GVAP and the need to address other challenges relating to lower than expected immunization coverage and also slower adoption of newer vaccines by low and middle-income countries, WHO member countries found the need for a renewed global commitment to end preventable deaths of newborns and children under 5 years of age by 2030. This was agreed and documented in the Sustainable Development Goals (SDGs) which called for vaccination risk communication in all WHO member countries (WHO, 2016).

Although Africa has made some progress in immunization services, large numbers of children remain unvaccinated and under-vaccinated. In 2017 for example, only a quarter of eligible children in Nigeria receive all recommended vaccinations (Oku et al., 2017). This coverage is far below the 90% WHO targeted recommended coverage that can help in achievement of sustained control of VPD (WHO, 2016). According to studies some of the reasons identified for Nigeria's consistently low immunization coverage rates include caregivers' poor knowledge of immunization, leading to low confidence and lack of trust; concerns about immunization safety; long distances to and long waiting times at health facilities and poor attitudes and skills of health workers (Olorunsaiye & Degge, 2016). In addition, the low adoption has been linked to gaps in communicating vaccination information, which has been demonstrated in a 2011–2015 multi-year plan, where the Cameroonian vaccination program identified a lack of focus on routine vaccination communication. In Nigeria, other factors; such as insufficient implementation of communication interventions, low levels of 'passion' of health district supervisors for communication activities, low levels of financing, insufficient involvement of stakeholders such as opinion leaders, traditional leaders and religious authorities were noted to have a role in the low adoption of routine immunization. Majorly, lack of training of focal communication persons particularly in routine immunization were further cited as the reason for the low routine immunization adoption(Oku et al., 2017).

In the area of public health, communication is becoming increasingly important that it has been found to improve adoption of health services including immunization in areas with such challenges. In countries, which have achieved at least 50% of the children immunized, studies have proved that childhood diseases and infant mortality rate are significantly lower. Areas that have considered the evolving nature of communications and the emergence of new media as a communication channel immunization coverage is high. In these areas communication strategies are fully and well-employed pre and post any vaccination campaign (Mutua et al., 2016).

1.1.3 Kenyan perspective

Ministry of Health (MOH), through advocacy, is constantly working towards persuading their clients to change their health seeking behaviors. Advocacy and communication interventions are inevitable in as much as immunization services are accessible, affordable and available. Inspite of the fact that Ministry is striving to have free routine immunization vaccines accessible, there are still groups, which are hesitant. These hesitant groups can easily bring about cases of disease outbreaks that could affect many others (MOH, 2013). According to MOH, development of a communications plan should be put in place, as a priority, should a new vaccine be introduced to create awareness and demand for the same. As one of the guiding principles on immunizations services, the MOH is to ensure provision and ease of access to immunization services to all Kenyans. To be able to link immunization with communities, MOH has put a plan to use community endorsed materials that have been seconded by the community gatekeepers (religious or/and cultural). The MOH should engage communities and other stakeholders for them to own advocacy programs when designing communication interventions (KMOH, 2014).

Vaccination communications, according to Kenya Ministry of health, need to engage the affected populations so that they can take informed decisions to protect themselves and their loved ones. Most appropriate and trusted channels of communication and engagement should be utilized. Persuasive communication strategies needs to bring together a diverse range of expertise in the field of communication, social sciences such as in mass media, emergency and crisis communication, social media, health education, health promotion, communication for behavior change and support strengthening techniques in order to achieve public health goals in emergencies (KMOH, 2014).

Government of Kenya puts key focus on life threatening vaccine preventable diseases as other peer countries do. According to (KDHS, 2014), infant mortality rate is 39 deaths per 1000 live birth, some of these deaths, having been brought about by vaccine preventable diseases. The report also indicates that only 68% of children in Kenya are fully vaccinated. Communication is one of the basic tenets in

health intervention programs. However, noise and distractions, competing messages, filters and channel breakdowns come in as communication barriers in any communication environment (Mutua et al., 2016). The context of caregivers' decision-making around immunization is key in understanding the communication strategies that campaigns should use. Common explanations, for non-adoption of routine immunization, by women are that they have no time to take a child to receive a vaccine and having too many household chores. To understand household-level decisions that affect utilization, communication strategist have to consider the trade-offs of competing demands on caregivers' time (WHO, 2014).

This study was conducted in Bomet County, one of the 47 Counties, located in South Rift region of Kenya. The county is dived into five (5) Sub-counties, 25 wards, 66 locations, 177 sub-locations and 1,977 villages. The Sub-Counties are Bomet Central, Bomet East, Chepalungu, Sotik, and Konoin (Bomet County Government, 2018). Bomet is a multi-ethnic County but predominantly occupied by Kipsigis sub-tribe of the Kalenjin tribe with its headquarters at Bomet Town based in Bomet central Sub-County. The major economic activities are dairy, tea and beef farming (Bomet County health records, 2018). The routine immunization adoption for the County stands at 50% against the national target of 90% (MOH, 2017).

1.2 Statement of the problem

A fully immunized child is an ambitious but practical indicator that should be used to measure health progress. Vaccine preventable diseases (VPDs) are life threatening and delay a country's development. However, according to UNICEF (2017) statistics, there has been a recognizable reduction of infant deaths caused by these diseases over the recent years. A major strategy to reduce vaccine preventable disease is by coming up with and reviewing communication plans with well-defined strategies that will ensure fully immunized child (FIC) in all settlements (UNICEF, 2016). In 2017, Kenya's national immunization coverage was 65% for FIC. The top performing counties at coverage above 80% were Kiambu, Turkana and Nairobi. Three counties (6%) had coverage of approximately 50%. The worst performing counties were Trans Nzoia (60%), Tana River (55%), Mandera (53%)

and Bomet 50%), (WHO 2017). Bomet was purposely selected for the study for this reason of being the lowest performing.

According to WHO (December 2017), Bomet County fully immunized children were at 50%, against the national target of 90% and above. This low coverage was being witnessed inspite of the fact that the government of Kenya has put key focus on these life-threatening VPDs as other peer countries do. The report further stated that the reasons for this coverage was not attributed to vaccine or commodity stock outs as there had been none reported in the County and attributed the low adoption to knowledge gap and low literacy levels among the care givers that hinders effective communication. This puts the County at a very high risk of children suffering from the communicable VPDs (MOH HIS, 2017). There have been studies conducted in this field:- Harvey et al (2016) conducted a study on parental reminder, recall interventions to improve childhood immunization adoption: A systematic review and meta-analysis. Oku et al (2017), studied factors affecting the implementation of childhood vaccination communication and educational strategies in Nigeria and found that message, channel, sender and receiver characteristics influenced adoption of routine immunization. In another study by Heather (2017), on parents' and informal caregivers' views and experiences of communication about routine childhood vaccination, the findings too support these communication characteristics as a factor in adoption. These studies among others supported the role of these variables on adoption of vaccination or lack thereof. The scholars stated that when these factors are addressed, there is assurance of adoption of routine immunization services.

The study target population was caregivers seeking services for children aged 0-5years from the five sub-county hospital. The number estimated to be 1,747 per month (Bomet County health records, 2018). The study used two theories: Elaboration likelihood mode of persuasion (ELM) and diffusion of innovation theory. The study used convergent parallel mixed method design to examining the influence of message content, channel, sender and receiver characteristics on the adoption of routine immunization as independent variables. Additionally, the

moderating influence of support systems on the relationship between persuasive communication on adoption of routine immunization was examined.

1.3 Study objectives

1.3.1 General objective

To determine persuasive communication factors influencing adoption of routine immunization of children aged 0-5 years in Bomet County

1.3.2 Specific objectives

1) To establish the influence of message content on adoption of routine immunization of children aged 0-5 years in Bomet County
2) To examine the influence of channel of communication on adoption of routine immunization of children aged 0-5 years in Bomet County
3) To determine the influence of sender characteristics on adoption of routine immunization of children aged 0-5 years in Bomet County
4) To investigate the influence of receiver characteristics on adoption of routine immunization of children aged 0-5 years in Bomet County
5) To establish the moderating influence of support systems on the relationship between persuasive communication and adoption of routine immunization of children aged 0-5 years in Bomet County.

1.4 Study hypothesis

H_{01}: Message content has no significant influence on adoption of routine immunization of children aged 0-5 years in Bomet County

H_{02}: Channel of communication has no significant influence on adoption of routine immunization of children aged 0-5 years in Bomet County

H_{03}: Sender characteristics has no significant influence on adoption of routine immunization of children aged 0-5 years in Bomet County

H_{04}: Receiver characteristics has no significant influence on adoption of routine immunization of children aged 0-5 years in Bomet County

H_{05}: Support systems has no significant moderating influence on the relationship between persuasive communication and adoption of routine immunization of children aged 0-5 years in Bomet County.

1.5 Significance of the study

This section is structured into four parts; the households and community, the County, policy makers and new knowledge. It discussed the significance of the study at these different levels.

1.5.1 Households and community

VPDs have been known to cause high rate of mortality and morbidity to those that do not adhere to the vaccination practice worldwide. The concept of health is wealth is so applicable at current times more than ever before. A family with a sick member and for this case, a child, has so much to lose in terms of life, time and money. Achieving a 90%, fully immunized coverage reduces by a great extent these losses because vaccination is the most effective and cost effective intervention in vaccine preventable diseases, which are the cause of most outbreaks. The findings of this study will therefore be used to develop communication strategies that will enable households and by extension community at large to have healthier children.

1.5.2 Bomet County

Considering the rapid mode of transmission of infectious diseases, attaining 90% fully immunized children in Bomet County will translate to herd immunity. A fully immunized child has more resistance to vaccine preventable disease, which are a known cause of high infant and child morbidity and mortality. The findings of this study will inform the means through which caregivers are influenced by use of persuasive communication strategies to take up the services and improve the current adoption from 50% to the recommended national target of 90%. This kind of coverage will also support the county in attaining the government agenda on

universal health coverage (UHC). Despite the low immunization coverage, Bomet County integrated National plan 2018-2022, does not focus on improving adoptions of routine immunization, instead the health priority on the plan is improving adoption of family planning. The findings of this study will put open the communication gaps in adoption of routine immunization and guide the County on the communication program that will raise the adoption of routine immunization to the national target.

1.5.3 Policy makers

The study is important to the policy makers in the Ministry of Health in Bomet County. Additionally, other key health stakeholder and partners in the immunization discourse will use study findings and recommendation to improve immunization coverage. Scrutiny on effectiveness of communication strategies that influence full child immunization in a representative sample of the county will enable the government to come up with new, effective, targeted and well-tailored communication messages. This with appropriate strategies guided by well-articulated policies, projects and programs will improve adoption of routine immunization. By ensuring increased, sustained and timely adoption of immunization service, the Country will be able to attain the WHO target of fully immunized children at 90%. This will in turn translate to a reduction in national infant and child morbidity and mortality leading to healthy growth of children in Kenya.

1.5.4 Body of knowledge

The findings of this study will contribute to the existing knowledge on persuasive communication factors influencing adoption of vaccination while considering the moderating role of support systems. The finding of this study will add value to the body of knowledge that is useful to the scholars both in the field of public health and health communication.

1.6 Scope of the study

The purpose of the study was to determine persuasive communication factors that influence adoption of routine immunization of children age 0-5 years in Bomet County. The target population was caregivers seeking services for children aged 0-5 years with an estimated number at 1,747 children (Bomet County health records, 2018). The independent variables are the communication factors; message content, channel of communication, receiver and sender characteristic. The moderating variable was support systems, with the dependent variable, adoption of routine immunization of children age 0-5 years in Bomet County.

In 2017, the County's five Sub-counties fully immunized child coverages were as follows: Chepalungu at 46%, Konoin 56% and Bomet central 51%, Sotik 48% and Bomet East 47%. This translates to 50% coverage for the County. Considering this performance, which is far below the national target of 90%, the five Sub-counties were involved in the study.

The study used two theories: The Elaboration likelihood model of persuasion (ELM) and Diffusion of innovation theory. ELM was selected for the study being a powerful theory of persuasion. The theory has been used in other studies to scrutinize information that requires cognitive resources. When the individual is not motivated and/or does not have enough prior knowledge to engage in evaluating a piece of information, information processing takes place through peripheral routes (Petty & Cacioppo, 1986). In such cases, the information recipient evaluates the information based on some peripheral cues (e.g., the credibility, reliability, and attractiveness of the information source) associated with the information and not the information itself (Bhattacherjee & Sanford, 2006).

Diffusion of innovation theory was also best fitted for this study because immunization is an innovation used in health as an intervention in disease prevention. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. The key to adoption is that the

person must perceive the idea, behavior, or product as new or innovative. It is through this that diffusion is possible.

Literature within five years was reviewed to help the researcher understanding of the study and promote scholarly. Additionally, according to Boyer (2016), this will help in articulating clear goals, show evidence of adequate preparation, select appropriate methods, communicate relevant results and engage in reflective critique. The study employed mixed method (qualitative and quantitative) design.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents previous work from which this study draws. Empirical literature on influence of persuasive communication factors in adoption of routine immunization and the moderating influence of support were reviewed. The study specific objectives were; 1. To establish the influence of message content on adoption of routine immunization 2. To examine the influence of channel of communication on adoption of routine immunization 3. To determine the influence of sender characteristics on adoption of routine immunization 4. To analyze the influence of receiver characteristics on adoption of routine immunization and 5. To establish the moderating influence of support systems on the relationship between persuasive communication and adoption of routine immunization of children age 0-5 years in Bomet County.

To put the study variables to perspective, the chapter analyzed theoretical framework that guided the study, conceptual framework, highlighted literature review, analyzed available literature on the routine immunization adoption in relation to persuasive communication factors. This was followed by a summary of the literature and gaps that the study attended to.

2.2 Theoretical framework

The study was informed by two theories: Elaboration likelihood model (ELM) of persuasion and Diffusion of Innovations Theory.

2.2.1 Elaboration likelihood model (ELM)

Elaboration likelihood model informed the message, receiver and sender factors. ELM considers persuasion as a cognitive event primarily, that is, the targets of persuasive messages use mental processes of motivation and reasoning (or a lack thereof) to accept or reject persuasive messages. The model developed by Petty and

Cacioppo in 1986, posits two possible routes or methods of influence: centrally routed messages and peripherally routed messages.

ELM, a powerful theory of persuasion, recognizes that sometimes audiences are active, thinking about messages and the arguments in those messages. However, the theory also recognizes that at other times receivers are passive, being persuaded by the peripheral route. Central processing requires that receivers have both ability and motivation to think about a message. ELM identifies several factors that influence the kind of thoughts listeners are likely to have: involvement, argument quality, argument quantity and credibility. Thus, conceptually this is a good theory of persuasion (Calder et al, 1974). Petty and Cacioppo inadvertently created the impression that listeners do either central or peripheral processing, but not both, by the metaphor they chose to explain their theory. This is not the case in real life situations where one tends to combine the two routes (Eagly & Chaiken, 1975).

2.2.2 Diffusion of innovations theory

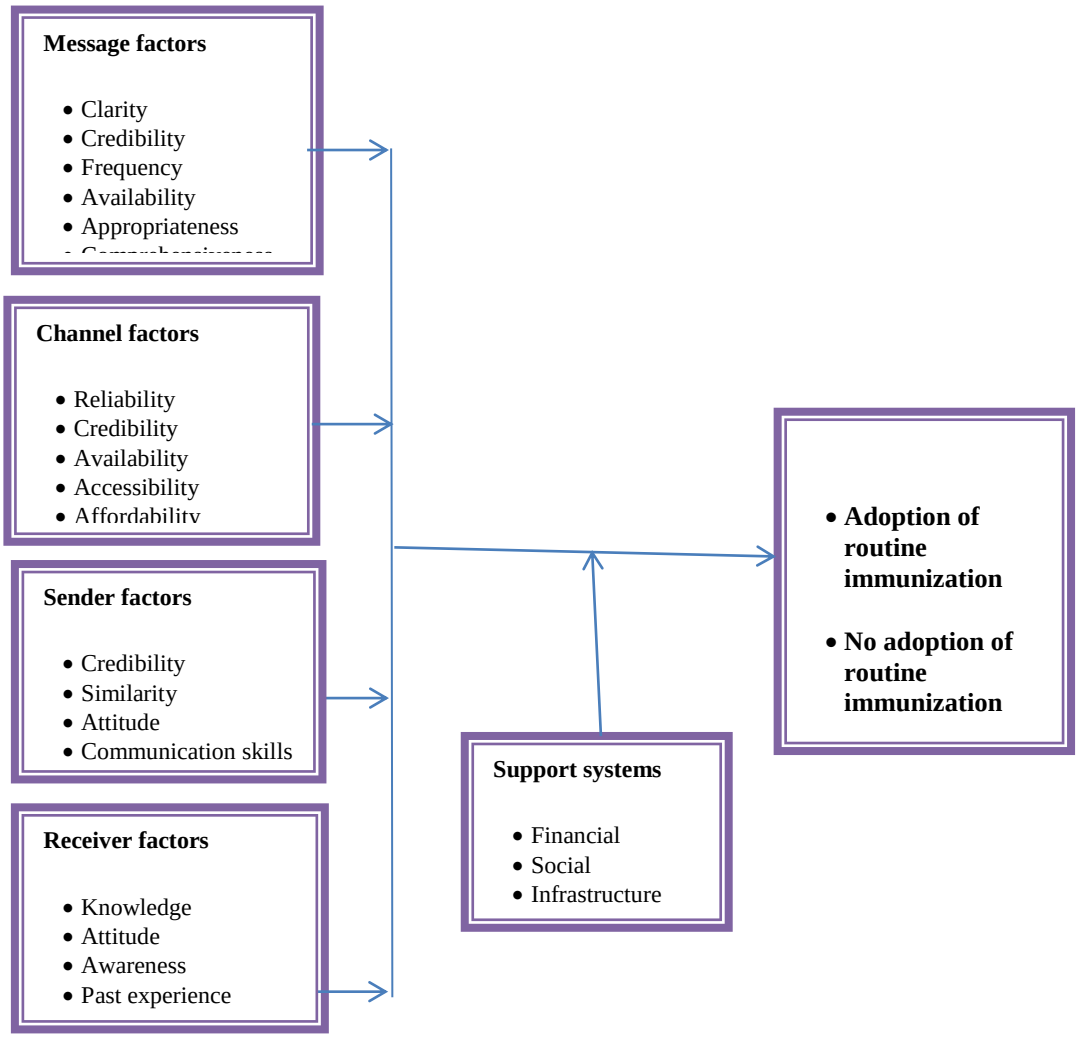
Diffusion of innovations theory informed; channel of communication factors, the moderating variable (support systems) and dependent variable (adoption of immunization). Diffusion of innovation theory was developed by E.M. Rogers in 1962. This theory seeks to explain how, why, and at what rate new ideas and technology spread. Rogers argues that diffusion is the process by which an innovation is communicated over time among the participants in a social system. Since it start in rural sociology, Diffusion of Innovations has been applied to numerous contexts, including medical sociology, communication, marketing, developmental studies, health promotion, organizational studies, knowledge management, and complexity studies, with a particularly large impact on the use of medicines, medical techniques, and health communication.

Support is the combination of external influence (mass media, organizational or governmental mandates) and internal influence (strong and week social relationships, distance from opinion leaders). There are many roles in support systems and their combination represents the total influences on a potential adopter. Communication channels allow the transfer of information from one unit to the

other and facilitate the occurrence of a diffusion. The passage of time is necessary for innovation to be adopted since they are rarely adopted instantaneously (Ryan & Gross 1943).

2.3 Conceptual framework

A conceptual framework is a diagrammatical research tool to assist the researcher develop awareness and understanding of the situation under scrutiny. Further, it demonstrates the relationships that exist between the dependent, independent and moderating variables under investigation. As an analytical tool, it has several variations and contexts (Creswell, 2013). The study has four independent variables, a moderating and a dependent variable. The independent variables are; message content factors, channel of communication factors, receiver and sender factors. Support systems is the moderating variable, adoption of routine immunization being the dependent variable. The ELM of persuasion was adopted for the content message, sender and receiver factors. The diffusion of innovations theory informed the channel of communication, support and dependent variables.



Independent variables **Moderating Variable** **Dependent variable**

Figure 2.1: Conceptual framework

2.3 Review of Variables

2.3.1 Message factors on adoption of routine immunization

According to Karmin (2016), a message, in rhetorical and communication studies, is defined as information conveyed by words (in speech or writing), and/or other signs and symbols. A message (verbal or nonverbal or both) is the content of the communication process. Message conveyer in a communication process is the sender; the sender conveys the message to a receiver. For this communication,

process to be complete a message should be clear, language used must be understood by the receiver and should be timely. Message appeal, frequency and message availability are important attributes in effective communication (Haji et at, 2016). Communication plans therefore should work well for caregivers as much as possible, empowering them to make their own decisions. In addition, they should use clear and simple language understood by the caregivers. List of the actions necessary to meet the set goals and the communication interventions must be reviewed and evaluated, changed and updated regularly with the involvement of the caregivers who through their children are in this case the target clients (Olorunsaiye & Degge, 2016).

Olorunsaiye & Degge (2016), states that implementation of strategic communication about childhood vaccination around the world, is done to generate and maintain demand for routine vaccination and to promote large-scale vaccination campaigns. Vaccine demand creation communication messages are key with the emergence of growing interest in communication as a potentially effective strategy to address vaccine hesitancy (UNICEF, 2016). According to Kaufman et al (2017), vaccination communication concept includes many interventions with a number of aims. The purpose being: to inform or educate, remind or recall, enhance community ownership, teach skills, provide support, facilitate decision-making, and enable communication.

Message can affect adoption of the vaccination if the message is not clear, specific, not timely, frequently repeated, not in a language that the receiver understands and at times, the message may not be available at all (Oldstein, 2015). A study conducted in Nigeria found that that effective vaccination communication with parents is critical in efforts to overcome barriers to childhood vaccination, tackle vaccine hesitancy and improve vaccination coverage. The scholar found that limited information exists regarding the perceptions of caregivers and health workers on the vaccination communication strategies employed in Nigeria (Oku, 2017). Oku attributed the knowledge gap to poor message construction, message that were not tailored to the target audience and poor communication skills on the part communicator.

Jacobson et al (2018), in a Systematic Reviews recommended that as technologies mature, researchers should consider how they can enhance reminder and recall interventions and what improvements in their effect can be achieved towards adoption of routine immunization. A critical issue involves the complexity of 'rules' required for a reminder or recall system. The simplest scenario involves older adults, because no special immunization algorithm is needed, and eligible patients can be selected by birth dates.

A study in Burkina Faso in the early 2010s showed that caregivers who had been exposed to a variety of interpersonal and media messages were more likely to know the requirements to complete vaccination schedule and know the dates for specific vaccines than caregivers in the control group. An intervention in Ethiopia found that "reminder/prompt" materials reduced dropout rates compared to the control group. Community health providers followed 6-week-old to 23-month-old children who visited vaccination centers to determine whether reminder stickers applied to the inside of their home front door would reduce immunization dropout rates (Waisbord & Larson, 2015). The health workers gave a circular sticker with a picture of a child receiving a vaccination and an appointment date to one group of caregivers. The immunization dropout rate of children whose caregivers received a reminder sticker was 55 percent lower than that of the control group of 7.3 percent against 13.3 percent (Hermann, 2017).

2.3.2 Channel factors

Leask et al (2017) defines a channel as a medium of message transfer need to be available and appropriate for the target population. Some of the channels considered are Radio, T.V. and Posters. These channels will require different message targeting and tailoring for effective communication and message retention. The mass media are important for creating awareness and knowledge and stimulating others to participate in the campaign process. The scholars further found that caregivers' knowledge on available vaccines, their receptive attitudes, exposure to mass media outputs and giving birth in big intervals ensured full immunization of their children. Improving and imparting education to caregivers in

Kenya as a way of achieving high vaccination rates and reduction of drop-outs. Improving caregivers understanding of communication campaigns appearing in the media. With increase in demand for vaccination services, communication intervention programs are what are needed most to ensure fully immunized children (Nyaku et al, 2017).

There is need for a methodical and proactive communication strategy to respond to misinformation and anti-immunization activities, this is according to WHO Strategic Advisory Group of Experts on Immunization. Communication is one of the basic tenets in health intervention programs. Noise and distractions, competing messages, filters and channel breakdowns however, come in as communication barriers in any communication environment (WHO, 2014). Mass media plays an important role in society. Authors in developmental communication and research and health intervention program managers obtain research questions from media outputs (Oku et al, 2017). Media frames (intended or unintended) ways that can provide effects of influence to their audiences. When immunization programs are mentioned in the press, less than one-third of times reference is made to national and international authorities' positions and statements (WHO, 2015). Trust in vaccines and immunization is being increasingly undermined and anti-vaccination movements capitalize the potential offered by the new means of communication. Public institutions and scientific societies are called to confront such a growing public health concern and their positions should have higher media prominence (Oldstein, 2015).

Having interpersonal communication activities with influential local leaders (religious, medical, and political) can positively affect the community's trust in and willingness to vaccinate their children. Community leaders can not only be valuable partners in promoting immunization, but also valuable key informants to understand the nature and reasons for any concerns (Oku et al, 2017). It was observed in another study that door-to-door canvassing and strategic "miking" (the use of itinerant megaphones) accounted for increased vaccination coverage in peri-urban and rural areas in Mozambique (WHO, & UNICEF, 2013). The proportion of

respondents with correct knowledge is improved when appropriate channels were used to pass the message (Nyaku et al., 2017).

Various media were cited by one-third of Novgorod's vaccinated population, after two months, as one of the means through which they learned about the need for additional doses of diphtheria vaccine (Sabarwal, 2016). Higher exposure to media messages correlated with higher coverage rates for the same communication intervention period in Voronezh (Anderson, 2015). A media campaign, in the Philippines, was credited for increasing knowledge about measles and other vaccines in 2010. Studies have shown that good access to a well-developed media system also contributed to positive changes in knowledge and increased participation in services (Ames, 2017). During this period of the communication interventions, the percentage of fully vaccinated children increased from 54 percent to 65 percent.

In several countries, where mass media is accessible and widely consumed, a number of studies have documented the impact of mass media-particularly radio and television-on awareness and vaccination rate. Findings generally report an increase in knowledge about; the benefits of vaccines, ages for immunization, immunization schedule, and places of immunization. In addition, there was improved perceptions of seriousness of some diseases and positive shifts in attitudes regarding childhood vaccination and more discussion about immunization in the home among the caregivers when messages are shared through television or radio (Phillips, 2017).

A study in Bangladesh, demonstrated that personal communication in meetings with influential local leaders showed a statistically significant increase in knowledge of vaccines and immunization schedule among caregivers. This was attributed to the fact that political, cultural, and religious leaders are influential opinion-makers, their messages strongly affect immunization behavior. Communication with religious and political leaders is key to increase acceptance of immunization. Further, communication has been credited with increasing the acceptance of immunization campaigns in India (Waisbord & Larson, 2015).

Communication interventions that included advocacy with leaders, community involvement with service delivery and child tracking, and media partnerships at various levels were responsible for dropout reduction and immunization coverage above the national average in another study in two provinces in Madagascar in 2013 (Maharani & Kuroda, 2018; Mukungwa, 2015).

2.3.3 Sender factors on adoption of routine immunization

A 2016 study by WHO indicated that expertise in communication was found to be a factor in adoption of vaccination. Changing and reinforcing voluntary behaviour is challenging, and poorly conceived. This calls for the communicator to executed communications skills that can exacerbate vaccination hesitancy. Professional experience in the design, delivery and evaluation of promotional communications and associated service provision can achieve positive attitudes towards caregivers and improved vaccination adoption (WHO, 2016).

A study conducted by UNICEF (2016), on factors influencing vaccine hesitancy in Zimbabwe, pointed to the health workers as the major source of information on vaccination. However, they ill-treated the caregivers at facility level. The ill-treatment of caregivers by health workers especially when they miss scheduled appointments cause some of the caregivers to skip subsequent appointments or stop completely from taking up the services. In the same study, caregivers complained about the negative attitude of some health workers, whom they alleged verbally abuse them for asking questions.

Additionally, they indicated that some health workers hardly commit time to explain the vaccines, symptoms of the disease prevented by the vaccine, the benefits of vaccination, and the importance of respecting the vaccination schedule but merely serve them passively. Without heightened awareness and adequate knowledge of the importance of vaccination, the propensity of vaccination diminishes resulting to vaccine hesitancy. Given these experiences, it is possible that ill-treatment of caregivers becomes a strong barrier to accessing modern health and vaccination services who are not willing to be insulted. The insults and intolerance of questions possibly (UNICEF, 2016).

Informed Health workers and motivated health care is key to vaccination delivery and adoption. Once this is done, health workers can be advocates and champions for immunization in the healthcare setting. Other opinion formers may also be influential once involved and be able to reach out to different target audiences. Involving multiple stakeholders and opinion formers may help to build public confidence and acceptance for national immunization schedules. Campaigns that are sustained and employ multi- strategic methods are associated with improved vaccine adoption and may contribute to more favorable public attitudes (WHO, 2016).

Community discussions and meetings with leaders, immunization programs were able to address concerns and opposition among religious groups in Congo, Mali, and Zambia (WHO & UNICEF, 2013). Recognition of key role of leaders in encouraging residents to participate in government programs, including immunization was found to be a major reason for the success of several health programs in Indonesia in the early 1990s. This followed competitions and other incentives that were provided for leaders to maintain interest and efforts in support of these programs (Maharani & Kuroda, 2018). Community volunteers held a monthly child health session to check immunization as well as general health status and counsel, treat, or refer each child as appropriate in the AIN (Integrated Child Health) program in Honduras and similar programs throughout Central America, (Hermann, 2017). In some of these programs, the nurse supervisor actually vaccinates during sessions, but in others, children are simply referred. Full coverage increased from 85 to 95 percent in Nicaragua and from 83 to 95 percent in El Salvador from 2012 to 2013. The mid-project evaluation in Honduras showed an increase from 73.2 percent to 80.7 percent of children fully immunized (Maharani & Kuroda, 2018).

In 2014, self-help organizations, in Bangladesh, were mobilized to update the list of children, announce the dates of EPI sessions, motivate caregivers to attend EPI sessions and liaise with government workers. There was report of improvements in the EPI coverage in the intervention area than in the comparison area. The BCG vaccine coverage increased from 55.8 percent to 74.4 percent, the coverage of

DPT1, DPT2, and DPT3 improved from 65 percent to 79.7 percent, 52.1 percent to 63.2 percent, and 44.8 percent to 47.9 percent, respectively. The measles vaccine coverage also increased from 43.4 percent to 59.2 percent. For the same period in the comparison area, the coverage of EPI decreased for all vaccines in the intervention area compared to the control (Oliver-Williams et al., 2017).

2.3.4 Receiver factors on adoption of routine immunization

According to WHO (2016), knowledge improvement is associated with higher vaccination adoption amongst some groups. It is less clear if information approaches can help to shift behaviour in all groups. The most personalized information exchange, face-to-face communication, is associated with improved vaccine adoption amongst patient risk groups demonstrating vaccine-hesitant behaviour. There is strong evidence from research on receiver risk perception and sender communication. The study further states that transparency in sharing of risk information with the receiver is helpful in building trust. Information content and style is likely to be more effective if based on formative research and systematic piloting of communication initiatives that motivate the caregiver to take up vaccination services. Esohe et al (2016), in a cross-sectional study in Benin City-Nigeria, found that the higher the level of education of a care giver, the higher the level of knowledge. In relation to the attitude towards vaccination, those caregivers with higher level of education with good knowledge were also found good attitude towards vaccination. The female caregivers that were married, had good attitude and religion did not to have any role in the adoption of the vaccination services. Conspiracy theories linking vaccination and fertility control and/or sterilization have been propounded and promoted by religious leaders, particularly in the North including in States with the least immunization coverage rates. One such theory is that polio vaccination and other vaccines are a part of a western plot to sterilize young girls (Anyene, 2014).

Oku et al (2017) studied peasants in Nigeria as a representation of the majority poor in the third world, in understanding low income earning people and those living in low income settlements,. These studies believed that adoption of

vaccination could only happen if the majority peasants were well persuaded. The research was characterized by ten working elements; mutual distrust in interpersonal relations peasants in general were suspicious, evasive and distrustful of others in the community, perceived limited good, peasants believed that all good things in life are limited in quantities thus non could improve their conditions. Dependence and hostility towards government authorities was a contributing factor. Peasants were had ambivalent attitude towards government officials though depended upon them to solve their problems. On fatalism, following low immunization coverage, peasants believed a supernatural force controlled their wellbeing and they had limited aspirations for advancement and low levels of achievement motivation. Further peasants lacked the ability to postpone satisfaction in anticipation for better rewards in future and also they had a limited view of the world as well as low empathy where they could not imagine themselves in new situations.

Witteman et al (2015), conducted a study on risk communication, values clarification and vaccination decisions. The study tested methods used in risk communication to parents in the context of parental decisions about influenza vaccinations for their children. The researcher aimed to help parents understand the risks associated with vaccinating and not vaccinating their children against influenza. The researchers purposed to make the parents grasp the tradeoffs inherent in the decision, visualize how their individual values relate to their options, and make choices that align with their values. Participants who were randomized to the absolute risk communication format combined with the values clarification interface were more likely to indicate intentions to vaccinate and make choices that aligned with their stated values. The effect was particularly notable among participants who had previously demonstrated less willingness to have their children vaccinated against influenza.

In Zimbabwe a study conducted by UNICEF, revealed that caregivers had limited knowledge and passive understanding of vaccination. In addition, the caregiver hardly identified the vaccine with specific disease. They understood vaccination as merely injections, and lacked the confidence to ask health workers about specific

vaccines and diseases. This was a demonstration of inadequate information and knowledge to empower them to fully understand the risks of missing or totally skipping vaccines stipulated in the child health card and vaccination schedule. Communication on vaccination had been largely based on traditional information, education and communication (IEC) materials (pamphlets, visual aids), which are viewed as panacea to demand generation and awareness raising (UNICEF, 2016). Involving communities in healthcare is widely seen as essential to attaining high quality care and patient outcomes. Communication is an integral part of community participation and of healthcare delivery. Healthcare should involve communication with the intended recipient and as in the case of childhood vaccination, their caregiver (Thomson et al, 2015). An important function of communication to parents about vaccination is to provide information about the role of vaccination in their setting, vaccine effectiveness, and potential side effects of every individual vaccine (Kimmel & Wolfe, 2015).

According to Imoh (2014), education level also determines immunization coverage. In his study of immunization coverage in Nigeria, the researcher found that coverage was higher in areas where most caregivers generally had knowledge about vaccine preventable disease symptoms. Additionally, coverage was high in areas where vaccination services were available at a privately funded health facility. The findings are based on primary data, which was analyzed using multiple regression models to identify determinants of full immunization status among 12- 23 months old.

In a study conducted by Hussein et al (2014), using a multivariate logistic analysis to identify the factors that influence immunization coverage of children aged 12-23 months in Oromia Regional State, Eastern Ethiopia, the results showed overall low vaccination coverage due to caregivers being unaware of the need for immunization. The caregivers did not return the children for the 2nd and 3rd doses due to fear of side reaction, wrong perception on contraindication of immunization and lack of information on place and/or time of immunization. Chesoli (2015), states that there are a number of reasons why the need for public communication campaigns has increased, governments and public administrations have suffered

issues of legitimacy in the public's perception. Additionally, the public has become aware of the risks of modernization, as in the case of introduction of new vaccines and immunization and communication has become an important means of implementing and enforcing public policy, social learning and education. Caregivers living in urban informal settlements face a myriad of challenges, with the fact that they have to keep up with looking for money or/and being employed, while also taking care of their families. For example, caregivers in rural areas such as Nairobi County many a times carry their children to wherever they work and therefore some may not have a lot of opportunities to be exposed to communication messages and interventions. In such cases, health communication interventions have to be carefully planned and designed to fit into the caregiver's busy schedules and not the other way round (Mukungwa, 2015) .

Maternal level of education is also a contributory determinant of vaccination outcomes according to Lisa et al (2014) used primary data to investigate full and timely vaccination coverage and associated factors in children aged 12-23 months in Gem, Siaya County Kenya. Simple random method was used for sample selection with multivariate logistic regression applied and results showed that children of caregivers with lower maternal education or children in households with the spouse absent were less likely to be fully vaccinated. Promoting immunization through community networks was found to be a proven means to build trust and acceptance of vaccines. Caregivers are most likely to trust other community members when they make decisions about the health of their children more than an outsider (WHO, 2016). The context of caregivers' decision-making around immunization is key in understanding the communication strategies that campaigns should use. Common explanations by women are that they have "no time," to take a child to receive a vaccine and having "too many household chores." To understand household-level decisions that affect utilization communication as a health intervention model communication strategist have to consider the trade-offs of competing demands on caregivers' time in these informal settlements (Awino, 2016).

2.3.5 Support systems

Support refers to the various types of assistance/help that people receive from others and is generally classified into three major categories: emotional, instrumental and informational support. Emotional support refers to the things that people do that make us feel loved and cared for, that bolster our sense of self-worth for example talking over a problem, providing encouragement/positive feedback. Such support frequently takes the form of non-tangible types of assistance. Instrumental support refers to the various types of tangible help that others may provide. For example, help with childcare/housekeeping, provision of transportation or money. Informational support represents a third type of social support and refers to the help those others may offer through the provision of information (Asuman et al, 2018). Further, support has been defined as the perception and actuality that one is cared for, has assistance available from other people and most popularly, that one is part of a supportive social network. These supportive resources can be emotional (nurturance), informational (advice), or companionship (sense of belonging); tangible (financial assistance) or intangible (personal advice). Support can come from many sources, such as spouse, family, friends, neighbors and governmental organizations (Merriam-webstar online).

According to WHO, Zimbabwe's ability to maintain high routine immunization coverage is largely due to the extensive network of community motivators who distribute and disseminate materials through the media, public and group meetings, and home visits (WHO, 2016). Many studies have documented several successful experiences including the work of the Catholic Church in Angola and the Philippines. In Ethiopia, Ghana, and Madagascar it was reported that community mobilization in rural districts was a successful strategy towards adoption of routine immunization (Olaosebikan et al, 2017). The programs of Urban Volunteers in Bangladesh and schoolchildren in Indonesia and the network of motivators in Zimbabwe (Phillips, 2017).

A study by Andrea et al (2018), on five countries on communication support for polio eradication and routine immunization, communication activities were

documented, the study sought to come up with best approaches and recommend to the different countries. The five country studies were to compare the country approach to best practices. Major findings were that Polio activities were generally very successful after proper engagement of stakeholders and proper program planning brought about a successful campaign (Kazi, 2017). Some major recommendations based on these studies were that immunization programs should place high priority in advocacy and establishment of strong partnerships at the community level. A study by Andrea et al, (2018), on five countries on communication support for polio eradication and routine immunization, communication activities were documented. The study sought to come up with best approaches and recommend to the different countries. The five country studies were to compare the country approach to best practices. Major findings were that Polio activities were generally very successful after proper engagement of stakeholders and proper program planning brought about a successful campaign (Kazi, 2017). Some major recommendations based on these studies were that immunization programs should place high priority in advocacy and establishment of strong partnerships at the community level through message that are delivered through media campaigns (Leask et al, 2017; Witteman et al, 2015).

In order to communicate effectively with parents and other stakeholders, it can be useful to explore how health support are currently communicating with parents and how parents perceive these approaches. In health communication interventions, understanding the knowledge, attitudes and practices of patients is importance before tailoring materials to meet their needs. When drawing up care plans, it is necessary to involve the client in the planning process. Communication plans therefore should work with caregivers as much as possible, empowering them to make their own decisions. This should be done by using clear and simple language understood by the caregivers. The Government to be clear on what it is going to do for the caregivers by sampling and assessing the individual needs and set realistic goals. The scholar recommended that necessary actions aimed to meet the set goals and communication interventions should be reviewed, evaluated, changed and updated regularly, with the involvement of the caregivers who through their children are in this case the clients (Olorunsaiye & Degge, 2016).

High healthcare costs, a lack of adequate infrastructure, and health worker shortages all decrease the ability of Low- and Middle-Income Countries (LMICs) to deliver primary healthcare services to their populations. Sub- Saharan Africa has just 3% of the global health workforce and an estimated 1.5 million more health workers are needed just to be able to provide basic health services in the region. Largely in response to these health worker shortages, the World Health Organization (WHO) launched the "treat, train, retain" initiative in 2006 in an effort to strengthen and expand the global health workforce. This included the development of more formal cadres of Community Health Workers (CHWs), defined as members of, selected by, and answerable to the communities where they work; supported by the health system; and receiving less training than formally trained health workers (WHO, 2014).

The main targets for most interventions were caregivers and community members, with few interventions directed at health workers. Most interventions identified were used in the context of campaigns rather than routine immunization programs (Afiong et al, 2016). GAVA states that anyone can be an immunization advocate. Immunization advocate could include: Health or child-focused non-governmental organizations (NGOs), international and regional agencies, government officials, researchers, health providers, private business people, parents, young people, faith groups, and community members are all possible advocates of childhood immunizations (WHO, 2016).

In another study, fathers were found to play a role in decision-making as well and that the vaccination status may be improved by providing health education to improve health literacy of both mothers and fathers (Xeuatvongsa et al, 2016). A study found that female caregivers, who were married, had good attitude towards the adoption of routine vaccination (Esohe et al, 2016). The fact of male support is more pronounced where the patriarchal setting are predominant, this factor can play a significant role in adoption of health services (Taiwo et al, 2018). This fact can be generalized to adoption of routine immunization.

2.3.6 Adoption of Routine immunization

According to World Health Organization (2016), immunization of children is the process whereby a child is made resistant to an infectious disease, through vaccination, that is, being given vaccines. A vaccine is a product that stimulates the immune system of a child to produce immunity to a specific disease, therefore protecting the child from non-communicable and communicable vaccine preventable diseases (CDC, 2017). Vaccines are typically given in three ways: through needle injections, orally and even by spraying through the nose. At two years, a child is expected to be fully immunized (FIC). However, this is not the case in urban informal settlements, where children born at home are likely to miss birth vaccines (WHO, 2016).

Even though there are policies in place that advocate for safe and effective vaccines available, almost every country struggles with vaccine hesitancy, that is, a delay in acceptance or refusal of vaccination. Vaccine refusal can result from complacency, inconvenience, a lack of confidence, poor communication and a rational calculation of pros and cons. Interventions should, therefore, be carefully targeted to focus on the reason for non-vaccination. Thus, efforts should be concentrated on motivating the complacent, removing barriers for those for whom vaccination is inconvenient, and adding incentives and additional utility for the calculating (Betsch et al, 2015).

Communication is an integral part of any health service delivery, including childhood vaccination. Effective communication between the health services and parents can support informed decisions and potentially increase childhood vaccination adoption. Effective communication is particularly important in low and middle-income country settings and where childhood vaccination rates remain below global targets (Heather, 2017).

Building and maintaining confidence in immunization programs is a permanent task. A paradoxical situation may emerge in countries where vaccines have reduced the burden of disease, rendering immunization programs victims of their own success in situations where individuals and communities feel less threatened by the less visible vaccine-preventable diseases than by the side effects of vaccines (Attah,

2016). There is documentation of situations where caregivers may have more information and awareness about adverse events than about the benefits of immunization and the need to sustain immunization. In addition to this state, caregivers in many communities around the world, immunization decisions are part of culturally grounded estimations about dangers and benefits that need to be addressed (Abdulrahman & Olaosebikan, 2017). When controversies arise, immunization programs need communication strategies that can be quickly put into action to mediate the effects of these controversies (UNICEF, 2016).

It is important to factor in strategies that will increase adoption of immunization through demand creation communication campaigns, considering that immunization is one of the most successful and cost-effective public health interventions to prevent diseases (Koivukangas, 2018). Since the initiation of Expanded Programme on Immunization (EPI) in low and middle-income countries (LMICs) in 1974, it has been estimated that more than two million child deaths have been prevented (Mbabazi et al, 2015).

Communication for demand creation is a crucial strategy in order to realize and sustain these benefits. Vaccination communication operates at an individual as well as a broad public health level and it is dynamic and involves multiple actors. Vaccine communication strategies are often delivered in complex packages with multiple components (McKinnon & Orthia, 2017). This fact calls for evidence from high-quality studies and systematic reviews to inform implementation and determine how to evaluate the effects of these diverse and often complex interventions that many times brings a significant challenge. There are a variety of vaccination communication strategies, meaning there should be a similarly wide range of potential outcomes, ranging from socially oriented outcomes related to communication and engagement to health status and health service outcomes, which include vaccination status or timely delivery of the service (Ames et al, 2017). Mostly, only vaccination-related end outcomes like vaccination status or coverage are measured, unfortunately, making it difficult to know exactly how communication interventions work (Andrea et al, 2018; Kazi, 2017).

Xeuatvongsa et al (2016), in a study in Lao People's Democratic Republic of Congo, found that maternal ethnicity, paternal education and notification of the vaccination date by medical staff were associated with full vaccination status. This study highlights that health-care workers should provide clear information on vaccinations, including the vaccination schedule to both parents for better adoption and completion of immunization schedule.

Vaccination communication is dynamic and involves multiple actors operating at an individual as well as a broad public health level, and is often delivered in complex packages with multiple components (McKinnon & Orthia, 2017). Evidence from high quality studies and systematic reviews is necessary to inform implementation. However, determining how to evaluate the effects of these diverse and often complex interventions is a significant challenge. Given the variety of vaccination communication strategies, it follows that there should be a similarly wide range of potential outcomes, from socially oriented outcomes related to communication and engagement to health status and health service outcomes, such as vaccination status (Ames et al, 2017). However, many of these relevant outcomes are not being adequately measured. Most trials measure only vaccination related end outcomes like vaccination status or coverage, making it difficult to unpack how communication interventions work or why they fail (Andrea et al, 2018; Kazi, 2017; Nyaku et al, 2017).

According to Xeuatvongsa et al (2017) a common myth is that it is easy to persuade people to get vaccinated. Faced with outbreaks of influenza and other vaccine-preventable diseases, parents, educators, healthcare providers, and policy makers around the world often want to know how to persuade people to get their vaccinations. But a comprehensive review of the scientific findings from research on vaccination behavior shows that the most effective interventions focus directly on shaping patients' and parents' behavior through effective vaccine communication, instead of trying to change their minds (Xeuatvongsa et al, 2017).

2.4 Empirical review

Victoria (2015), in a desk review study, that aimed to characterize the vaccine-hesitant or resistant parent and assess, found that despite clear benefits, many parents choose not to vaccinate their children, most often citing the fear of the unknown as their motive. In a time when the incidence of VPDs is very low to nonexistent, it is easy to see why parents would become distracted by stories of severe reactions to vaccination. Vaccination scares propagated by the media and self-serving clinicians have led many parents to choose the risk of infection over the risk of vaccination. The study further suggested that understanding the fear some parents have as they contemplate vaccinating their child and addressing specific concerns for their child with scientific data is a reasonable approach to improve immunization rates in this subgroup. Parental refusal may be entirely based on trust or lack thereof to the pharmaceutical practitioners more than classically trained physician and nurses. Further, they may have misinformation about adverse reactions to a vaccine, such as death or seizures. They have had personal experience with a vaccine side effect. This can be dealt with through appropriate communication (Victoria, 2015).

Afiong et al (2016), in a study, communication strategies to promote adoption of childhood vaccination in Nigeria, revealed that most of the communication strategies identified aimed to inform and educate and remind or recall. Few aimed to teach skills, enhance community ownership, and enable communication. The study did not identify any intervention that aimed to provide support or facilitate decision-making. Many interventions had more than one purpose. Further, the study recommended that identification and development of the Nigerian vaccination communication interventions should be aimed to assist program managers to identify gaps in vaccination communication. This may be a useful tool as part of efforts to address vaccine hesitancy and improve vaccination coverage in Nigeria and similar settings.

Lisa et al (2014) used primary data to investigate full and timely vaccination coverage and associated factors in children aged 12-23 months in Gem, Siaya

County Kenya. Simple random method was used for sample selection. Multivariate logistic regression was applied and results showed that children of mothers with lower maternal education or children in households with the spouse absent were less likely to be fully vaccinated. Ouko (2014) conducted a study which sought to analyze the determinants of immunization coverage among children aged 12-23 months in Kenya. Using the probit and OLS estimators, the study found that mother's education and literacy, place of delivery, antenatal visits as well as household head age significantly increased the chance of child being immunized. Household size had a negative and significant effect on the probability of a child being fully immunized. Marital status of the mother, place of delivery, antenatal visits and literacy level of the mother had a positive effect on the level of immunization coverage. Household size, household head age and perceptions towards adoption of vaccines negatively affected the level of immunization coverage.

Witteman et al (2015), conducted a study on Risk Communication, Values Clarification and Vaccination Decisions and found that many health related choices require choosing between two options, each of which carries an element of risk. When presented with such risk tradeoffs, people often make choices that fail to align with available scientific evidence and/or with their own values. They further stated that previous research, have developed risk visualizations and interactive values clarification designs that help people make more coherent choices. The study tested methods used in risk communication to parents in the context of parental decisions about influenza vaccinations for their children. The researcher aimed to help parents understand the risks associated with vaccinating and not vaccinating their children against influenza. The researchers purposed to make the parents grasp the tradeoffs inherent in the decision, visualize how their individual values relate to their options, and make choices that align with their values. The study involved 406 participants in an online factorial experiment were a diverse sample of parents and guardians whose children were aged 6 months to 17 years and were eligible for influenza immunization but who had not yet received a vaccine in the current year. The participants were randomly assigned to view either standard information about influenza vaccines or information presented in an absolute risk communication

format, and then to either be presented or not presented with an interactive values clarification interface.

Hussein et al (2014) used multivariate logistic analysis to identify the factors that influence immunization coverage among children aged 12-23 months in Oromia Regional State, Eastern Ethiopia. This community based cross sectional survey involved both qualitative and quantitative data analysis. Stratified multi-stage cluster sampling technique with simple random sampling was used to select the sample size. The results showed overall low vaccination coverage due to caregivers being unaware of the need for immunization; caregivers did not return the children for the 2nd and 3rd doses due to fear of side reaction; wrong perception on contraindication of immunization and lack of information on place and/or time of immunization. The study however did not show the effect of involving the health worker to enhance coverage (Otubor et al, 2015).

Fayoyin (2016), conducted a study in Somalia. Engaging Social Media for Health Communication in Africa: Approaches, Results and Lessons, on role of Mobile Phones for Polio Campaign in Somalia, one of the countries in the polio epidemic belt. The country was experiencing an increasing penetration of mobile phones, making targeted information sharing much easier. As a result, a new mobilization strategy with mobile phone technology as the major tool of communication on polio immunization was designed. The initiative involved the use of communication strategies to educate the community on adoption of Polio vaccination. However, Fayoyin stated that it was difficult to attribute the high adoption of polio immunization directly to the mobile information dissemination. This again demonstrates the need for a robust investigation of the impact of the various communication variables in program delivery in order to isolate cross cutting, compounding or mutually reinforcing variables in health communication.

In understanding low income earning people and those living in low income settlements, Oku et al (2017) studied the perceptions and experiences of childhood vaccination communication strategies among caregivers and health workers in Nigeria: A qualitative study studied peasants and subsistent farmers in Nigeria.

These studies believed that adoption of vaccination could only happen if the majority peasants were well persuaded. The research was characterized by ten elements; mutual distrust in interpersonal relations and peasants in general, were found to be suspicious, evasive and distrustful of others in the community, perceived limited good, peasants believed that all good things in life are limited in quantities thus non could improve their conditions. Dependence and hostility towards government authorities was found as a contributing factor. Peasants were found to have ambivalent attitude towards government officials though depended upon them to solve their problems. Fatalism, peasants believed a supernatural force controlled their wellbeing and they had limited aspirations for advancement and low levels of achievement motivation. Further peasants lacked the ability to postpone satisfaction in anticipation for better rewards in future and also they had a limited view of the world as well as low empathy where they could not imagine themselves in new situations. This view of life contributed a lot to the willingness or not on adoption of health services.

Xeuatvongsa et al (2016) conducted a cross-sectional study to determine the factors affecting the vaccination status of children aged 12–35 months in Lao People's Democratic Republic of Congo. This study found that the proportion of infants who were fully immunized was still lower than the national target and maternal ethnicity, paternal education, and notification of the vaccination date by medical staff were associated with full vaccination status. It also found that Television, radio, and posters were underutilized sources of information on vaccination programs or of vaccination date notification. This finding suggests that targeted and culturally acceptable sub-group specific messages, using appropriate means of communication, are necessary. It also suggests that fathers may play a role in decision-making as well and that the vaccination status may be improved by providing health education to improve health literacy of both mothers and fathers. This study highlights that health-care workers should provide clear information on vaccinations, including the vaccination schedule.

WHO (2016) following a systematic literature review of the evidence for effective National immunization schedule promotional communications, found that

Communication interventions should aim to measure multiple outcomes as well as the strength and nature of any identified association. Vaccine-related knowledge, attitudes, perceptions and behaviour are all useful indicators of effectiveness. Interventions need to be based on macro-level theories of behaviour change as well as models of individual level behaviour choices. Given that immunization coverage must occur at population level for public health objectives and benefits to be fully realized, effective communications planning, and immunization service delivery, must aim to understand individual choice perspectives, as well as the social dynamics that shape social norms, values and culture. Credible and trusted champions for immunization and visible proof of action can help to build support and trust in vaccination efficacy and safety, as well as raise awareness of the benefits. Informed and motivated health care workers can become important advocates and champions for immunization in the healthcare setting. Other opinion formers may also be influential and be able to reach out to different target audiences. Involving multiple stakeholders and opinion formers may help to build public confidence and acceptance for national immunization schedules. Sustained, multi-methods campaigns which are associated with improved vaccine adoption may also contribute to more favorable public attitudes.

Knowledge improvement is associated with higher vaccination adoption amongst some groups. It is less clear if information approaches can help to shift behaviour in all groups. The most personalized information exchange, face-to-face communication, is associated with improved vaccine adoption amongst patient risk groups demonstrating vaccine-hesitant behaviour. There is strong evidence from research on risk perception and communication, that transparency in sharing of risk information is helpful in building trust. Information content and style is likely to be more effective if based on formative research and systematic piloting of communication initiatives. Health care workers are responsive to education and information, and its effectiveness may extend to patient risk groups as well as health care worker audiences. The effectiveness of training and education is enhanced when combined with improved service delivery that is making the vaccines more available in the same setting as the education (or information) provision.

Expertise in communication was found to be a factor in adoption of vaccination. Changing and reinforcing voluntary behaviour is challenging, and poorly conceived, and executed communications may exacerbate vaccination hesitancy. Professional experience in the design, delivery and evaluation of promotional communications and associated service provision can achieve positive attitudes towards immunization and improved vaccination adoption.

Esohe et al (2016) conducted a study a cross-sectional in Southern Nigeria on determinants of adoption of pentavalent vaccine. The study participants were caregivers. Esohe found that most females than males had more knowledge of pentavalent vaccine. The researcher stated that this finding was not surprising at all because the study also found that women were most involved in the antenatal care and immunization services. Among the women caregiver, knowledge on vaccines was highest for those that were educated. The higher the level of education, the study found that the higher the level of knowledge. In relation to the attitude towards vaccination, those with higher level of education with good knowledge were also found good attitude towards vaccination. The female caregivers that were married had good attitude and religion did not to have any role in the adoption of the vaccination services.

Yargawa & Jo (2015) in a systemic review and meta-analysis study on male involvement and maternal health outcomes found that male involvement could improve maternal health outcomes. Since adoption of maternal health is more related to good healthy seeking behavior, this study can be used to infer that, male involvement in vaccination services adoption can also improve the coverage. The observed protective effect conferred by husbands' support and care on odds of maternal depression is consistent with evidence from developed countries. A husband's practical support in terms of assisting with child-care and household chores and his emotional support expressed via boosting his wife's self-esteem in her ability to care for the baby could help explain this protective effect against maternal depression. In developing countries where practices adverse to maternal mental health, such as gender inequality and domestic violence can be a deterrent in

adoption of health services. This fact can be generalized for adoption of vaccination.

A study conducted in Zimbabwe by UNICEF (2016), on factors influencing vaccine hesitancy and immunization coverage, revealed that caregivers had limited knowledge and passive understanding of vaccination. In addition, they hardly identified the vaccine with specific disease. They understood vaccination as merely 'injections', and lacked the confidence to ask health workers about specific vaccines and diseases. This was a demonstration of inadequate information and knowledge to empower them to fully understand the risks of missing or totally skipping vaccines stipulated in the child health card and vaccination schedule. Furthermore, communication on vaccination had been largely based on traditional information, education and communication (IEC) materials (pamphlets, visual aids), which are viewed as panacea to demand generation and awareness raising (UNICEF, 2016). This study further pointed out that health workers as the major source of information on vaccination. However, they ill-treated the caregivers at facility level. The ill-treatment of caregivers by health workers especially when they miss scheduled appointments cause some of the caregivers to skip subsequent appointments or stop completely from taking up the services. In addition, the caregivers complained about the negative attitude of some health workers, whom they alleged verbally abuse them for asking questions. They also indicated that some health workers hardly commit time to explain the vaccines, symptoms of the disease prevented by the vaccine, the benefits of vaccination, and the importance of respecting the vaccination schedule but merely serve them passively. Without heightened awareness and adequate knowledge of the importance of vaccination, the propensity of vaccination diminishes resulting to vaccine hesitancy. Given these experiences, it is possible that ill-treatment of caregivers becomes a strong barrier to accessing modern health and vaccination services who are not willing to be insulted. The insults and intolerance of questions possibly.

A study by Andrea et al (2018), on five countries on communication support for polio eradication and routine immunization, communication activities were documented, the study sought to come up with best approaches and recommend to

the different countries. The five country studies were to compare the country approach to best practices. Major findings were that Polio activities were generally very successful after proper engagement of stakeholders and proper program planning brought about a successful campaign (Kazi, 2017). Some major recommendations based on these studies were that immunization programs should place high priority in advocacy and establishment of strong partnerships at the community level through media campaigns (Leask et al, 2017; Witteman et al., 2015).

A study in Burkina a study was carried out on the role of interpersonal communication in vaccination adoption showed that caregivers who had been exposed to a variety of interpersonal and media messages were more likely to know the requirements to complete vaccination schedule and know the dates for specific vaccines than caregivers in the control group (Waisbord & Larson, 2015).

An intervention study in Ethiopia by Mohamed (2015), found that "reminder/prompt" materials reduced dropout rates compared to the control group. Community health providers followed 6-week-old to 23-month-old children who visited vaccination centers to determine whether reminder stickers applied to the inside of their home front door would reduce immunization dropout rates. The health workers gave a circular sticker with a picture of a child receiving a vaccination and an appointment date to one group of caregivers. The immunization dropout rate of children whose caregivers received a reminder sticker was 55 percent lower than that of the control group (7.3 percent against 13.3 percent; Pvalue .01).

2.5 Critique of existing literature

Afiong (2016), found that communication strategies to promote adoption of childhood vaccination in Nigeria. Despite the study, revealing that most of the communication strategies identified aimed to inform and educate and remind or recall and only a few aimed to teach skills, enhance community ownership, and enable communication, the researcher did not identify any intervention that aimed to provide message that are aimed at supporting or facilitating decision-making.

Without this component of decision-making, the behaviour change may not be sustained because any intervention provided may not be evidence based and therefore not scientifically sound.

Victoria (2015), found that the reason for vaccination hesitancy was mainly due to fear, less VDPs and misinformation on the adverse effects following vaccination. The scholar seemed to imply that, only media, as a channel of communication, propagates scare messages. This study did not address the role of using communication in dealing with the issues that come up as a result of the scare messages and further creating demand for the service. Vaccination scares propagated by the media and self-serving clinicians have led many parents to choose the risk of infection over the risk of vaccination. The study further indicated that media propagates the fears suggesting that understanding the fear some parents have as they contemplate vaccinating their child and addressing specific concerns for their child with scientific data is a reasonable approach to improve immunization rates in this subgroup. This study contradicts its earlier finding of negative media effect towards adoption by fully supporting the crucial role of use appropriate channel such as media in dimysfing any misinformation and creating acceptance of adoption. I concur with this study recommendations that communication through use of media can solve the vaccine hesitancy, which translates to low vaccine adoption. However, level of fear appeal must be moderate otherwise this strategy might be counterproductive if sever fear is used as it may make the audience desperate and lack self-efficacy.

Mohamed in 2015 found that “reminder/prompt” materials reduced dropout rates compared to the control group. Community health providers followed 6-week-old to 23-month-old children who visited vaccination centers to determine whether reminder stickers applied to the inside of their home front door would reduce immunization dropout rates. The health workers gave a circular sticker with a picture of a child receiving a vaccination and an appointment date to one group of caregivers. The immunization dropout rate of children whose caregivers received a reminder sticker was 55% lower than that of the control group. This finding cannot be generalized to most African settings, particularly rural setting and for the low-

income areas where mobile phone ownership may not be a common feature for all. This issue applies to areas that only men are privileged to have mobile phones.

Waisbord & Larson (2015), on the role of interpersonal communication in vaccination adoption showed that caregivers who had been exposed to a variety of interpersonal and media messages were more likely to know the requirements to complete vaccination schedule and know the dates for specific vaccines than caregivers in the control group. This fact can work in states where there are adequate health workers to deliver the face to face messages considering that this kind of communication requires more time though its more effective.

WHO (2016), following a systematic literature review, the finding that **k**nowledge improvement is associated with higher vaccination adoption amongst some groups is not always the case. Many times, knowledge does not transit to adoption. Other moderating factors such as attitude and myths about vaccination over rules that role of knowledge in adoption of health services.

Esohe et al (2016), in a cross-sectional in Benin City- Nigeria, found that the higher the level of education of a caregiver, the higher the level of knowledge. In relation to the attitude towards vaccination, those with higher level of education with good knowledge were also found good attitude towards vaccination. The female caregivers that were married had good attitude and religion did not to have any role in adoption of vaccination services. This factor of marriage influencing the female caregiver adoption is not explain how and why. This may have been a coincidental finding.

2.6 Research gap

Studies have been carried out on immunization communication factors. Different factors influencing adoption of vaccination have been investigated. It has been demonstrated that when the sender, message, receiver and channel factor have been addressed to appropriately, there has been an increase in adoption of immunization services translating to an increase in the percentage of fully immunized. The challenge has been to sustain the gains over time.

Literature on the role of support systems in adoption of health services is still developing. Furthermore, the factor of support systems has not been considered in relation to adoption of routine immunization and its influence on relationship between persuasive communication and adoption of routine immunization. Actually, literature that attempts to tie influence of support to adoption of routine vaccination services is so limited. Scholars such as: Jacobson et al (2018); WHO (2015); Harvey et al (2016); Heather (2017) among other scholars, have demonstrated linear relationship between adoption and communication factors without considering other mediating factors such as support systems. The literature review has studies that scholars have ended up concluding that once the communication factors have been well placed, there is adoption of vaccination services. This cannot be the case, particurly in rural settings with firm cultural settings and respect for patriarchal headship. If by any chance the community is not pro vaccination, then there is limited adoption. This is the gap that was identified and this study addressed the moderating influence of support systems on persuasive communication on adoption of routine immunization.

2.7 Summary of literature review

Studies have proven that message availability, clarity, frequency of repetition acts to remind and enhance routine vaccination adoption. However, the role of message language has not been demonstrated as a factor in adoption or lack of. The communication channel depends on the community and the existing support systems. Literature has emphasized health workers as common source of information by playing key role both as a channel and sender in communication of routine immunization messages. However, on the same breath, health workers have been accused of being a source of vaccine hesitancy due to their disrespect to the caregivers especially to those that have missed to honor clinic appointment.

Community gatekeepers have been shown to act as trusted channels of communication because of their level of association with the community and as role models. Those vaccination campaigns that have failed to factor in community participation do not gain favor with the recipients. Some community channels work

better than any other types such as social media. The receiver factors are as varied as are the receivers themselves. Studies do not seem to have concrete study on the exact receiver factors that attribute to adoption. However, most studies are pointing at knowledge gap as the main factor for non-adoption. The knowledge gap has been attributed to both the sender and the receiver. The sender should have communication skills that aim to motivate the receiver towards adoption. On the other hand, the receiver knowledge does not always translate to adoption of health services. Literature shows a shortcoming in any of these factors will negatively affect the outcome. The role of support in adoption of routine immunization adoption has not been closely examine.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents study methodology. It is describes the methods that were used to obtain data for the study and it is presented in different sections. The study design was used to explore the influence of message content, channel, receiver, sender and moderating influence of support on adoption of routine immunization among children aged 0-5 years in Bomet County. Further, it explains the target population, sampling frame, sample and sampling technique, data collection instruments and procedure, validity and reliability, data analysis and presentation and ethical consideration that was needed for the study.

3.2 Research design

A study design is the overall strategy that a researcher choose for integrating different aspects of a research study in a coherent and logical way, thereby, ensuring effective address of the research problem. It constitutes the blueprint for the collection, measurement, and analysis of data (Creswell & Creswell, 2018). The study used mixed method design, specifically convergent parallel mixed method design. A convergent parallel design entails that the researcher concurrently conducts the quantitative and qualitative elements in the same phase of the research process, weighs the methods equally, analyzes the two components independently and interprets the results together (Berg, 2001). The rationale for mixing is that neither qualitative nor quantitative methods are sufficient by themselves to capture the trends and details of adoption of routine immunization. Qualitative method is used to collect the in-depth details on the communication factors influencing adoption of routine immunization and the influence of support on the same. This approach assumes a single person represents the group feelings and emotions of all persons as they are equally important to interpret. These feelings are ignored by the quantitative method. Further, the scholar explained that this approach is preferred because it enables the researcher collect numerical data and perform quantitative

analysis using statistical procedures in order to determine factors related to adoption of routine vaccination (Creswell, 2014).

3.3 Target population

A population is the aggregate of all cases that conform to some designated set of specification Hennink et al (2011). The target population for this study was caregivers who were seeking services for children 0-5years at the targeted sub-county hospitals. The Sub-county Paediatric health records were perused to estimate the number of children, in this age bracket, that had been attended to three months prior to the study. An average was calculated to derive the number who were attended to per month (table 3.1). This translated to 1,747 children age 0-5 years seen in the five Sub-counties (County health records, 2018). As an inclusion criteria, only caregivers aged between 15 to 49 years seeking care for children aged 0-5 years at the outpatient/Paediatric clinic were eligible for the study.

Table 3.1: Average number of children seeking services per Sub-County

Sub-County	Number of children treated
Sotik	400
Bomet East	296
Bomet central	332
Konoin	332
Chepalungu	387
TOTAL	**1,747**

Source: Bomet County Health records 2018

3.4 Sampling frame

Karmin, (2016) defines sampling frame as a list of the sampling units that are used in the selection of the sample. The sample was drawn from the day's outpatient/paediatric clinic register in the five sub-counties; Sotik, Bomet East, Bomet Central, Konoin and Chepalungu. Since the sampling was done from each Sub-County Hospital, the researcher picked the study participants randomly.

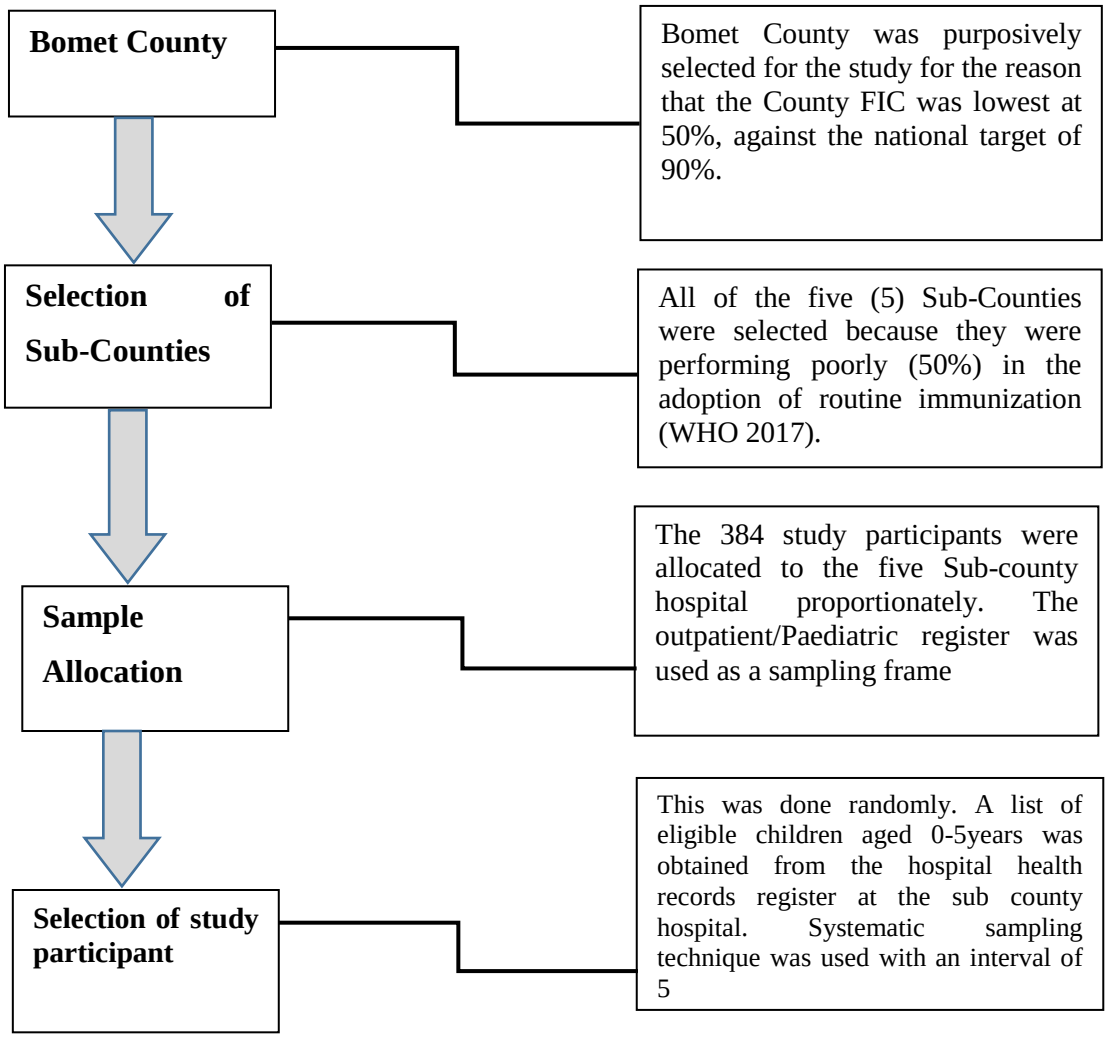


Figure 3.1: Participants flow chart

3.5 Sample and sampling technique

3.5.1 Sample

A sample size should have characteristics that should enable generalization of the study findings and subsequent predictions. The target population was caregivers aged 15-49 years seeking care for children aged 0-5 years at the sub-county hospital, estimated to be 1747 (Bomet County health records, 2018).

Sample size was determined according to Fischer et al (1991). In Fischer's formula, any population of more than ten thousand (10,000) people is considered infinite, and the sample size was calculated using the formula:

$$n = \frac{Z^2pq}{d^2}$$

Where:

Z = The standard deviate (1.96)

n = Desired sample size

p = Percentage of population with the desired characteristics

q = 1-p

d = Margin of error (0.05)

Therefore: $$n = \frac{(1.96)^2 (0.50) (0.50)}{(0.05)^2}$$

$$=384$$

Considering the total sample size and the population size in each sub-county, the sample for each sub-county was determined proportionately as indicate on table 3.2.

Table 3.2: Proportionate sampling of study sample

Sub-County	Number seen	%	Participants	Sampling interval
Sotik	400	23	88	5
Bomet East	296	17	65	5
Bomet central	332	19	73	5
Konoin	332	19	73	5
Chepalungu	387	22	85	5
TOTAL	1,747	100	384	

3.6 Data collection instruments and methods

The main instruments used in mixed method researches consist of close-ended or open-ended questionnaires, interviews and observations. These different ways of gathering information can supplement each other and boost the validity and dependability of the data (Mohammad, 2013). This study conducted data triangulation and used cross-sectional data collection procedure using an interviewer administered questioner and KII guide. A semi-structured interviewer administered questionnaire, with a mixture of open and closed ended questions was used. Interviews were conducted among caregivers seeking services for children age 0-5years at the Sub-County hospital. Before commencement of the exercise, fifteen research assistants were identified to support the principle researcher. The research assistants were required to be form four leavers who were fluent in English, Swahili and the local language. These were trained extensively on the meaning of every question, data collection method and terms used in the study tool. Then, each Sub-County was allocated three research assistants and data was collected simultaneously in all the five sub-counties to avoid cross transfers of the clients. Other instruments included a guide, digital recorder, notebook, pencils, erasers, camera, ball pen and a laptop. The interviews were held on weekdays, between 9am to 4pm in the months of February and March 2020.

3.6.1 Questionnaire

Questionnaires are doubtless one of the primary sources of obtaining data in any research endeavor (Kar et al, 2019). Data was collected using semi-structured interviewer administered questionnaire, with a mixture of open and closed ended questions, which was designed in English by the principle researcher. The Questionnaire was developed to measure the study objectives to ensure these are adequately covered in both scope and depth, guided by literature review. It was designed to include: a). Demographic characteristics b). Message content factors c). Channel of communication d) Receiver characteristic e). Sender characteristics f). Support factors g). Adoption of routine immunization (Appendix I11).

3.6.3 Key informant interview (KII) procedure

KII is a qualitative in-depth interview with people who have in-depth information on the subject of study. The purpose of key informant interviews was to collect information from health professionals, who have first-hand knowledge about routine immunization. These experts, with their particular knowledge and understanding, provide insight on the nature of problems and give recommendations for solutions (Creswell, 2014). KII was conducted with Sub-County medical officer, Sub-County health promotion officer and Sub-County EPI coordinator. (Appendix 1V). All the information obtained was recorded on a smart phone.

3.7 Validity and reliability

3.7.1 Validity

A study measuring instruments needs to be appropriate for it to be considered a good tool. Key indicator for a measuring tool is its validity and reliability (Creswell, 2014). The scholar defines validity as the ability of a measure to measure what it purports to. For an instrument to be considered valid, it should be reliable. To establish reliability of the instrument, the questionnaire was pre-tested to a sample of 38 (10%), caregivers who had taken children aged 0-5years to a neighboring Kipsigis Sub-county hospital in Kericho County. Thereafter, any error in terms of accuracy, appropriateness and relevance to the study was corrected. This exercise was then concluded by rectifying spelling errors, ambiguous and culturally offensive terms. Further, validity was ensured by use of random heterogeneous samples whose findings can be generalized.

3.7.2 Reliability

Creswell stated that reliability deals with the consistency, dependability and replicability of study findings (Creswell, 2014). Obtaining similar results in quantitative research is rather straightforward. Additionally, reliability is an assessment of the degree of consistency between multiple measurements of a

variable (Hair et al, 2010). Cronbach's Alpha test was used for measuring reliability in this study. Readings higher than 0.7 were gotten for all the variables, on whose basis, the instrument was considered reliable (table 4.1).

3.7.3 Pilot study

The purpose of the pilot study was to find out the suitability of the research instrument in collecting the information that was required by establishing the extent to which the instrument is reliable and valid for use. With this objective in mind, attest of reliability, validity and the practicability of the research instrument was conducted at neighboring Kericho County. This area has a locality with similar settings with the study area (Census, 2019). 10% of the sample size is considered sufficient and capable of producing realistic projections for the reliability and validity of the research tools as concurred by (Bashir & Marudhar, 2018). Therefore, 38 caregivers, taking children to seek health care services at Kipsigis sub-county Hospital were randomly selected to participate. Cronbach's Alpha was applied to test the reliability. This exercise was then concluded by rectifying spelling errors, ambiguous and culturally offensive terms.

3.8 Data analysis and presentation

During data collection process, there was spot checks in the field with questionnaires being cross checked by the principal investigator. To enhance team work, daily meetings for briefing and debriefing were held. For data cleaning, all the questioners were verified, checked out for any missing questioners and incomplete surveys. In order to conduct the data analysis SPSS tool version 21, was used. The qualitative data was trascribed according to the identified themes and edited then analyzed qualitatively in the form of narratives. Descriptive statistics such as frequencies, percentiles and mean were used to present data. The findings of the analysis are presented using tables with frequencies and percentage. The second category of analysis was inferential statistics. The statistical tool for the inferential analysis was logistic regression. The data type was ordinal as indicated on table 3.3.

Table 3.3: Specific analysis per objective

Objective	Level of measurement	Analysis
To establish the influence of message content on adoption of routine immunization of children aged 0-5 years in Bomet County	Ordinal	Logistic regression
To examine the influence of channel of communication on adoption of routine immunization	Ordinal	Logistic regression
To determine the influence of sender characteristics on adoption of routine immunization	Ordinal	Logistic regression
To investigate the influence of receiver characteristics on adoption of routine immunization	Ordinal	Logistic regression
To establish the influence of support systems on the relationship between persuasive communication on adoption of routine immunization of children aged 0-5 years in Bomet County.	Ordinal	Logistic regression

3.9 Study model

Regression model per objective

3.9.1 Regression model for objective one

$H_1 1$: There is significant influence of message content on adoption of routine immunization of children aged 0-5 years in Bomet County

$$\mathbf{Y = ß_0 + ß_1 x_1 + è}$$

Whereby;

Y= Adoption of routine immunization of children aged 0-5 years in Bomet County

$ß_0$= Constant

$ß_1$=Coefficients of determination

x_1=Message content

è= Error term

3.9.2 Regression model for objective two

$H_1$2: There is significant influence of channel of communication on adoption of routine immunization of children aged 0-5 years in Bomet County

$$\mathbf{Y = ß_0 + ß_2x_2 + è}$$

Whereby;

Y= Adoption of routine immunization of children aged 0-5 years in Bomet County

$ß_0$= Constant

$ß_2$=Coefficients of determination

x_2= Channel of communication

è= Error term

3.9.3 Regression model for objective three

$H_1$3: There is significant influence of sender characteristics on adoption of routine immunization of children aged 0-5 years in Bomet County

$$\mathbf{Y = ß_0 + ß_3x_3 + è}$$

Whereby;

Y= Adoption of routine immunization of children aged 0-5 years in Bomet County

$ß_0$= Constant

$ß_3$=Coefficients of determination

x_3= Sender characteristics

è= Error term

3.9.4 Regression model for objective four

$H_1$4: There is a significant influence of receiver characteristics on adoption of routine immunization of children aged 0-5 years in Bomet County

$$Y = ß_0 + ß_3x_3 + è$$

Whereby;

Y= Adoption of routine immunization of children aged 0-5 years in Bomet County

$ß_0$= Constant

$ß_3$=Coefficients of determination

x_3= Receiver characteristics

è= Error term

3.9.5 Moderating Variable

A moderating variable is one that affects the direction and the strength of the relationship between an independent or predictor variable and a dependent criterion variable. This variable may reduce or enhance the direction of the relationship between a predictor variable and a dependent variable, or change the direction of the relationship between the two variables from positive to negative. A moderator is supported if the interaction of predictor and moderator on the outcome of the dependent variable is significant. Multiple regression analysis (Stepwise method)

was used to establish the moderating effect of support systems on the relationship between persuasive communication influences (Z) the independent variables and the dependent variable.

$H_1$5: There is significant moderating influence of support systems on the relationship between persuasive communication and adoption of routine immunization of children aged 0-5 years in Bomet County.

The statistical model used for analysis was as follows:

$$\mathbf{Y = ß_0 + ß_1x_1 + ß_2x_2 + ß_3x_3 + ß_4x_4 + ß_{1z}x_1z + ß_{2z}x_2z + ß_{3z}x_3z + ß_{4z}x_4z + zè}$$

Whereby:

Y= adoption of routine immunization of children aged 0-5 years in Bomet County

$ß_0$= Constant

$ß_i$= Coefficient of X_i for i= 1,2,3,4

x_1 = Message Content

x_2= Channel of communication

x_3= Sender characteristic

x_4= Receiver characteristics

z= Support (Hypothesized moderator)

$ß_z$ is the coefficient of x_1 and the interaction term between support and each of the dependent variables for i= 1,2,3,4

è = Error term

Correlation analysis was also used to scale and analyze how independent variable, like message content and dependent, variable adoption of routine immunization, correlate and whose data was put in interval and ratio scales. The correlation coefficient, r, is a summary measure that describes the extent of the statistical relationship between the two variables or more. The correlation coefficient is scaled so that it is always between -1 and +1. When r is close to 0 this means that there is little relationship between the variables and the farther away from 0 r is, in either the positive or negative direction, the greater the relationship between the two variables.

Overall model for the study;

Without moderator

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta 5 X_5 + e$$

with the moderator

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_1 * Z + \beta_6 X_2 * Z \; \beta_7 X_3 * Z + \beta_8 X_4 * Z + e$$

Where:

Y=Adoption of routine immunization

ß$_0$= Constant

ß$_i$= Coefficient of X_i for i= 1,2,3,4

X_1 = Message content

X_2 = Channel of communication

X_3 = Sender characteristics

X_4 = Receiver characteristics

Z = Support system (Moderator)

e = Error term

3.10 Ethical consideration

The researcher got letters of introduction from JKUAT MTCA and another from JKUAT board of post-graduate studies, indicating that the researcher had been cleared to collect data. Ethical clearance was sought from Mount Kenya university Ethical board (MKU, 0360 Feb 2020). Upon receipt of ethical clearance, NACOSTI study license was sought and granted License No: **NACOSTI/P/20/3696**. Further, the researcher was given authorization by Bomet County Health services and at each sub-county, authority was granted for data collection. Written informed consent was obtained from the study participants. Further data analysis was done in such a way that no information identifiers were included.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings and discussion of the study. It begins by outlining the pilot study results, reliability and validity of the study instruments and the response rate. The descriptive statistics are thereafter presented and study assumption outlined. The chapter then presents the results of logistic and multiple regression analysis per study objectives tests the hypotheses and finally suggests the optimal model.

4.2 Pilot Study Results

Pilot study was carried out at neighboring County–Kericho, Kipsigis sub-county hospital. The participants were caregivers of children age 0-5 years (study target population). Cronbach's Alpha was applied to test the reliability of the instrument and readings higher than 0.7 were gotten for all the variables, on whose basis, the instrument was considered reliable (table 4.1).

4.3 Reliability and Validity of Research Instrument

4.3.1 Reliability

4.3.1.1 Cronbach's Alpa constant

In this study, the reliability of the instrument was tested using Cronbach's alpha constant, which measures the internal consistency and average correlation among the indicators under consideration. Cronbach's values range between 0 and 1. Acceptable values of alpha should be at least 0.70. Higher alpha coefficient values imply that there is consistency among items under consideration that measures the concept of interest (Bonett & Wright, 2014). The alpha test for all the items was found to be reliable for measurement because the reliability coefficient values were found to be above the recommended threshold of 0.7 (table 4.1).

4.3.2 Validity

Factor Analysis

Factor analysis test was used to test the validity of the study instrument. Factor analysis is used to detect construct validity, highlight variability among observed variables and any correlated variables in order to reduce redundancy in data. Acceptable Factor loadings should be 0.5 and above. Factor loadings are classified as follows: 0.32 (poor), 0.45 (fair), 0.55 (good), 0.63 (very good) or 0.71 (excellent) (Stephanie, 2015)). None of the item recorded factor loading lower than 0.50, the items were therefore considered valid for the study (table 4.2 and 4.3)

Table 4.1: Cronbach's Alpa

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CMF1	20.41	26.459	.311	.775
CMF2	21.50	24.885	.526	.744
CMF3	21.82	24.127	.555	.738
CMF4	22.17	24.836	.561	.740
CMF5	21.35	27.731	.315	.771
CMF6	21.47	26.160	.373	.765
CMF7	21.52	24.088	.468	.752
CMF8	21.56	24.211	.604	.733
CMF9	22.00	23.819	.443	.758
Overall, For Message Content Factor	**Before**	**0.775 at 9 items**	**After**	**0.755 at 9 items**
CF1	11.64	8.188	.403	.704
CF2	12.01	8.547	.446	.786
CF3	12.17	8.040	.503	.664
CF4	12.49	7.572	.541	.647
CF6	12.60	7.418	.511	.660
Overall, For Channel Factor	**Before**	**0.720 at 5 items**	**After**	**O.720 at 5 items**
SF1	8.02	5.262	.450	.623
SF2	8.28	5.489	.533	.565
SF3	8.18	5.150	.584	.527
SF4	8.45	6.701	.292	.708
Overall, For Sender Factor	**Before**	**0.679 at 4 items**	**After**	**0.708 at 3 items**
RF1	4.99	2.834	.524	.313
RF2	5.17	2.440	.588	.183
RF3	6.67	4.137	.159	.806
Overall, For Receiver Factor	**Before**	**0.679 at 4 items**	**After**	**0.708 at 3 items**
SU1	15.03	18.435	.370	.790
SU2	14.96	19.230	.321	.796
SU2	15.02	16.149	.669	.736
SU3	14.91	15.998	.613	.745
SU4	15.08	15.408	.714	.724
SU5	15.40	16.980	.597	.751
SU6	15.65	17.117	.387	.795
Overall, For Sender Factor	**Before**	**0.679 at 4 items**	**After**	**0.708 at 3 items**

Table 4.2: Factor Loadings

Message Content	Factor Loadings
The message was clear	.701
The message was accurate	.542
The message was authentic	.722
The message was believable	.748
The message was acceptable in my culture	.711
The language used was appropriate	.620
The language in the message was respectful	.656
I understood the message on routine immunization well	.625
Channel of communication	**Factor Loadings**
I trust the channel used to deliver the message	.582
The channel delivers message	.583
The channel is always available	.642
I have access to the channel	.629
I am able to pay for the channel (s)	.613
Sender characteristics	**Factor Loadings**
The source the message was trustworthy	.768
I was able to identify with the message bearer	.693
The sender was able to articulate the message well	.579
The sender was willing to answer my questions in regard to routine immunization	.500
Receiver characteristics	**Factor Loadings**
Vaccination is safe for my child	.769
It is necessary for me to take my child for vaccination	.758
I would consider buying vaccines if they are no longer available for free	.946
Support systems	**Factor Loads**
I am well supported financially to have my child vaccinated	.506
I have enough financial resources to have my child vaccinated	.591
My community encourages adoption of routine immunization	.585
My religion allows adoption of routine immunization	.582
Vaccines are always available in my nearest health facility	.589
Health workers are always available for routine immunization services	.536

Table 4.3: Model Fit indices

Fit indices Model	CMIN/DF	CFI	IFI	AGFI	RSMEA

Fit indices Model	CMIN/DF	CFI	IFI	AGFI	RSMEA
Fit indices Value	2.9721	0.986	0.94	0.93	0.0021

4.4 Response rate

Data was collected from all the five Sub-counties of Bomet County. During data cleaning, only 365 questioners out of the 384 participants interviewed, had questioners properly completed and therefore qualified for data analysis. This translated to 95.1% response rate (table 4.4).

Table 4.4: Response Rate

Response Rate	Frequency	Percent
Completed	384	100%
Fit for analysis	365	95.1%
Spoilt	19	4.9%
Total	**384**	**100%**

4.5 Demographic Information

4.5.1 Respondents' age

Majority of the respondents were in the age bracket of 19-25 at 42.2%. This was closely followed by age 26-30 at 21.9%. Age 14-18 indicated a percentage of 13.3%. Age 31-35 recorded a percentage of 11.0%, 36-40 then 41 and above recorded 5.8% for each case. The finding suggest that many of the mothers in the study area, many of them mainly comprised of teenagers. This study agrees with one carried by Kachikis et al (2020), that found maternal age is a factor influencing adoption of routine immunization.

4.5.2 Marital status

On the question of marital status, it was established that majority of the respondent are married and this was supported by 61.4%. This is in spite of the fact that a significant percentage of them being in the age bracket of 14- 18 year (teenagers),

forming 36.6 % of the population of single mothers. However, this study did not find any significant difference in attitude or adoption of routine immunization between the single and married caregivers (table 4.5). This differs with a study by Esohe et al (2016) that found female caregivers that were married had good attitude towards adoption of immunization services.

4.5.3 Number of children

The question on number of children, 49% said they had between 4-6 children, followed by 35.1% with 1-3 children (table 4.5). The higher the number of children and specifically those with more below five years adopted less the routine immunization (P value of 0.004). The number of children was also found to significantly influence adoption of routine immunization (Kaufman et al., 2017).

4.5.4 Number of children 5 years and below

The question on the number of children 5 years and below, 75.3% had one child, with a significant percentage (20%), having two children below 5 years. The study established that those participants with one child below 5 years had the highest adoption rate compared to those with a higher number. This study agrees with one by Hayles et al (2015), that found that those women with higher number of children tended to ignore taking children for vaccination (table 4.5).

4.5.5 Highest level of education

The study was also interested in establishing the level of education and occupation of the respondents. Majority of the respondent had primary level of education at 53.7 %, followed by secondary level those had attained only primary level of education with only 8.8% having attained tertiary level of education and lastly those who had no level of education were 1.9%, which was the least (table 4.5). The higher the level education, the higher the likelihood of adoption of routine immunization (P value of 0.001). This study is in agreement with a study that found that children of caregivers with lower maternal education were less likely to be fully vaccinated (Lisa et al, 2014). Additionally, the study agrees with Imoh (2014),

found that education level determines immunization coverage as the study found that coverage was higher in areas where most caregivers generally had knowledge about vaccine preventable diseases symptoms.

4.5.6 Occupation

Further, it was found that 36.9 % of the respondents reported to be housewives, 29.9% were farmers, with the 14.1 % being self-employed and 10.1% were in formal employment (table 4.5). It was obvious that there was high levels of dependency which may affect adoption of routine immunization. The occupation of a caregiver was not found to have an effect on adoption of routine immunization in this county. However, this study contradicts with studies that have documented that caregiver occupation may determine adoption of routine immunization. This analogy can be related with other studies such as one on routine immunization review in Nigeria, (O'Connell, & Wonodi, 2015) found that caregivers who were employed were found to adopt routine immunization compared to their counterparts who were housewives.

4.5.7 Respondent religion

Concerning 57.3 % were Protestants, a significant number (37.3%) catholic, Muslims 5.5% and others taking up the remaining 6.8% (table 4.5). Region had an influence on adoption with those that were Catholics having lower adoption compared to the others (p value 0.003). They were found to be the same group that had wrong information on side effects. Studies have found a relation between routine immunization adoption and religion. Conspiracy theories linking vaccination and fertility control and/or sterilization have been propounded and promoted by religious leaders (Anyene, 2014).

Table 4.5: Demographic information

Age in years	Frequency	Percent	Cumulative Percent
14-18	49	13.4	13.4
19-25	154	42.2	55.6
26-30	80	21.9	77.5
31-35	40	11.0	88.5
36-40	21	5.8	94.2
41& above	21	5.8	**100**
Total	**365**	**100**	
Marital status			
Single	141	38.6	38.6
Married	224	61.4	**100.0**
Total	**365**	**100.0**	
Occupation			
Housewife	135	36.9	36.9
Farmer	109	29.9	66.8
Self-employed	51	14.1	80.9
Employed	70	19.1	**100**
Total	**365**	**100**	
Level of education			
Never been to school	7	1.9	1.9
Primary education	196	53.7	55.6
Secondary education	130	35.6	91.2
Tertiary education	32	8.8	**100**
Total	**365**	**100**	
Religion of respondents			
Catholic	136	37.3	37.3
Protestant	184	50.4	87.7
Muslim	20	5.5	93.2
Others	25	6.8	**100**
Total	**365**	**100**	
Number of children			
1-3	128	35.1	35.1
4-6	180	49.3	84.4
Above 6	57	15.6	**100**
Total	**365**	**100**	

4.6 Message Content factors influencincing adoption of routine immunization of children age 0-5 years in Bomet County

4.6.1 Availability, clarity and accuracy of the message

To determine the influence of message content factors that influence adoption of routine immunization of children aged 0-5 years old. The question on if they had received any message on routine immunization within the last three months. The results indicated that 56.12% had received content massage on immunization while 43.84% had not received any massage (figure 4.1). On whether the message was clear; 27.0% strongly disagreed, 23.9% disagreed, 20.3% were undecided, with 18% agreeing and 10.8% strongly agreeing, giving a mean of 2.62 and standard deviation of 1.339. On whether the message was accurate, 9.0% strongly disagreed, 32.9% disagreed, while 39.6% were undecided, 13.5% agreed and only 5.0% of the participants strongly agreed that the message was accurate. The mean was 2.93, meaning that the participants did not find the message accurate). 39.2% is a significant percentage that had not received any message on routine immunization. The proportion of the population, who had not received a message on routine immunization, may translate to knowledge gap and therefore affect adoption of routine immunization. Message availability is an important attribute in communication process. Message can affect adoption of routine immunization if the message is not clear, specific, timely and repeated (Oldstein, 2015). Further, another study on the role of communication in adoption of routine immunization confirmed that message availability is an important attribute in communication process (Asuman et al, 2018).

When the key informant were asked if the Sub-county conducts education sessions on routine immunization, they affirmed to this, however the majority said that they do not have adequate staff to conduct the session. For example one of the key informant said;

'As much as we are willing to conduct education sessions, we have a challenge because of the shortage of staff'.

According to them, Health workers, specifically nurses, are the ones that conduct health education every morning before the services are offered. When this does not happen for whatever reason, both message availability and frequency is limited and so the client/care giver does not get the information. It follows that they have no chance to get motivation for adoption of routine immunization. This factor was found to have contributed to the low adoption of routine. When caregiver were asked if the health workers were ready to answer their questions, they strongly disagreed and this can be attributed to the workload and burn out due to personnel shortage.

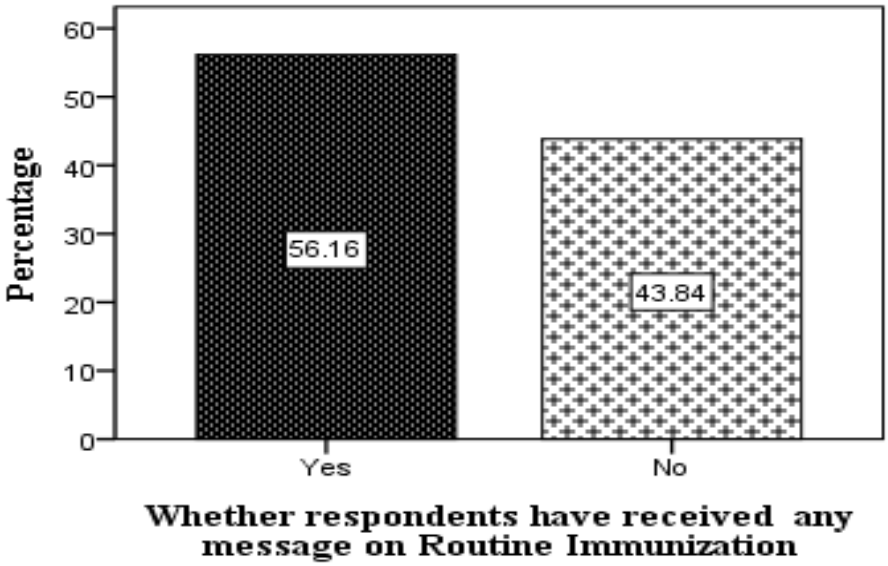


Figure 4.1: Respondent who had received message on routine immunization

4.6.2 Message clarity, authenticity, believability and acceptability

On message clarity, 27% strongly disagreed, 23.9% disagreed, 20.3% were undecided with18.0% agreed and only 10.8% strongly agreed giving a mean of 2.62. When asked if message was authentic; 21.2 % strongly disagreed, 36.0% disagreed, 27.5% were undecided, with only 12.2% agreed and 3.2% strongly agreed that it was authentic. The mean was 2.40. The statement, the message was believable; 26.6% strongly disagreed, 53.2% disagreed and 10.4% were undecided 7.7% agreed and only 2.3% of the participants, strongly agreeing and the mean 2.0. When asked if the message was acceptable in their culture, 7.7% strongly

disagreed, 14.7 disagreed, 61.3% were undecided, 16.2% agreed, 0.5% strongly agreed with a mean of 2.90.

These findings shows that since the message was not clear, the participants would not be able to decide on whether it was authentic, believable and acceptable or not. The finding again suggest that the massage was not acceptable (table 4.7). The fact that large proportion of the population was undecided, on whether the message was acceptable, it suggest that majority of the population perhaps did not understand the massage content they had received. In a study in Nigeria, a scholar attributed the knowledge gap to poor message construction, message that were not tailored to the target audience and poor communication skills on the part of the communicator (Oku, 2017). Based on these outputs, it was clear that the message was not believable. These findings agrees with those of O'Connell & Wonodi, (2015), in a study on system strengthening in routine immunization, with the findings where the researcher found that message availability played a significant role in adoption of routine immunization. However, Haji (2016), in a study found that message availability is enough factor in adoption of routine Immunization. The role of message appeal is more significant.

4.6.2 Message language appropriateness, understandability, respectful and authenticity

On the statement, the language used was appropriate; 8.1% strongly disagreed, 36.9% disagreed, 30.2% were undecided, 21.2% agreed, with only 3.6% strongly agreeing. Giving a mean of 2.75. The participants disagreed on these two statements. The language used in the message was understandable; 14.4% strongly disagreed, 36.0% disagreed, 23.9% were undecided, 15.8% agreed and 9.9% strongly agreeing, with a mean of 2.71. The language in the message was respectful; 14.0% strongly disagreed, 25.7% disagreed, 42.8% were undecided, 15.3% agreed with 2.3% strongly agreeing. Giving a mean of 2.66. The statement ‘I understood the message on routine immunization well’; the majority, 37.4% strongly disagreed, 29.7% disagreed, 13.5% were undecided and only 11.7% agreed and 7.7% said they strongly agreed, giving a mean of 2.23. The findings showed

that the participants did not understand the language. Therefore, they were not sure if the language used was respectively. This could have led to the reason why the message on routine immunization had the majority of the participants not understanding it well and ended up responding as undecided (table 4.6). The study shows that there are gaps in message content in terms of attributes of a good communication message. Routine immunization messages were found to be infrequent and even when it is available, the language used is not clear. This study agrees with scholars who have stated that, for an effective message, the sender should use clear and simple language understood by the caregivers to enable the caregiver to make informed choices (Olorunsaiye & Degge, 2016). Additionally, Kaufman et al (2017), states that message understandability is very important in adoption of routine immunization.

Qualitative data further illustrated the gap in conducting routine immunization awareness in the County. For example, one of the key informant said;

'As much as we are willing to conduct education sessions, we have a challenge because of the shortage of staff since the same nurses who are expected to conduct health educations sessions are the same one expected to attend the clients'.

The above findings mirrors that of Zainabu (2015) who found out that shortage of staff contributed to poor maternal and child services provision in many public health facilities.

Table 4.6: Message factors

INDICATORS	SD	D	U	A	SA	MEAN	STD. DEV
The message was clear	27.0%	23.9%	20.3%	18.0%	10.8%	2.62	1.339
The message was accurate	9.0%	32.9%	39.6%	13.5%	5.0%	2.73	.975
The message was authentic	21.2%	36.0%	27.5%	12.2%	3.2%	2.40	1.049
The message was believable	26.6%	53.2%	10.4%	7.7%	2.3%	2.06	.938
The message was acceptable in my culture	7.7%	14.4%	61.3%	16.2%	0.5%	2.90	.803
The language used was appropriate	8.1%	36.9%	30.2%	21.2%	3.6%	2.75	.996
The language used in the message was understandable	14.4%	36.0%	23.9%	15.8%	9.9%	2.71	1.188
The language in the message was respectful	14.0%	25.7%	42.8%	15.3%	2.3%	2.66	.974
I understood the message on routine immunization well	37.4%	29.7%	13.5%	11.7%	7.7%	2.23	1.274

4.7 Channel factors influencing adoption of routine immunization of children aged 0-5 years in Bomet Count

4.7.1 Channels of communication

The second objective of the study was to examine the influence of channels of communication on adoption of routine immunization. Preliminary analysis was carried out based on whether the respondents owned and channel of communication and if so, if they had received any massage on routine immunization or not. Cross tabulation, analysis between channel of communication and whether the respondent have received owned any message on Routine Immunization was conducted. The findings published on table 4.5 indicates that among 226 (56.18%) respondents who

had received message on Routine Immunization, 167(82.7%) agreed that the channel of communication through which they received message was radio while 35(17.3%) did not agree. Similarly, 73(36.1%) agreed that the channel of communication was through television with majority at 129(63.9%) disagreeing. Those who had received message on Routine Immunization through Health worker were 129(65.5%) while 68(34.5%) did not agree. Phone as channel of communication recorded 9 (4.5%) who accepted and 193(95.5%) did not accept. lastly Poster/flyer/brochure as channel of communication majority at 139(70.6%) did not accept while 58(29.4%) accepted that they have received massage through this channel of communication (table 4.7).

Based on these findings, it was concluded that there was an association between channel of communication and whether the respondents had received any message on on Routine Immunization. The study identified radio as the main channel of communication, followed by health workers. Interestingly, it was discovered that the county does not extensively use the community channels, which have proven to be very effective. A study in India found that exposure to radio and television was found to influence caregivers' decision on going for vaccination during polio immunization campaign (Sarkar & Daya, 2015). This study differs with a study carried out in Bangladesh by Laxminarayan, in 2016. The study found that communication with influential local leaders showed a statistically significant increase in knowledge of vaccine and improvement in adoption of immunization services. Further, communication interventions that included advocacy with leaders, community involvement with service delivery, child tracking and media partnerships at various levels were responsible for dropout reduction and increased immunization coverage (Laxminarayan, 2016).

KIs further stated that the main channel channels of communication used to send message on routine immunization was the health-workers and as earlier indicated, they said the nurses give health talks to the patients/clients in the morning. One of them went further and displayed a daily health talk schedule, showing the topics and the health workers who are supposed to facilitate. However, there was concern on the availability of time and said;

'People expect too much from us health workers, we are overstretched and even the clients are always in a hurry to go back to their homes, so this makes it a bit difficulty to start off with health talks everyday'.

This kind of situation does not show a state of efficient channeling of the routine immunization message.

Table 4.7: Cross tabulation on Channel of communication and message on Routine Immunization

Channel of communication		**Have you received any message on Routine Immunization**		**Total**
		Yes	No	
Radio as channel of communication	Yes	167(82.7%)	24(100.0%)	191(100.0%)
	No	35(17.3%)	0(0.0%)	35(100.0%)
Total	Count	202(100.0%)	24(100.0%)	226(100.0%)
Television as channel of communication	Yes	73(36.1%%)	6(25.0%)	79(35.0%)
	No	129(63.9%)	18(75.0%)	147(65.0%)
Total	Count	202(100.0%)	24(100.0%)	226(100.0%)
Health worker as channel of communication	Yes	129(65.5%)	10(41.7%)	139(62.9%)
	No	68(34.5%)	14(58.3%)	82(37.1%)
Total	Count	197	24	221(100.0%)
Phone as channel of communication	Yes	9(4.5%)	11(45.8%)	20(8.8%)
	No	193(95.5%)	13(54.2%)	206(91.2%)
Total	Count	202(100.0%)	24(100.0%)	226(100.0%)
Poster/flyer/brochure as channel of communication	Yes	58(29.4%)	13(54.2%)	71(32.1%)
	No	139(70.6%)	11(45.8%)	150(67,9%)
Total	Count	197	24	221(100.0%)

4.7.2 Trusting the channels, availability and reliability of the channel

The question on trusting the channel used to deliver the message; 33.3% agreed that they trusted the channel, with 21.2% strongly agreeing, a small percentage (2.7%) strongly disagreeing and 31.5% undecided. Giving a mean of 3.59. The channel delivers message; 44.6% agreed that the channel does deliver messages, none of the participants strongly disagreed, however 27.9% disagreed and 25.2% were not too sure, they were undecided. Giving a mean of 3.21. Closely related is the question on whether the channel is always available; 58.6% were undecided, 16.2% disagreed, 7.7% strongly disagreed, 8.1% strongly agreed and 9.5% agreed. Giving a mean of 3.06 (table 4.8).

In summary, the participants reported that they trusted the channel and it is available to deliver the message. This attribute is very important for effective communication. In this case, if the message, sender and receiver factors were appropriate, these channels would be used to pass the message on routine immunization. This study agrees with one conducted by O'Connell & Wonodi (2015) that found that message availability and reliability was a factor that influences adoption of routine immunization.

The other option that was mentioned by a significant number of the Key informants was use of local radio, using their local language, but this is not so efficient because of limited financial support. Television and poster are not very popular. The reasons given were such as this;

' Our community has challenges in accessing information from television because majority either do not have electricity or they simply cannot afford to buy one. Additionally, considering that we have a large number being either illiterate or sem-illiterate, use of written materials may not be useful'.

4.7.3 Channels' accessibility and affordability

The response on if the participants have access to the channel; 6.8% strongly disagreed with majority (44.1%) disagreeing that they have access, 20.7%

undecided, 25.2% of the participants agreed, giving a mean of 2.74. Additionally, the question on whether the participants are able to pay for the channel(s); 15.3% strongly disagreed, 33.8% disagreed, 28.4% undecided. Only a small percentage (18.0%) agreed and 4.5% strongly agreed. The mean was 2.63. The participants, though they trusted the channel and knew that it delivered the messages on routine immunization; they had limited access and could not afford to pay for the channel (table 4.8).

Key informants, on being asked about the involvement of community leaders in passing message on immunization, they agreed that CHVs are used. However, their efficiency is not maximum and are not very reliable because there are no stipends to motivate them. This factor of trusting and access to the channel is known to work towards improving adoption of routine immunization if all the other factors were working (Klassen-Ross, 2017).

Table 4.8: Channel factors

Indicators	SD	D	U	A	SA	Mean	Std. dev
I trust the channel used to deliver the message	2.7%	11.3%	31.5%	33.3%	21.2%	3.59	1.028
The channel delivers message	0.0%	27.9%	25.2%	44.6%	2.3%	3.21	.880
The channel is always available	8.1%	9.5%	58.6%	16.2%	7.7%	3.06	.942
I have access to the channel	6.8%	44.1%	20.7%	25.2%	3.2%	2.74	1.013
I am able to pay for the channel (s)	15.3%	33.8%	28.4%	18.0%	4.5%	2.63	1.085

4.8 Sender factors influencing adoption of routine immunization of children age 0-5 years in Bomet County

The third objective of the study was to examine the influence of sender characteristics on adoption of routine immunization.

4.8.1 Trustworthiness and ability to identify with the sender

On whether the source of the message was trustworthy, 6.8% strongly disagreed, 36.9% disagreed, 24.3% were undecided, 18.0% agreed with 14.0% strongly agreed. This gave a mean of 2.95. When the participants were asked if they were able to identify with the sender; 8.6% strongly disagreed, 42.3% disagreed, 23.9% were undecided and 21.6% agreeing. Only 3.6% strongly agreed with a mean of 2.69. The participants did not trust the source of the message and also they did not identify with the sender. The study found that the main source of information of the routine immunization messages was health workers. However, the caregivers were not able to identify with them and they were not willing to answer their questions. Given these experiences, the health workers were not responsive enough to the caregivers concerns and needs for information (table 4.9). This tied with a study by O'Connell and Wonodi that found that ill-treatment of caregivers by nurses becomes a strong barrier to accessing vaccination services. The insults and intolerance of questions from health workers is an hindrance to adoption of routine immunization (O'Connell & Wonodi, 2015).

4.8.2 Able to articulate message and willing to answer questions

On question whether the sender was able to articulate the message well; 6.8% of the participants strongly disagreed, majority (38.3%) disagreed with a significant percentage (32.0%) undecided, 14.0% agreed and a smaller percentage (9.0%) strongly agreeing that the sender was able to articulate the message well. The mean was 2.80. The question on whether the sender was willing to answer their questions regarding routine immunization; 14.4% strongly disagreed, 34.7% disagreed, 37.4% were undecided, 10.8% agreed and a smaller percentage (2.7%) strongly agreeing, giving a mean of 2.53 (table 4.9). The participants were not

able to articulate the message well and this was one of the reason for low adoption rate. Study have found that that found that caregivers who are not able to articulate the message well, had low adoption rate compared to those that were able to (McNair, 2014). In this study, the gap in adoption rate can be attributed to the gap in message articulation.

This variable was further tested by interviewing the Key informants on health workers knowledge and their attitude towards adoption of immunization. They were reported to have good knowledge on vaccines and MOH recommended schedule. Additionally, they portrayed good attitude towards vaccination. This report contradicted that of the caregivers who are the recipients of the message and therefore the services. There was evidence of scheduled immunization education sessions. A number reported challenge that the caregivers are impatient and they tend to come to the clinic late. For example, one of the KI said;

'In this region, people keep dairy cows and calls for women, who are the main caregivers, have to start by taking care of their animals before taking their children to the clinic'.

This makes immunization not a priority, considering that the child is not sick.

Table 4.9: Sender factors

INDICATORS	SD	D	U	A	SA	MEAN	STD. DEV
The source of the message was trustworthy	6.8%	36.9 %	24.3%	18.0%	14.0%	2.95	1.176
I was able to identify with the sender	8.6%	42.3 %	23.9%	21.6%	3.6%	2.69	1.018
The sender was able to articulate the message well	6.8%	38.3 %	32.0%	14.0%	9.0%	2.80	1.058
The sender was willing to answer my questions in regard to routine immunization	14.4%	34.7 %	37.4%	10.8%	2.7%	2.53	.959

4.9 Receiver factors influencing adoption of routine immunization of children age 0-5 years in Bomet County

The participants were interviewed to measure the receiver factors using the constructs in the sections below.

4.9.1 Knowledge on vaccines

The participants were asked if they knew any vaccines given to children. 93.4 % said they did. The 93.4% participants were then asked to indicate the vaccines they knew, indicating the diseases they prevent and the recommended MOH schedule. The results were: Knowledge of BCG; 73.9% knew about BCG, 51.3% knew it prevents TB with a 48.7% who did not know. About knowledge of the Polio Vaccine; 84.2% knew polio vaccine, 66.0% knew it prevents Poliomyelitis and only 19.1% knew when it is supposed to be given. Knowledge of the Diphtheria vaccine; Only 3.8% knew about Diphtheria with majority (96.2%), not aware. 95.9% did not know what disease it prevents and only 3.6% were aware of when it is given. Knowledge of the Pneumococcal vaccine; 39.3% were aware of the vaccine, on the disease it prevents, 68.3% knew it prevents pneumonia, and only 5.7% knew when it is supposed to be given. Knowledge of the Rota Virus; 81.2% did not know the vaccine, 86.2% did not know the disease the child is protected from and 95.6% did not know when is given. Knowledge of the Measles vaccine; 54.3% knew about the vaccine with 45.7% not aware. Only 30.2% knew what disease it prevents, with 69.8% not aware. Knew about measles, 92.6% did not know when it supposed to be given (Appendix V1).

Generally, there was knowledge gap on the vaccine type, disease it prevents and schedule of immunization. The vaccine most known to the participants was Polio (84.2%) and the researcher attributed this to the campaign and not routine vaccination. These findings portrayed knowledge gap on types of vaccine (33%). Even those that said they knew any vaccine, there was a gap on knowledge on specific types of vaccines, vaccine schedule and diseases they prevent. The knowledge some had on the vaccines and the benefits, was not accurate. A caregiver is not motivated to take their children for vaccination. Different scholars

have shown that caregivers' knowledge is a factor in adoption of routine immunization. According to UNICEF without heightened awareness and adequate knowledge of the importance of vaccination, the propensity of vaccination diminishes resulting to vaccine hesitancy (UNICEF, 2016).

4.9.2 Knowledge on vaccines side effect

The participants were asked if vaccines have any side effects; 66.3% agreed and 33.7% said no (table 4.10). The 66.3% were further asked to mention the side effect that can possibly occur.

Table 4.10: Knowledge on vaccines side effect

	Frequency	Percent	Valid Percent
Yes	242	66.3	66.3
No	123	33.7	33.7
Total	365	100.0	100.0

The following were the responses; 87.1% cause fever, 82.1% make children sick, 78.1% make children infertile, 72.7 % can cause polio, 63.6% said it can give children HIV/AIDs (table 4.11). The caregivers' were found to have a lot of information on the vaccines' side effects. However, much of the information was misinformed and mythical. For example 78.1% indicated that one of the side effects of the vaccine is that they can make children infertile with 63.6% of the respondents indicating that the vaccine can give children HIV& AIDS. This could be a reason for the low adoption of routine immunization services. This study agrees with Attah (2016) that found that a paradoxical situation may emerge where individuals and communities feel less threatened by the less visible vaccine-preventable diseases than by the side effects of vaccines.

Table 4.11: Vaccines side effects

			Side effects		Total
			Yes	No	
Can give children a fever	Yes	Count	209	0	209
		% within Side effects	87.1%	0.0%	84.6%
	No	% within Side effects	12.9%	100.0%	15.4%
Can make children sick	Yes	Count	197	0	197
		% within Side effects	82.1%	0.0%	79.8%
	No	Count	43	7	50
		% within Side effects	17.9%	100.0%	20.2%
Total		Count	240	7	247
Can make children infertile	Yes	Count	189	0	189
		% within Side effects	78.1%	0.0%	75.9%
	No	Count	53	7	60
		% within Side effects	21.9%	100.0%	24.1%
Total		Count	242	7	249
Can cause polio	Yes	Count	176	0	176
		% within Side effects	72.7%	0.0%	70.7%
	No	Count	66	7	73
		% within Side effects	27.3%	100.0%	29.3%
Total		Count	242	7	249
Can give HIV/AIDs	Yes	Count	154	0	154
		% within Side effects	63.6%	0.0%	61.8%
	No	Count	88	7	95
		% within Side effects	36.4%	100.0%	38.2%
Total		Count	242	7	249

4.9.3 Knowledge on death from VPD

On the question of whether they had heard about a death of a child associated with VPDs**,** 59.5% said they had heard of a child who died of a vaccine preventable disease (table 4.12). Out of these, 60.8% felt these deaths could have been prevented by vaccination. This contradicts studies that found that caregivers had limited knowledge on fatalism, following low immunization coverage and believed that a supernatural force controlled their wellbeing , therefore they had limited aspirations for advancement and low levels of achievement motivation (Oku et al, 2017).

Table 4.12: Knowledge on death from VPD

	Frequency	Percent	Valid Percent
Yes	217	59.5.	59.5
No	148	40.5	40.5
Total	365	100.0	100.0

4.9.3 Receiver attitude

To measure the receiver attitude, the participant was asked to respond on the statement, 'Vaccination is safe for my child'. 36.4% were undecided, a significant percentage (23.6%) agreed that it is safe, 20.3% strongly agreed with only 17% disagreeing. This gave a mean of 3.43. If they felt it was not safe, they would not have been at the clinic. When asked if it is necessary for them to take their child for vaccination, 37.7% agreed, 19.8% were undecided, with 23.1% disagreed and then 3.3% strongly disagreed. The response on; 'I would consider buying vaccines if they are no longer available for free', was as follows; 55.6% strongly disagreed, 22.7% disagreed, 17.0% were undecided with only0.3% agreed and 4.4% strongly agreeing, giving a mean of 1.74 (table 4.13). The participants were found to have negative attitude towards vaccination. Improved perceptions of seriousness of some diseases and positive shifts in attitudes regarding childhood vaccination among the caregivers has been reported to improve adoption of routine immunization (Oku et al, 2016; Phillips, 2017).

When KII were asked on the challenges that they encounter that led to the low routine immunization adoption, most cited high level of illiteracy, myths and misconception and fear of side effect. One of them said that;

'There was drastic reduction in adoption following a reported death following vaccination that was reported in Konini Sub-county sometimes between 2015 and 2016'.

Studies have reported vaccination hesitancy that was associated with fear of side effects.

Table 4.13: Receiver attitude

INDICATORS	SD	D	U	A	SA	MEAN	STD. DEV
Vaccination is safe for my child	2.7%	17.0%	36.4%	23.6%	20.3%	3.43	1.072
It is necessary for me to take my child for vaccination	3.3%	23.1%	19.8%	37.7%	16.0%	3.40	1.106
I would consider buying vaccines if they are no longer available for free	55.6%	22.7%	17.0%	0.3%	4.4%	1.74	1.033

4.10 Influence of support systems

The fifth objective of the study was to examine the moderating influence of support systems on the relationship between persuissive communication and adoption of routine immunization

4.10.1 Well supported financially

The support factor, a moderating variable, were further tested. The indicator, 'I am well supported financially to have my child vaccinated', 5.5% strongly disagreed, 48.2% disagreed, 29.3% were undecided, with a very small percentage 11.0% agreed and 6% strongly agreeing. The mean was 2.64. Meaning that the participants do not agree that they have financial support to have their children vaccination. On the statement, 'I have enough financial resources to have my child vaccinated', 45.5% disagree, 33.9% are undecided and 15.2% agreed. The mean is 2.72. The participants reported to not having financial support to go for vaccination services. As was found, health facilities are far apart and there is a need for money for fare to and from the health facility. Financial support has significant influence on adoption of routine immunization as shown on table 4.14. This agrees with a study that found that caregivers, who had financial ability and had a health facility near their area of living, were more likely to take children for routine immunization (Lee & Robinson, 2016).

4.10.2 Community, religion and health workers support

The statement, 'My community encourages adoption of routine immunization', 40.5% disagreed, while 34% were undecided, 5.8 strongly agreed, and the mean 2.66. The indicator 'My religion allows adoption of routine immunization', 34.2% were undecided, 37.8% disagreed and had a mean of 2.76. The question on if Health workers are always available for routine immunization services, the responses were as follows; 49.3% disagreed, 23.3% were undecided, with the mean of 2.28. This study shows that the community and religion minimally support vaccination. Additionally, health workers are not always available to offer routine immunization. This study contradicts the findings by many scholars showing that community involvement improves adoption (WHO, 2016). Communication interventions that included advocacy with leaders, community involvement with service delivery and child tracking, and media partnerships at various levels were responsible for dropout reduction and immunization coverage above the national average in Madagascar in 2013 (Maharani & Kuroda, 2018; Mukungwa, 2015).

This fact was augmented when KI reported shortage of health workers and low partner support as reasons for low defaulter tracing. The shortage was said to be generalized and this seems to explain why the caregivers said that the health workers do not have time to explain to them about immunization. On community involvement, they agreed to engaging community through the community health volunteers. The challenge they faced on this is minimal support to facilitate and motivate them adequately. One of them said;

'If the community health volunteers are adequately supported, they can pass the message on routine immunization and therefore create demand for the services'.

4.10.3 Vaccine availability and distance from nearest health facility

When asked if 'Vaccines are always available in my nearest health facility', 51.5% disagree, 23.0% are undecided, and a small percentage (8.8) agreeing and same percentage strongly agreeing with a mean of 2.59. The response on the statement 'The health workers are always willing to provide routine immunization services', 45.5% strongly disagreed, 26.0% disagreed and the mean 2.0 (table 4.14). This translated to challenges in distance from health facility offering vaccination services and that the health workers were not supportive to the caregivers. These findings shows that health workers, as much as they are the main source of information, they were not responding compressively to the caregivers needs for information and were a barrier to adoption of the routine immunization services. This was attributed to shortage of staff and some vaccines such as BCG and measles are offered on specific days to avoid wastage. So when caregivers take their children for vaccination on days that are not scheduled, they miss to be vaccinated and this leads to missed opportunities and increase the dropout rate. This study has similar findings with a study conducted by UNICIF (2016), reported that health workers ill-treated the caregivers at facility level. Additionally, they hardly commit time to explain to the caregivers' symptoms of VPDs, benefits and importance of respecting vaccination schedules.

Table 4.14: Support systems factors

INDICATOR	SD	D	U	A	SA	MEAN	STD DEV
I am well supported financially to have my child vaccinated	5.5%	48.2%	29.3%	11.0%	6.0%	2.64	.963
I have enough financial resources to have my child vaccinated	2.2%	45.5%	33.9%	15.2%	3.3%	2.72	.866
My community encourages adoption of routine immunization	8.2%	40.5%	34.0%	11.5%	5.8%	2.66	.986
My religion allows adoption of routine immunization	7.9%	37.8%	34.2%	9.9%	10.1%	2.76	1.074
Vaccines are always available in my nearest health facility	7.9%	51.5%	23.0%	8.8%	8.8%	2.59	1.053
Health workers are always available for routine immunization services	17.5%	49.3%	23.3%	7.1%	2.7%	2.28	.930
The health workers are always willing to provide routine immunization services	45.5%	26.0%	15.3%	7.1%	6.0%	2.02	1.203

4.11 Adoption of routine immunization

4.11.1 Children not immunized

The participants were asked if they knew of any caregivers who do not take their children for immunization; 54.5% agreed and the rest did not know (table 4.15). Pertaining to the reasons why the caregivers do not take children for vaccination,

the participants were allowed to have multiple responses. The following were given as the reasons for not taking children for vaccination; 78.0% stated religious reason, 72.7%, long distances, 75.5% lack of money, 73.7% family members don't agree, 54.5% fear of Nurses and 68.0% said community members don't agree. The community and social structures of an individual plays a big role in uptake of health services. In this study, it has been found that the religious, family and local community has minimal support for adoption of routine immunization. According to Kaufman et al., (2017), vaccination communication concept includes many interventions with a number of aims. The purpose being: to inform or educate, remind or recall, enhance community ownership, teach skills, provide support, facilitate decision-making, and enable communication. This is not the case in Bomet County, due to low community involvement, community ownership is portrayed to be weak and therefore not supportive to adoption of routine immunization. Health workers have been reported as feared and this again becomes a barrier to uptake. This tally with a study that found that insults by health workers is cause for vaccine dropout (UNICEF, 2016).

All fifteen KIs interviewed agreed that the Sub-county offered immunization services and they had a targeted number of children for immunization. However, they agreed to not meeting the target. One of them said;

'It is surprising that despite not having challenges in vaccines stock out, we are not able to reach our target, we have a high immunization dropout rate. At times, we even come across children with zero doses'.

This finding conforms to that of the MOH report of 2017 on County routine immunization adoption at 50%, which is below the WHO target of 90% (MOH HIS, 2017).

Table 4.15: Knowledge on children not immunized

	Frequency	Valid Percent	Cumulative Percent
Yes	194	54.5	54.5
No	162	45.5	100.0
Total	356	100.0	
Missing System	9		
Total	365		

4.11.3 Children immunized

On the question 'Has your child been vaccinated today?'; 56.7% had their children vaccinated with 43.3% having not. Out of those vaccinated 76.3% had it indicated on the booklet. This percentage of children immunized (56.7%), closely relates with the WHO report of 2017 that was the reason for this study (table 4.16). Routine immunization coverage is still below the WHO, recommendation. Documentation can act as a reminder and lack thereof, may be a cause of dropout rate considering that the study has found there is high level of low literacy, both health and academic literacy. Additionally, studies have found that caregivers did not return the children for the 2nd and 3rd doses due to fear of side reaction, wrong perception on contraindication of immunization and lack of information on place, date or time of immunization (Helleringer et al., 2016).

Table 4.16: Percentage of children immunized

	Frequency	Percent	Valid Percent
Yes	207	56.7	56.7
No	158	43.3	43.3
Total	365	100.0	100.0

4.12 Tests of assumption

4.12.1 Sample Adequacy Test for the pilot study

To ascertain if the sample size was adequate enough to conduct principle component analysis, Kaiser-Meyer-Olkin test was conducted. Kaiser-Meyer-Olkin test compares the values of the observed correlation coefficients with the values of the partial correlation coefficients thus confirming whether the sample size is adequate. The sampling adequacy value should be more than 0.5 for acceptable or satisfactory factor analysis to be conducted. In this case, a common criterion is that the researcher should have 10–15 participants per variable. Massey (2019) recommends a value 0.5 as minimum, values ranging between 0.7- 0.8 are also acceptable, and values more than 0.9 are very good. The results shows that KMO values were ranging between 0.641 and 0.817 with the least value of 0.641 which was found to be appropriate because it was above the minimum of 0.5 (table 4.17).

In addition, Bartlett test of Sphericity was performed to establish the suitability of the dataset is for principle component analysis (PCA) to be conducted. Should it happen that the null hypothesis is accepted based Bartlett test of Sphericity results then, the analysis should not proceed. The results showed that all the correlation matrix for all the variables indicators were unit matrices hence there was no multicollinearity amongst the indicators for all the variables.

Table 4.17: KMO and Bartlett's Test

Message Content (X1)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.717
Bartlett's Test of Sphericity	Approx. Chi-Square	193.890
	Df	28
	Sig.	.000
Channel of communication (X2)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.689
Bartlett's Test of Sphericity	Approx. Chi-Square	142.827
	Df	28
	Sig.	.000
Sender characteristics (X3)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.807
Bartlett's Test of Sphericity	Approx. Chi-Square	323.704
	Df	28
	Sig.	.000
Receiver characteristics (X4)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.641
Bartlett's Test of Sphericity	Approx. Chi-Square	298.687
	Df	28
	Sig.	.000
Support systems (Z)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.789
Bartlett's Test of Sphericity	Approx. Chi-Square	261.045
	Df	15
	Sig.	.000

4.12.1 Skewness and Kurtosis Test for Normality

One of the most important assumption that should be investigated is the assumption of normality just to ensure the data is normally distributed before the regression analysis is conducted. The assumption of normality can be tested using various techniques, which may include, Q-Q plot, skewness and kurtosis and Kolmogorov-smirnov and Shapiro Wilk test. In this study, skewness and kurtosis was used to test for normality. Generally, skewness is a measure of the extent of deviation of distribution from symmetry while Kurtosis mainly describes the peakness of distribution (Mantalos, 2011). Skewness is obtained by the ration of difference in

the mean and mode with standard deviation. On the other hand, kurtosis values are imputed by use of moments. For normality to be achieved, the values of Skewness should be zero while Kurtosis values should be three. Instances where skewness is not zero, the data is said to be to be positively skewed or negatively skewed. However, values of skewness within the range of +1 and -1 are acceptable for data to be considered normally distributed. Similarly, for data to be considered to be normality distributed, the values of kurtosis should also fall within a range of values of -2 and +2 (Mantalos, 2011). For data to be considered to be normality distributed. Table 4.18 shown below shows the summary of both skewness and kurtosis values for all the variables, which were under scrutiny and were within acceptable range of -2 and +2.

Table 4.18: Skewness and Kurtosis

		Message Content (X_1)	**Channel of communication (X_2)**	**Sender characteristics (X_3)**	**Receiver characteristics (X_4)**
Statistic	Skewness	-.717	-.455	-.872	-.470
	Kurtosis	.921	1.470	.746	.024
Std. Err	Skewness	.212	.212	.212	.212
	Kurtosis	.420	.420	.420	.420
Conclusion distribution	Remark on	Normal	Normal	Normal	Normal

Variables: Message Content (x1), channel of communication (x2), sender characteristics (x3), receiver characteristics (x4)

4.12.2 Kolmogorov-Smirnov and Shapiro Wilk test for Normality

Kolmogorov- Smirnov and Shapiro Wilk was employed to test whether the data set assumed the Gaussian condition. Kolmogorov- Smirnov and Shapiro Wilk compares the scores in the samples and check whether they have the same mean or standard deviation (Hanusz & Tarasińska, 2015). The findings for Kolmogorov-Smirnov showed that, the p- values were greater than 0.05 for all the variables (Message content, Channel of communication, Sender characteristics, Receiver characteristics, Support systems and Adoption of routine immunization) indicating that the distributions were normally distributed. Shapiro-Wilk test results also showed that the five variables were normally distributed. The detail (table 4.19).

Table 4.19: Kolmogorov-Smirnov and Shapiro-Wilk

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	d.f	P-value	Statistic	d.f	p-value
Message Content	.062	365	.200*	.985	365	.148
Channel of communication	.059	365	.200*	.990	365	.474
Sender characteristics	.045	365	.200*	.994	365	.827
Receiver characteristics	.039	365	.200*	.992	365	.622
Support	.063	365	.200*	.991	365	.611

*. This is a lower bound of the true significance.

4.12.3 Outliers Test

An outlier may be explained as that observation which are far from the rest of other observation. The presence of outlier in many cases makes the data not to be normally distributed (not to assume Gaussian condition that is normality condition). It therefore necessary to test the presence of outliers in any given data and even remove/expunge them for normality condition to be satisfied or met (Creswell, 2013). In this study, the outliers present were tested and removed (table 4.20). From the table, for message content, there was no outlier detected, for channel of communication there were two extreme values (outliers) detected and removed. For sender characteristics there were no extreme values detected. However, for receiver characteristics, there were three extreme values observed and consequently removed for receiver characteristics list. Similarly, for support, there were two outliers detected and removed. Lastly, for Adoption of routine immunization, there was only one outlier detected and removed. As already stated, the presence of outlier makes the data not to be normally distributed, therefore the removal of these observations enhanced and therefore, improved the normality of the data sets thus fit regression analysis.

Table 4.20: Outliers detected

Variables	Position of observed outliers	Total number of outliers
Message content	-	0
Channel of communication	66, 116	2
Sender characteristics	-	0
Receiver characteristics	23, 58, 36,	3
Support	47, 102	2

4.12.5 Multicollinearity

For multiple regression models, a condition may occur where the independent variables within the study are related with each other. Such condition may be referred to us multicollinearity which in most cases requires testing before performing regression analysis to ascertain that the problem of multicollinearity does not exist (Wang, & Zou, 2018). In this study, multicollinearity was tested using Variance Inflation Factor (VIF), which is a reciprocal of tolerance. Some scholars suggest that A VIF value more than 10 (VIF $\geq$ 10) indicate that there is a problem of multicollinearity. The threshold value for existence of multicollinearity is 10 and above with corresponding tolerance statistic values below 0.1 indicating a serious problem while those below 0.2 indicating a potential problem (Mishra, 2016).

The outcome on table 4.21 suggest that the Variance Inflation Factor (VIF) value for message content was established to be 2.191 with corresponding tolerance statistic value of 0.456 in the absence of moderator and VIF value of 2.220 with corresponding tolerance statistic value of 0.573 in the presence of moderator. VIF for Channel of communication was found to be 1.746 with corresponding tolerance statistic value of 0.551 in the absence of moderator and VIF value of 1.813 with corresponding tolerance statistic value of 0.450 in the presence of moderator. Again, the VIF values for Sender characteristics was found to be 2.529 with corresponding tolerance statistic value of 0.395 in the absence of moderator and VIF value of 2.561with corresponding tolerance statistic value of 0.390 in the

presence of moderator. VIF values for Receiver characteristics was found to be 1.523 with corresponding tolerance statistic value of 0.657 in the absence of moderator and VIF value of 1.574 with corresponding tolerance statistic value of 0.635 in the presence of moderator. The findings, shows the independent variables were not related with each other for both models (where the moderator is included and when it is not) hence the problem of multicollinearity did not exist since the VIF values were within the acceptable limits (table 4.21).

Table 4.21: Multicollinearity Test

	Collinearity Statistics No Moderator		**Collinearity Statistics Presence of Moderator**	
	Tolerance	**VIF**	**Tolerance**	**VIF**
Message Content	.456	2.191	-	-
Channel of communication	.573	1.746	-	-
Sender characteristics	.395	2.529	-	-
Receiver characteristics	.657	1.523	-	-
Message Content *Z	-	-	.450	2.220
Channel of communication *Z	-	-	.551	1.813
Sender characteristics *Z	-	-	.390	2.561
Receiver characteristics *Z	-	-	.635	1.574

4.13 Logistic Regression Analysis

The regression analysis was carried out to determine the relationship between the independent variables and the dependent variable. A logistic regression was conducted for all the variables and the results were interpreted based on block 0 models and block 1 models. In block 0 models the interpretation was done based on classification tables and variables equations tables. Block 0 models display results of logistic regression models in the absence of explanatory variables. The models were used in establishing if there was a significant improvement of the model after the inclusion of predictor models. Block 1 output are displayed in form of omnibus coefficient tables, classification tables, summary coefficient table and variables in the equation tables which is displayed by the p- values, wald-statistics values, and two pseudo R-square values which demonstrates the extent to which the explanatory variable under consideration affect the dependent variable if included in the model.

4.13.1 Logistic regression: Message content and adoption

Observed	Predicted

The first objective of the study was to establish the influence of Message content on adoption of routine immunization of children aged 0-5 years in Bomet County. Logistic regression was conducted and based on this model, an output between Message content and adoption of routine immunization was derived. The output was split into two sections, block 0 and block 1. Block 0 assessing the usefulness of having a null model, which is a model with no explanatory variables. In this section, the variables in the equation table only include a constant, so every respondent had the same chance of saying Yes or No for the factors that determine adoption of routine immunization. Before the inclusion of the variable (message content), suggest that 53.0% of the respondents agreed that the children had been immunized (Classification table 22).

Considering Variables in the Equation table 4.22, the intercept-only model was ln(odds) =.521. If both sides of this expression were exponentiated, the predicted odds of [Exp(B)] =1.127 was obtained. That is, the predicted odds, of those who agreed to have had their children immunized, was 1.127. Since 194 of the respondents said Yes while 172 said No, the observed odds was 194/172 = 1.127.

Block 0: Beginning Block

Table 4.22: Classification Table for Message Content

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 0	Constant	.119	.135	.771	1	.380	1.127

Table 4.23: Variables in the Equation for message content

			Adoption of routine immunization		Percentage Correct
			Yes	No	
Step 0	Adoption of routine immunization	NO	0	172	0.000
		YES	0	194	100.0
	Overall Percentage				53.00

a. Constant is included in the model.

b. The cut value is .500

If the independent variable Message content was included in the model, Block 1, which consist of Omnibus test table, model summary, classification table 4.23 and a new variable equation table 4.24, was obtained. The omnibus Tests of Model Coefficients for Message content table displayed the outcome of the Likelihood Ratio (LR) test, which, shows whether the inclusion of the variables in the block contributes significantly to model fit. P-value was employed in making decision, which implies that if p-value smaller than 0.05 is recorded then the block 1 under scrutiny is said to be significant in other words block 1 will be an improvement to the block 0 model.

In this study, the inclusion of message content in the model considered two cases: that is the model with no moderator and model with moderator. Starting with omnibus test models for model 1(with no moderator) and model 2 (with moderator). Both models were significant since both model recorded p-values of 0.000, which are below 0.05. Hence, message content; both in presence of moderator and in absence of moderator significantly affect adoption of routine immunization of children aged 0-5 years in Bomet County (table 4.24).

The Summary model table for message content logistic regression model table gives the values for two pseudo R2 (Cox & Snell R-Square and Nagelkerke R-Square) values, which can be interpreted in a similar way as coefficient of determination in regression models. The two pseudo R2 values measure the extent to which explanatory explains the variation in the dependent variable. The two pseudo R2 were; 0.112 to 0.149 for model 1 and 0.259 to 0.346 for model 2. Therefore it was concluded that between 11.2% to 14.9% and 25.9% to 34.6% of the variation in adoption of routine immunization of children aged 0-5 years in

Bomet County was explained by message content for the model in block 1 in the absence of moderator and in the presence of moderator (support systems) respectively (table 4.24).

The correct classification rate for the two models were recorded for the case of model 1 and model 2 and the outcome indicated that classification rate had increased by 8.2% to 61.2% for model 1(absent of moderator) that is 61.2-53.0 = 8.2% and 18.1% to 73.1% in the present of moderator, again obtained by 73.1-53.0 = 18.1%. The finding indicates that there was an improvement of both models. The model with moderator (support systems) was superior than model without moderator.

Following inclusion of message content in the block, the relationship between the predictor variable message content and adoption of routine immunization is given by logistic regression equations expressed as: $Y= -4.817+ 1.767X_1$ for model without moderator and $Y = -8.737+2.905X_1 *Z$ for model with moderator (support systems). The models indicated that for every unit of message content, the value of adoption of routine immunization of children aged 0-5 years in Bomet County changes by 1.767 in the absence of moderator (support) and 2.905 when support is present (table 4.24). Therefore, message content had significant positive influence on adoption of routine immunization of children aged 0-5 years in Bomet County.

Scholars have found that message content has significant influence on immunization adoption. Oldstein (2015), found that message can affect uptake of vaccination if it is not available, clear, specific and not in a language that the receiver understands. However, studies on the same when support systems is a moderator are limited. However, Wolicki (2015), in a study found that message content plays a role in adoption of routine immunization but only if the receiver has prior information and intent on the subject and therefore message only acts as a reminder.

Block 1: Method = Enter (Message Content)

Table 4.24: Omnibus Tests of Model Coefficients for Message Content

Model 1 (Absence of Moderator)				
		Chi-square	Df	Sig.
Step 1	Step	25.950	1	.000
	Block	25.950	1	.000
	Model	25.950	1	.000
Model 2	(Presence of Moderator)			
		Chi-square	Df	Sig.
Step 1	Step	65.735	1	.000
	Block	65.735	1	.000
	Model	65.735	1	.000

Model Summary for message content

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	276.876[a]	.112	.149
2	237.091[a]	.259	.346

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Model 1 Equation table - Without moderator

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Message Content	1.767	.385	21.082	1	.000	5.855
	Constant	-4.817	1.074	20.109	1	.000	.008

a. Variable(s) entered on step 1: Message Content

Model 1 Equation table - With moderator

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Message Content	2.905	.444	42.871	1	.000	18.261
	Constant*z	-8.737	1.353	41.720	1	.000	.000

a. Variable(s
b.) entered on step 1: Message content

4.13.2 Logistic regression: Channel of communication and adoption

The study sought to establish the relationship between channels of communication on Adoption of routine immunization of children aged 0-5 years in Bomet County. The objective was tested using hypotheses that; Channel of communication has no significant influence on adoption of routine immunization of children aged 0-5 years in Bomet County. Analysis using logistic regression was performed and based on logistic model, the output between channel of communication and adoption of routine immunization was categorized into two sections; Block 0 and Block 1. As stated earlier, Block 0 had no explanatory variables therefore the equation table only included a constant so every respondent had the same chance of saying Yes or No for the factors that determine adoption of routine immunization of children aged 0-5 years in Bomet County (table 4.25).

Equation table 4.25 suggest that, the intercept-only model recorded ln (odds) =.053 which translates to predicted odds value of [Exp(B)] =1.051 when both sides of the equation was exponentiated. Since 187 of the respondents said Yes while 178 said No, the observed odds were 187/178 = 1.051.

Block 0: Beginning Block

Table 4.25: Classification Table 1 for Channel of communication

Model 1 Without moderator					
	Observed		Predicted		
			Adoption of routine immunization		Percentage Correct
			No	Yes	
Step 1	Adoption of routine immunization	No	0	178	0.00
		Yes	0	187	100.0
	Overall Percentage				51.3

a. The cut value is .500

Variables in the Equation for Channel of communication

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 0	Constant	.053	.133	.159	1	.690	1.051

Independent variable communication channel, was included in the model, Block 1 that consist of Omnibus test table, model summary, classification and a new variable equation was obtained (table 4.26). The omnibus Tests of Model Coefficients for Channel of communication table displayed the outcome of the Likelihood Ratio (LR) test, which shows the inclusion of the variables in the block of variables contributes significantly to model fit. P-value was employed in making decision. If p-value smaller than 0.05 is recorded, the block 1 under scrutiny is significant, in other words block 1 will be an improvement to the block 0 model.

To accomplish the objective of the study, inclusion of communication channel in the model was considered and this led to two cases. That is; model with no moderator and one with moderator (support). Considering the omnibus test models for model 1(with no moderator) and model 2 (with moderator), both models were significant at p-values of 0.000. From these findings, it was concluded that Channel of communication had significance influence on adoption of routine immunization of children aged 0-5 years in Bomet County. This was both in the in absence and in the presence of moderator (table 4.26).

Inclusion of Channel of communication in the model, registered two pseudo R2 (Cox & Snell R-Square and Nagelkerke R-Square). With values of 0.306 to 0.408 for model 1 and 0.436 to 0.586 for model 2. This translates to 30.6% to 40.8% and 43.6% to 58.6% of the variation in adoption of routine immunization of children aged 0-5 years in Bomet County was explained by channel of communication; for the model in block 1 in the absence of moderator and in the presence of moderator (support systems) respectively (Summary model table 4.26).

The model classification table output of logistic regression, when the independent variable channel of communication was included gave an improvement of the two models. The outcome increased the classification rate by 23.0% to 74.3% for model 1(absent of moderator) that is 74.3 – 51.3 = 23.0% and an increase of 31.3% to 76% given by 82.6 – 51.3 = 31.3% in the presence of moderator. The outputs were indicators that, there was an improvement of both models. However, model 2 was superior to model 1.

Equation table 2, shows the relationship between the predictor variable (Channel of communication) and Adoption of routine immunization was expressed as; $Y=10.420+2.569X_1$ without moderator and $Y= -14.801+ 4.557X_1 *Z$ with moderator. For every unit of channel of communication, the value of adoption of routine immunization changes by 0.386 in the absence of moderator, 2.569, and 4.557 in the presence of moderator (support system). Therefore, the channel of communication had significant positive influence on Adoption of routine immunization of children aged 0-5 years in Bomet County.

These findings agrees with others studies that have shown that channels of communication have significant influence on adoption of routine immunization. Surajudeen Abiola, (2017) stated that mass communication through radio and television have been found to increase awareness and therefore improve knowledge on the benefits of vaccination, immunization schedules, age of immunization and place of vaccination. Waisbord & Larson found that availability of channels of communication on routine immunization improved perception of seriousness of VPDs and positive sifts in attitude regarding childhood vaccination. Communication with community leaders and other opinion makers has been found to increase adoption of routine immunization, (Waisbord & Larson, 2015).

Block 1: Method = Enter

Table 4.26: Omnibus Tests of Model Coefficients for channel of communication

Model 1 (Absence of Moderator)				
		Chi-square	Df	Sig.
Step 1	Step	82.514	1	.000
	Block	82.514	1	.000
	Model	82.514	1	.000
Model 2	(Presence of Moderator)			
		Chi-square	Df	Sig.
Step 1	Step	125.295	1	.000
	Block	125.295	1	.000
	Model	125.295	1	.000

Model Summary for Channel of communication

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	230.629[a]	.306	.408
2	177.532[a]	.436	.582

b. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Equation table - Model 1 Without moderator

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Channel of communication	2.569	.365	49.541	1	.000	.077
	Constant	10.420	1.469	50.330	1	.000	33523.168

b. Variable(s) entered on step 1: Channel of communication

Equation table Model 1 With moderator

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Channel of communication	4.557	.589	59.886	1	.000	95.316
	Constant*z	-14.801	1.928	58.947	1	.000	.000

c. Variable(s) entered on step 1: Channel of communication

4.13.3 Logistic regression: sender characteristics and adoption

The third objective of the study was to investigate the influence of sender characteristics on adoption of routine immunization of children aged 0-5 years in

Bomet County. The null hypothesis tested was that: Sender characteristics has no significant influence on adoption of routine immunization of children aged 0-5 years in Bomet County. This was against the alternative. The logistic regression between sender characteristics and adoption of routine immunization was carried out. The findings for Block 0 were similar to the one in channel of communication (table 4.27).

Block 0: Beginning Block

Table 4.27: Classification Table 1 for sender characteristics

Model 1 Without moderator					
	Observed		Predicted		
			Adoption of routine immunization		Percentage Correct
			No	Yes	
Step 1	Adoption of routine immunization	No	0	185	00.0
		Yes	0	190	100.0
	Overall Percentage				51.3

a. The cut value is .500

Variables in the Equation for sender characteristics

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 0	Constant	.053	.133	.159	1	.690	1.027

Inclusion of independent variable (sender characteristic) displayed on Block 1 tables, confirms that there was significant relationship between the dependent variable (adoption of routine immunization) and independent variable (sender characteristics). This is explained using the results on omnibus tests of Model Coefficients for Sender characteristics tables, which displayed the outcome of the Likelihood Ratio (LR) tests. P-value was employed in making decision and by considering omnibus test models for model 1(with no moderator support) and model 2 (with moderator support), both models were significant (p-values of 0.000). Based on the findings, it was concluded that Sender characteristics in presence of moderator and in absence of moderator significantly influences adoption of routine immunization of children aged 0-5 years in Bomet County (table 4.28).

Considering the values of two pseudo R2 (Cox & Snell R-Square and Nagelkerke R-Square) values of 0.291 to 0.388 for model 1 and 0.302 to 0.403 for model 2 were recorded in the model if sender characteristic was included in the model. The values suggest that 29.1% to 38.8% and 30.2% to 40.3% of the variation in adoption of routine immunization was explained by sender characteristic for the model in block 1 in the absence and presence of moderator (support systems) respectively (table 4.29).

Additionally, classification rate for the two models were recorded for the case of model 1 and 2. The outcome suggest that classification rate had increased by 22.6% to 73.9% that is 73.9 – 51.3 =22.6% for model 1(absent of moderator) and by 25.2% to 76.5% that 76.5 – 51.3 =25.2% in the present of moderator. The finding also confirms that there was an improvement of both models. The model with moderator proved to be a better model than the one without moderator (model 1-table 4.29).

The regression equation between sender characteristics and adoption of routine immunization of children aged 0-5 years in Bomet County. In the absence of moderator (Support systems) was expressed as; $Y=-7.384+0.344X_3$ (table 4.30). The p value corresponding to wald-statistics was 0.000. If moderator is included in the model, the model can be expressed as $Y=2.317 +0.331X_3+0.123X_3*Z$. The p-value of $0.000<0.05$ was recorded. Table 4.30 shows that there was significant relationship between sender characteristics and adoption of routine immunization.

Sender characteristics determine adoption of routine immunization as found in a various studies. A sender should be able to communicate across bound with the caregiver and community leadership. Studies confirm that community discussions and meeting with leaders to address the concerns and opposition among religious groups have given good results in adoption of Immunization services (WHO & UNICEF, 2018). A 2016 study, by WHO found that expertise in communication is a factor in adoption of immunization. Communicators with experience in design, delivery and evaluation of promotional communication can achieve positive attitude towards caregivers and improve vaccination uptake (WHO, 2016).

Block 1: Method = Enter

Table 4.28: Omnibus Tests of Model Coefficients for sender characteristics

Model 1 (Absence of Moderator)				
		Chi-square	Df	Sig.
Step 1	Step	77.644	1	.000
	Block	77.644	1	.000
	Model	77.644	1	.000
Model 2	(Presence of Moderator)			
		Chi-square	Df	Sig.
Step 1	Step	81.348	1	.000
	Block	81.348	1	.000
	Model	81.348	1	.000

Model Summary for Sender characteristics

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	235.499[a]	.291	.388
2	231.796[a]	.302	.403

c. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Table 4.29: Equation table - Model 1 Without moderator

		B	**S.E.**	**Wald**	**Df**	**Sig.**	**Exp(B)**
Step 1[a]	Sender characteristics	1.198	.176	46.254	1	.000	3.312
	Constant	-7.384	1.089	45.991	1	.000	.001

c. Variable(s) entered on step 1: Sender characteristics

Table 4.30: equation table - Model 1 with moderator

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Sender characteristics	2.987	.422	50.033	1	.000	19.823
	Constant*z	-12.939	1.838	49.582	1	.000	.000

d. Variable(s) entered on step 1: Sender characteristics

4.13.4 Logistic regression: Receiver characteristics and adoption

In this section, the study objective was to establish the influence of receiver characteristics on adoption of routine immunization of children aged 0-5 years in Bomet County. The objective was tested using hypotheses that; there is no significant influence of receiver characteristics on adoption of routine immunization of children aged 0-5 years in Bomet County. Analysis using logistic regression was performed and based on logistic model, the output between receiver characteristics and adoption of routine immunization was classified into two sections; Block 0 and Block 1. Block 0 had no explanatory variables therefore the equation table only included a constant so every respondent had the same chance of saying Yes or No for the response on if the child had been immunized.

The intercept-only model recorded ln (odds) =.053 which translates to predicted odds value of [Exp(B)] =1.028. If both sides of the equation was exponentiated. That is, the predicted odds of those who adopted vaccination against those that did not. Since 185 of the respondents said Yes while 180 said No, the observed odds were 185/180 = 1.028 (table 4.31).

Block 0: Beginning Block

Table 4.311: Classification Table 1 for receiver characteristics

Model 1 Without moderator				
	Observed		Predicted	
			Adoption of routine immunization	Percentage Correct
			No	Yes	
Step 1	Adoption of routine immunization	No	0	180	0.00
		Yes	0	185	100.0
	Overall Percentage				51.3

Table 4.32: Variables in the Equation for Receiver characteristics

		B	**S.E.**	**Wald**	**Df**	**Sig.**	**Exp(B)**
Step 0	Constant	.053	.133	.159	1	.690	1.028

On inclusion of the independent variable receiver characteristics in the model, Block 1 that consist of Omnibus test table, model summary, classification table 2 and a new variable equation table 2 was obtained. The omnibus Tests of Model Coefficients for receiver characteristics table displayed the outcome of the Likelihood Ratio (LR) test, shows whether the inclusion of the variables in the block of variables contributes significantly to model fit. P-value was employed in making decision (table 4.33).

The objective was realized by inclusion of receiver characteristics in the model and this led to two situations as stated; that is model with no moderator and model with moderator (support systems). The omnibus test models for model 1(with no moderator) and model 2 (with moderator) showed that both models were significant with p-values of 0.000. The findings concluded that receiver characteristics had a significance influence on adoption of routine immunization of children aged 0-5 years in Bomet County. This was so, both in the absence and presence of moderator (table 4.33).

The study findings as displayed in summary model table are evidence that inclusion of receiver characteristics in the model contributed significantly towards improvement of model since two pseudo R2 (Cox & Snell R-Square and Nagelkerke R-Square) values of 0.306 to 0.408 for model 1 and 0.436 to 0.586 for model 2 were recorded. The two pseudo R2 indicates that 30.6% to 40.8% and 43.6% to 58.6% of the variation in adoption of routine immunization, was explained by receiver characteristics both in the absence and presence of moderator (support systems) respectively (table 4.33).

Model classification table output of logistic regression when the independent variable receiver characteristics was included, gave an improvement on the two models. The correct classification rate for the two models are recorded in each case. The classification rate had increased by 23.0% to 74.3% for model 1(absent of moderator) that is 74.3 – 51.3 = 23.0% and an increase of 31.3% to 76% given by 82.6 – 51.3 = 31.3% in the presence of moderator. The outputs were indicators that, there was an improvement of both models though model 2 was superior to 1.

Equation table 2, after incorporating receiver characteristics in the block, the relationship between the predictor variable (receiver characteristics) and adoption of routine immunization was expressed as; $Y=10.420+2.569X_1$ without moderator and $Y= -14.801+ 4.557X_1 *Z$ with moderator. The models indicated that for every unit of receiver characteristic, the value of adoption changes by 0.386 in the absence of moderator and 2.569 and 4.557 in the presence of moderator (table 4.34). From these results, it was therefore, concluded that receiver characteristics had significant positive influence on adoption of routine immunization of children aged 0-5 years in Bomet County.

Study findings agrees with several others. An example is Thomson et al., (2015), who stated that healthcare should involve communication with the intended recipient and as in the case of childhood vaccination, their caregiver. An important function of communication to parents about vaccination is to provide information about the role of vaccination in their setting, vaccine effectiveness and potential side effects of every individual vaccine (Kimmel & Wolfe, 2015).

Block 1: Method = Enter

Table 4.33: Omnibus Tests of Model Coefficients for Receiver characteristics

Model 1 (Absence of Moderator)				
		Chi-square	**Df**	**Sig.**
Step 1	Step	82.514	1	.000
	Block	82.514	1	.000
	Model	82.514	1	.000
Model 2 (Presence of Moderator)				
		Chi-square	Df	**Sig.**
Step 1	Step	125.295	1	.000
	Block	125.295	1	.000
	Model	125.295	1	.000

Table 4.34: Model Summary for Receiver characteristics

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	230.629[a]	.306	.408
2	177.532[a]	.436	.582

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Equation table Model 1 Without moderator

		B	**S.E.**	**Wald**	**Df**	**Sig.**	**Exp(B)**
Step 1[a]	Receiver characteristics	2.569	.365	49.541	1	.000	.077
	Constant	10.420	1.469	50.330	1	.000	33523.168

d. Variable(s) entered on step 1: Receiver characteristics

Model 1 With moderator

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Receiver characteristics	4.557	.589	59.886	1	.000	95.316
	Constant*z	-14.801	1.928	58.947	1	.000	.000

4.14 Multivariate Regression Analysis

Multiple logistic regression model was performed with the objective of establishing the effect of predictor variables on the dependent variable (adoption of routine immunization of children). In line with this objective, this section provides the general results on the overall effects of all the independent/predictor variables; Message content, channel of communication, sender and receiver characteristics on the dependent variable which was adoption of routine immunization of children aged 0-5 years in Bomet County.

The overall model for the study was;

Without moderator

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta 5 X_5 + e$$

with the moderator was;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_1 * Z + \beta_6 X_2 * Z \; \beta_7 X_3 * Z + \beta_8 X_4 * Z + e$$

Where:

Y=Adoption of routine immunization

X_1 = Message content

X_2 = Channel of communication

X_3 = Sender characteristics

X_4 = Receiver characteristics

Z = Support systems (Moderator)

The multiple logistic regression model shows that the block zero result remains unchanged just like in the case of simple logistic regression models discussed earlier. In other words the classification tables results are similar. Besides that the omnibus tests of Model Coefficients tables on all the study variables, generated

results of the overall model as perfect. After inclusion of independent variables in the block one, the explanatory contributed significantly to the model fit as this was supported by the fact that p-values (sig) were smaller than 0.05. Showing that there was a significant improvement to the block 0 model with p-values smaller than 0.05. For this reason, it was concluded that message content, channel of communication, sender characteristics and receiver characteristics had a significant effect on adoption of routine immunization of children aged 0-5 years in Bomet County (table 4.35).

The other finding as shown on the model summary table suggest that Cox & Snell R-Square value was 0.437 and Nagelkerke R-Square value was 0.587 in the absence of moderator. The inclusion of moderator in the model (model 2) led to a significant improvement of model 1. This was supported by Cox & Snell R-Square value of 0.469 and Nagelkerke R-Square value of 0.629. From these findings, between 43.7% to 58.7% without moderator and between 46.9% to 62.9% in the presence of moderator variations in adoption of routine immunization of children aged 0-5 years in Bomet County, was explained by message content, channel of communication, sender characteristics and receiver characteristics in block 1. Meaning; with the correct message content, channel of communication, sender characteristics and receiver characteristics, the adoption rate also increased from 53.0% to 76.4% that is, 76.4-53.0%=23.4%, a significant improvement on block 0. Also for model 2 where there was moderator, the percentage classification rate increased from 53.0% to 81% implying that there was an improvement of 28% (table 4.35).

Considering the findings published on variables in the equation for all explanatory variables table, there was positive and significant influence of the independent variables; message content, channel of communication, sender characteristics and receiver characteristics on adoption of routine immunization. The model was expressed as;

$$Y=-106.12+5.161X_1+5.490X_2+2.989X_3+14.592X_4$$

The regression coefficient of 5.161, 5.490, 2.989, 14.592 indicates that an increase in message content, channel of communication, sender characteristics and receiver characteristics by 1unit leads to an increase in adoption of routine immunization by 5.161, 5.490, 2.989, 14.592 units respectively. Taking the estimates of the coefficients as far as the model 2 is concerned (presence of moderator), the model generated in the presence of moderator was expressed as follows:

$$Y= 12.392+3.161X_1+4.491X_2+1.552X_3+5.221X_4 +2.141X_1*Z+ 0.080X_2*Z+0.174X_3*Z+ 0.118X_4*Z$$

The coefficients were: 12.392, 3.161, 4.491, 1.552, 5.221, 2.141, 0.080, 0.174, and 0.118 respectively. The above coefficient can be elaborated to imply that every single input or increase of predictor variables, the dependent variable also increases with the above stated coefficient values. The wald-statistics based on these models also proves that every predictor variable had a significant influence on dependent variable (adoption of routine immunization in Bomet County, Kenya). Table 4.35 shows the summary of the findings.

Block 1

Table 4.35: Omnibus Tests of Model Coefficients for Explanatory Variables

Model 1 (Absence of Moderator)				
		Chi-square	**Df**	**Sig.**
Step 1	Step	309.366	4	.000
	Block	309.376	4	.000
	Model	209.376	4	.000
Model 2	**(Presence of Moderator)**			
		Chi-square	**Df**	**Sig.**
Step 1	Step	380.403	8	.000
	Block	380.403	8	.000
	Model	380.403	8	.000

Table 4.36: Model Summary for Explanatory Variables

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	288.345[a]	.437	.587
2	267.318[a]	.469	.629

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Table 4.37: Variables in the Equation for predictor variables

Model 2 Without moderator							
		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Message Content	5.161	1.779	8.415	1	.000	174.294
	Channel of communication	5.490	1.625	11.412	1	.001	242.264
	Sender characteristics	2.989	1.019	8.608	1	.003	19.864
	Receiver characteristics	14.592	3.715	15.429	1	.004	214.900
	Constant	-106.1	25.765	16.968	1	.000	.000
Variables entered on step 1: Message content, channel of communication, sender characteristics and receiver characteristics							
Model 1 With moderator							
		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Message Content	3.161	1.579	11.615	1	.000	74.234
	Channel of communication	4.491	1.325	10.442	1	.001	42.164
	Sender characteristics	4.982	1.039	10.608	1	.003	19.864
	Receiver characteristics	1.552	3.715	13.429	1	.004	14.900
	Message Content *z	5.221	22.721	14.238	1	.000	54.000
	Channel of communication *z	2.141	1.779	18.415	1	.000	74.294
	Sender characteristics*z	3.492	1.625	11.412	1	.001	242.264
	Receiver characteristics *z	2.981	1.019	18.608	1	.003	19.864
	Constant	12.392	3.715	15.429	1	.004	214.900
Variable(s) entered on step 1: Message content *z, channel of communication*z, sender characteristics*z , and receiver characteristics*z .							

Based on the analysis, the entire null hypotheses were rejected that is; Message Content, channel of communication, sender characteristics and receiver characteristics for model 1 without the moderator (support), had significant effect on adoption of routine immunization in Bomet County, Kenya. Model 2, with all the explanatory variables; Message content, channel of communication, sender characteristics and receiver characteristic and support as a moderator had significant influence on adoption of routine immunization in Bomet County, Kenya.

Based on the study findings, all the null hypotheses were rejected (table 4.40).

Table 4.38: Hypotheses analysis without moderator

No	Hypotheses	W-value	P- value	Decision
1.H_0	Message content has no significant influence on adoption of routine immunization in Bomet County, Kenya.	8.415	.000	Reject **H_0**
2. H_0	Channel of communication has no significant influence on adoption of routine immunization in Bomet County, Kenya.	11.412	.000	Reject **H_0**
3. H_0	Sender characteristics has no significant influence on adoption of routine immunization in Bomet County, Kenya.	8.608	.000	Reject **H_0**
4.H_0	Receiver characteristics has no significant influence on adoption of routine immunization in Bomet County, Kenya.	5.429	.000	Reject **H_0**
5.H_0	Support systems has no significant moderating influence on the relationship between persuasive communication and adoption of routine immunization in Bomet County, Kenya.	11.5	.000	Reject **H_0**

Table 4.39: Overall Regression Coefficient with moderator

No	Hypotheses	w- value	P- value	Decision
1.H_0	Message content, in the present of moderator (support systems), has no significant influence on adoption of routine immunization in Bomet County, Kenya	14.238	.034	Reject **H_0**
2. H_0	Channel of communication, in the present of moderator (support systems) has no significant influence on adoption of routine immunization in Bomet County, Kenya	18.415	.002	Reject **H_0**
3. H_0	Sender characteristics, in the present of moderator (support systems), has no significant influence on adoption of routine immunization in Bomet County, Kenya	11.412	.002	Reject **H_0**
4.H_0	Receiver characteristics, in the present of moderator (support systems), has no significant influence on adoption of routine immunization in Bomet County, Kenya	18.608	.000	Reject **H_0**

4.15 Optimal Model

The broad study objective was to investigate the influence of persuasive communication on adoption of routine immunization of children aged 0-5 years in Bomet County, Kenya. To achieve the study purpose, the study considered four independent variables; message content, channel of communication, sender and receiver characteristics against adoption of routine immunization. Further, the study sought to evaluate the mediating influence of support systems on the relationship between persuasive communication and adoption of routine immunization. Based on several tests conducted in this study, it was concluded that the predictor variables (message content, channel of communication, sender and receiver characteristics plus the moderator – (support systems), had influence on the dependent variable Y (adoption of routine immunization of children age 0-5 years

in Bomet County, Kenya). In this study, none of the independent variable was expunged.

Therefore, the proposed model was retained as the optimal model (model with moderator) since the two pseudo R2 square values (Cox & Snell R-Square and Nagelkerke R-Square value) were: 0.469 and 0.629 were much greater than Cox & Snell R-Square and Nagelkerke R-Square values : 437 and 0.587 for model 1 (model without moderator).

The optimal model without moderator;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta 5 X_5 + e$$

$$Y = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_i$$

Optimal model with the moderator;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_1 * Z + \beta_6 X_2 * Z \; \beta_7 X_3 * Z + \beta_8 X_4 * Z + e$$

$$Y = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_1 * Z + \beta_6 X_2 * Z + \beta_7 X_3 * Z + \beta_8 X_4 * Z + e_i$$

Where:

Y=Adoption of routine immunization

X_1 = Message content

X_2 = Channel of communication

X_3 = Sender characteristics

X_4 = Receiver characteristics

Z = Support systems (Moderator)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions and recommendations as drawn from results and analysis elucidated in the previous chapters. The main objective of this study was to determine persuasive communication factors influencing adoption of routine immunization of children aged 0-5 years in Bomet County. Specific objectives were to; 1) establish the influence of message content, 2) examine the influence of channel of communication, 3) determine the influence of sender characteristics, 4) investigate the influence of receiver characteristics and 5) establish the moderating influence of support systems on the relationship between persuasive communication and adoption of routine immunization of children aged 0-5 years in Bomet County. Analysis using logistic regression was performed and based on logistic model, the output between predictor variable and adoption of routine immunization was classified into two sections; Block 0 and Block 1. Block 0 had no explanatory variables.

5.2 Summary

The study summary has been outlined as per study objectives.

5.2.1 Demographic characteristics

Majority of the participants were in the age bracket of nineteen to twenty five years with a significant number being adolescents. This signified a high rate of women getting pregnant at an early age. The level education for the majority was primary school with a very small number having attained tertiary level of education. The findings on level of education can be explained by the high rate of those that are giving birth at an early age. Additionally, majority reported that they were married with significant number reporting that they were housewives. Respondents' level of

education had significant influence on adoption of routine immunization. The higher the number of children below five years the less the likelihood of adopted. Marital status and caregiver's age did not show any significant influence on adoption. However, region had an influence on adoption with those that were Catholics having lower adoption compared to the others.

5.2.2 Influence of message content

The first objective was to investigate the influence of message content on adoption of routine immunization with the last three months prior to the study. This was meant to test message availability and frequency. A majority affirmed that they had received a message on routine immunization, with a significant percentage (43.84%) saying they had not. Message availability, authentic, accuracy, cultural acceptability and language is has been documented by researchers as an important attribute in communication process. The study found gaps in these message attributes. Studies have attributed low adoption of routine immunization to message content not being clear, specific, timely and repeated.

On whether the message was authentic and believable majority were undecided and significant others disagreed. These findings also shows that since the message was not clear, the participants would not be able to decide on whether it was authentic and acceptable. Studies have attributed the knowledge gap to poor message construction, message that were not tailored to the target audience and poor communication skills on the part communicator.

In summary, the participants were generally undecided on the message question. Additionally, they demonstrated a general disinterest and apathy towards vaccination services and did not seem to care to know what this subject is all about. The study found message content to have a significant influence on adoption of routine immunization in the study area. Message content classification rate outcome, indicated an increased in adoption of routine immunization for those that had good support systems, compared to those that did not have or had minimal support. The models indicated that for every unit of message content, the value of adoption of routine immunization changed positively both in the absence and

present of the moderator. Therefore, message content had significant positive influence on adoption of routine immunization of children aged 0-5 years in Bomet County. However, compared to the other variables, it was found to have the least effect.

5.2.3 Influence of channel of communication

On the second study objective, the researcher sought to establish the influence of channels of communication on adoption of routine immunization of children aged 0-5 years in Bomet County. The objective was tested using hypotheses that; Channel of communication has no significant influence on adoption of routine immunization. To accomplish the objective of the study, inclusion of communication channel in the model was considered and this led to two cases as stated earlier that is model with and one without the moderator (support systems). Considering the omnibus test models for model 1(with no moderator) and model 2 (with moderator), both models were significant, although the one with the moderator was found to be better in influencing adoption. Channel of communication had significance influence on adoption of routine immunization of children aged 0-5 years in Bomet County.

5.2.4 Influence of sender characteristics

The objective influence of sender characteristic was tested using P-value. Omnibus test models for model 1 (with no moderator) and model 2 (with moderator support), both models were significant. The values of two pseudo R2 (Cox & Snell R-Square and Nagelkerke R-Square) values in the model on inclusion of sender characteristic were tested. There was positive variation in adoption of routine immunization, explained by sender characteristic for the model both in the absence and presence of moderator (support systems). Based on the findings, it was concluded that sender characteristics both in the presence and absence of moderator, significantly influences adoption of routine immunization of children aged 0-5 years in Bomet County.

5.2.5 Influence of receiver characteristics

The objective on influence of receiver characteristics on adoption of routine immunization of children aged 0-5 years was realized by inclusion of receiver characteristics in the model and this led to two situations; that is model with and another without moderator (support systems). The omnibus test models for model 1(with no moderator) and model 2 (with moderator) showed that both models were significant. The findings concluded that receiver characteristics had a significance influence on adoption of routine immunization of children aged 0-5 years in Bomet County. This was so, both in the in absence and presence of moderator. The values of pseudo R2 (Cox & Snell R-Square and Nagelkerke R-Square) recorded improved variation in adoption of routine immunization. Receiver characteristic had the highest influence on adoption of routine immunization compared to all the other variables in the study.

5.3 Conclusion

The following conclusion was drawn based on the study findings. Study participants had apathy, nearing to negative attitude towards routine immunization services. This was demonstrated by the reluctance in answering the questioner, with quite a high number being undecided on even very simple question relating to the study.

Message content attributes had positive influence on adoption of routine immunization. Adoption rate changed positively in the absence of moderator (support system) and even higher when support systems were present. This was the reason for rejection of Null hypothesis; Message content has no significant influence on adoption of routine immunization in Bomet County. However, message content compared to other variables contributed less to adoption of routine immunization.

Secondly, Channel of communication contributes to a positive variation in adoption of routine immunization both in absence and presence of moderator (support systems). Therefore, the null hypothesis; Channel of communication has no

significant influence on adoption of routine immunization in Bomet County was rejected.

Thirdly, the null hypothesis on objective three that stated; Sender characteristics has no significant influence on adoption of routine immunization in Bomet County was rejected too. The study found that there was positive variation in adoption without moderator and even higher when moderator was introduced.

Fourthly, receiver characteristics were found to have the highest influence on adoption. Variation in adoption was elicited even without moderator and higher adoption chance in the presence of the moderator. The null hypothesis; Receiver characteristics has no significant influence on adoption of routine immunization in Bomet County, was rejected.

Lastly, the moderating variable, support systems, was found to have a significant positive influence on the relationship between persuasive communication and adoption of routine immunization. Therefore, the model with the variable (support systems) was found to be a better one as it improved the rate of adoption of routine immunization.

5.4 Recommendations

Bomet County should focus on persuasive communication in order to improve adoption of routine immunization. For the communication to be effective and sustain adoption of routine immunization, based on the study findings, the researcher gave the following recommendations;

1. Routine immunization specific messages, targeted and tailored to caregivers, should be made available and provided frequently
2. Thirdly, the study having found that health workers are the main channels as well as senders of the routine immunization messages, the county health management should find means of motivating health workers towards achieving good healthworker-caregiver communication tactic. This will help

the caregivers to build trust and identify with the message sender, in which are the study identified a gap

3. The knowledge gap should be addressed by the sender making sure that messages are simple, clear and in a language that is easily understood by the caregivers
4. Secondly, to achieve community support, community ownership should be cultivated by involving the opinion leaders such as religious leaders, local administration and community own resource persons. Involvement strategy should include use of the community members in routine immunization advocacy activities

5.5 Further research

The study focused on Bomet County on the account that it was performing poorly in adoption of routine immunization. The researcher recommends that;

1. Comparative studies should be done, comparing the best with the poorly performing counties to find other factors that may have contributed to the better performance so that the findings can enhance the findings of this study
2. Additionally, the study having found that the overall adoption rate would increase from 53.0% to 81% implying that there was an improvement of 28%., studies should be conducted to understand and gets means of achieving the recommended 90% and above FIC if the persuasive communication factors were addressed to adequately and in the presence of the moderator, support systems

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APPENDICES

Appendix I: Consent Form

PERSUASIVE COMMUNICATION AND ADOPTION OF ROUTINE IMMUNIZATION OF CHILDREN AGED 0-5 YEARS IN BOMET COUNTY

I am a PhD student in Health Communication in the school of Communication, Jomo Kenyatta University of Agriculture and Technology. As part of this degree I am undertaking a research project leading to a thesis. The purpose of this research study is determine the influence of persuasive communication in adoption of routine immunization of children aged 0-5 years in Bomet County. Your input in this study will help in designing persuasive communication interventions and strategies that are relevant to care givers in this County in adoption of routine immunization of children age 0-5 years.

You will be asked to complete a questionnaire which will take approximately 30 minutes. Completion of the questionnaire implies consent to participate in the research. It is important that you complete the questionnaire with complete honesty; there is no right or wrong answer. All responses collected will be put into a written report on an anonymous basis. It will not be possible for you to be identified personally. All the data collected will be kept secure and no other person besides me and my supervisors will have access to the completed questionnaire. The thesis will be submitted for marking at the School of communication and deposited at the university library. It is intended that one or more articles will be submitted for publication in scholarly journals. The questionnaires will be destroyed five years after the end of the project. If you have any questions or would like to receive further information about the project, please contact me at the School of Health sciences, Meru University of science and technology, or call me on 0722240444, or my thesis supervisor Prof. Helen Mberia, through email –hmberia@jkuat.ac.ke

Consent

I have been given and have understood the explanation of this research project. I have had an opportunity to ask questions and have them answered to my satisfaction. I hereby accept to participate in the research study.

Sign: _____ Date: _____

Appendix II: Questionnaire

Serial no……..

Name of research assistant ……..

Sub-county: …….

Health facility…….

Date: ……

Interviewee relationship with child…….

DEMOGRAPHIC CHARACTERISTICS

1. Age (in years): ……
2. What is your highest level of education? (Tick one)
   a) Never been to school
   b) Primary education
   c) Secondary education
   d) Tertiary education
3. What is your occupation?……..
4. How many children do you have?
   a) 1-3
   b) 4-6
   c) Above 6
5. How many are below five years?
   [ ]
6. What is your marital status? (Tick one)
   a) Single
   b) Married
7. What is your religion? (Tick one)

a) Catholic

b) Protestant

c) Muslim

d) Others, Specify……

MESSAGE FACTORS

8. Have you received any message on Routine Immunization with the last three months?

a) [ ] Yes

b) [ ] No

If yes answer the following questions:

The following statements are in regard to the message on routine immunization received. Please indicate your level of agreement with the statement where; SD= strongly disagree, D=Disagree, UN= undecided, A=Agree, SA=strongly agree,

STATEMENT	SD	D	UN	A	SA
The message was clear					
The message was accurate					
The message was authentic					
The message was believable					
The message was acceptable in my culture					
The language used was appropriate					
The language used in the message was understandable					
The language in the message was respectful					
I understood the message on routine immunization well					

CHANNEL FACTORS

9. Do you own any channel of communication?

   a) [ ] Yes

   b) [ ] No

10. Which of the following channel were used to deliver the information on routine immunization to you? (Please tick)

   a) Radio

   b) Television

   c) Chief/church/village elder

   d) Healthworker

   e) Posters/fliers/brochures

   f) Others……

10. The following statements are in regard to the channel used to deliver the message on routine immunization. Please indicate your level of agreement with the statement where; SD= strongly disagree, D=Disagree, UN= undecided, A=Agree, SA=strongly agree.

STATEMENT	SD	D	UN	A	SA
I trust the channel used to deliver the message					
The channel delivers message					
The channel is always available					
I have access to the channel					
I am able to pay for the channel (s)					

SENDER FACTORS

11. The following statements are in regard to the sender of message on routine immunization. Please indicate your level of agreement with the statement where; SD= strongly disagree, D=Disagree, UN= undecided, A=Agree, SA=strongly agree.

STATEMENT	SD	D	UN	A	SA
The source the message was trustworthy					
I was able to identify with the message bearer					
The sender was able to articulate the message well					
The sender was willing to answer my questions in regard to routine immunization					

RECEIVER FACTORS

12. Do you know any vaccines given to children? (Tick one)

a) [ ] Yes

b) [ ] No

If yes, list the type of vaccines you know, the disease they prevent and the time they are given?

Type of vaccine	**Disease protected**	**When given**
BCG	TB	Birth
Polio	Polio	Birth, 6 wks, 10 wks and 14 wks
Diptheria	Diptheria	6 wks, 10 wks and 14 wks
Whooping cough	Whooping Cough	6 wks, 10 wks and 14 wks
Pneumococcal vaccine	Pneumonia	6 wks, 10 wks 14 wks
Rota Virus	Rota Virus	6 weeks and 10 weeks
Measles	Measles	9 months and 18 months

13. Are there any side effects of vaccines? (Tick one)

a) [ ] Yes
b) [ ] No

If yes, (Tick)

a) Can give children a fever
b) Can make children sick
c) Can make children infertile
d) Can cause polio
e) Can give HIV/AIDs

Others…….

14.Are there some caregiver that you know do not take their children for vaccination?

a) [ ] Yes
b) [ ] No

15.Is there a reason (s) that may stop a caregiver from taking child for immunization?

a) Religious reasons
b) Long distances
c) Lack of money
d) Family members don't agree
e) Fear of health workers
f) Others……

Receiver attitude on routine immunization

Please indicate your level of agreement with the following statements where; SD= strongly disagree, D=Disagree, UN= undecided, A=Agree, SA=strongly agree.

STATEMENT	SD	D	UN	A	SA
Vaccination is safe for my child					
It is necessary for me to take my child for vaccination					
I would consider buying vaccines if they are no longer available for free					

16.Have you ever heard of a child who died of a vaccine preventable disease?

a) [ ] Yes
b) [ ] No

17.If yes, do you think the death could have been prevented by vaccination?

a) [ ] Yes
b) [ ] No

SUPPORT SYSTEMS FACTORS

18. Please indicate your level of agreement with the following statements where; SD= strongly disagree, D=Disagree, UN= undecided, A=Agree, SA=strongly agree.

STATEMENT	SD	D	UN	A	SA
I am well supported financially to have my child vaccinated					
I have enough financial resources to have my child vaccinated					
My community encourages adoption of routine immunization					
My religion allows adoption of routine immunization					
Vaccines are always available in my nearest health facility					

Health workers are always available for routine immunization services					
The health are always willing to provide routine immunization services					

ROUTINE IMMUNIZATION ADOPTION

19. Has your child been vaccinated? *(Tick one)*

a) [ ] Yes
b) [ ] No

a). If yes, confirm from the mother child booklet

b). If no why?

……
……
……

This is the end of the interview thank you for your assistance.

Appendix 1II: Kii Interview for Service Provider

Interviewer:…….Date ……..

Sub-county. ……

Interviewee Position:……

1. Does this sub-County offer immunization services?
2. How many children do you immunize per month?
3. What number of children do you target for immunization?
4. Are there some caretakers who do not bring them for immunization.
5. Does your Sub-county conduct education sessions on routine immunization?
6. Does the Sub-County have adequate staff to conduct immunization sessions?
7. How do you create awareness to the caregivers on the service?
8. What channels do you use for communication for routine immunization?
9. Do you think the methods you use to communicate are effective?
10. How does the community support routine immunization?
11. What are some of the challenges that you face when communicating to your clients coming for immunization?

This is the end of our discussions, thank you for your assistance.

Appendix IV: Vaccine/Disease/Schedule

			Know any vaccines given to children		Total
			Yes	No	
Knowledge on BCG	Yes	% within Know any vaccines given to children	73.9%	0.0%	72.8%
	No	% within Know any vaccines given to children	26.1%	100.0%	27.2%
Knowledge that it Prevents TB	Yes	% within Know any vaccines given to children	51.3%	0.0%	50.6%
	No	% within Know any vaccines given to children	48.7%	100.0%	49.4%
Knowledge of times BCG is given (At birth)	Yes	% within Know any vaccines given to children	26.3%	0.0%	25.9%
	No	% within Know any vaccines given to children	73.7%	100.0%	74.1%
Knowledge on Polio Vaccine	Yes	% within Know any vaccines given to children	84.2%	20.0%	83.2%
	No	% within Know any vaccines given to children	15.8%	80.0%	16.8%
Knowledge that it prevents Polio	Yes	% within Know any vaccines given to children	66.0%	20.0%	65.3%
	No	% within Know any vaccines given to children	34.0%	80.0%	34.7%
Knowledge of times Polio given: Birth, 6 wks, 10 wks and 14 wks	Yes	% within Know any vaccines given to children	19.1%	20.0%	19.1%
	No	% within Know any vaccines given to children	80.9%	80.0%	80.9%

Knowledge of the Diphtheria vaccine	Yes	% within Know any vaccines given to children	3.8%	0.0%	3.8%
	No	% within Know any vaccines given to children	96.2%	100.0%	96.2%
Knowledge that it protects Diphtheria	Yes	% within Know any vaccines given to children	4.1%	0.0%	4.1%
	No	% within Know any vaccines given to children	95.9%	100.0%	95.9%
Knowledge of times Diphtheria given (6 wks, 10 wks and 14 wks)	Yes	% within Know any vaccines given to children	3.6%	0.0%	3.5%
	No	% within Know any vaccines given to children	96.4%	100.0%	96.5%
Knowledge of the Pneumococal vaccine	Yes	% within Know any vaccines given to children	39.3%	20.0%	39.0%
	No	% within Know any vaccines given to children	60.7%	80.0%	61.0%
Knowledge that it protects Pneumonia	Yes	% within Know any vaccines given to children	68.3%	80.0%	68.5%
	No	% within Know any vaccines given to children	31.7%	20.0%	31.5%
Knowledge of the times Pneumococal given (6 wks, 10 wks 14 wks)	Yes	% within Know any vaccines given to children	5.7%	0.0%	5.6%
	No	% within Know any vaccines given to children	94.3%	100.0%	94.4%

Appendix V: Vaccine/Disease/Schedule

			Know any vaccines given to children		Total
			Yes	No	
Knowledge of the Rota Virus vaccine	Yes	% within Know any vaccines given to children	18.8%	20.0%	18.8%
	No	% within Know any vaccines given to children	81.2%	80.0%	81.2%
Total		Count	341	5	346
Knowledge that it protects Rota Virus	Yes	% within Know any vaccines given to children	13.8%	20.0%	13.9%
	No	% within Know any vaccines given to children	86.2%	80.0%	86.1%
Total		Count	339	5	344
Knowledge of Rota times given (6 weeks and 10 weeks)	Yes	% within Know any vaccines given to children	4.4%	0.0%	4.3%
	No	% within Know any vaccines given to children	95.6%	100.0%	95.7%
Total		Count	339	5	344

Appendix VI: Vaccine/Disease/Schedule

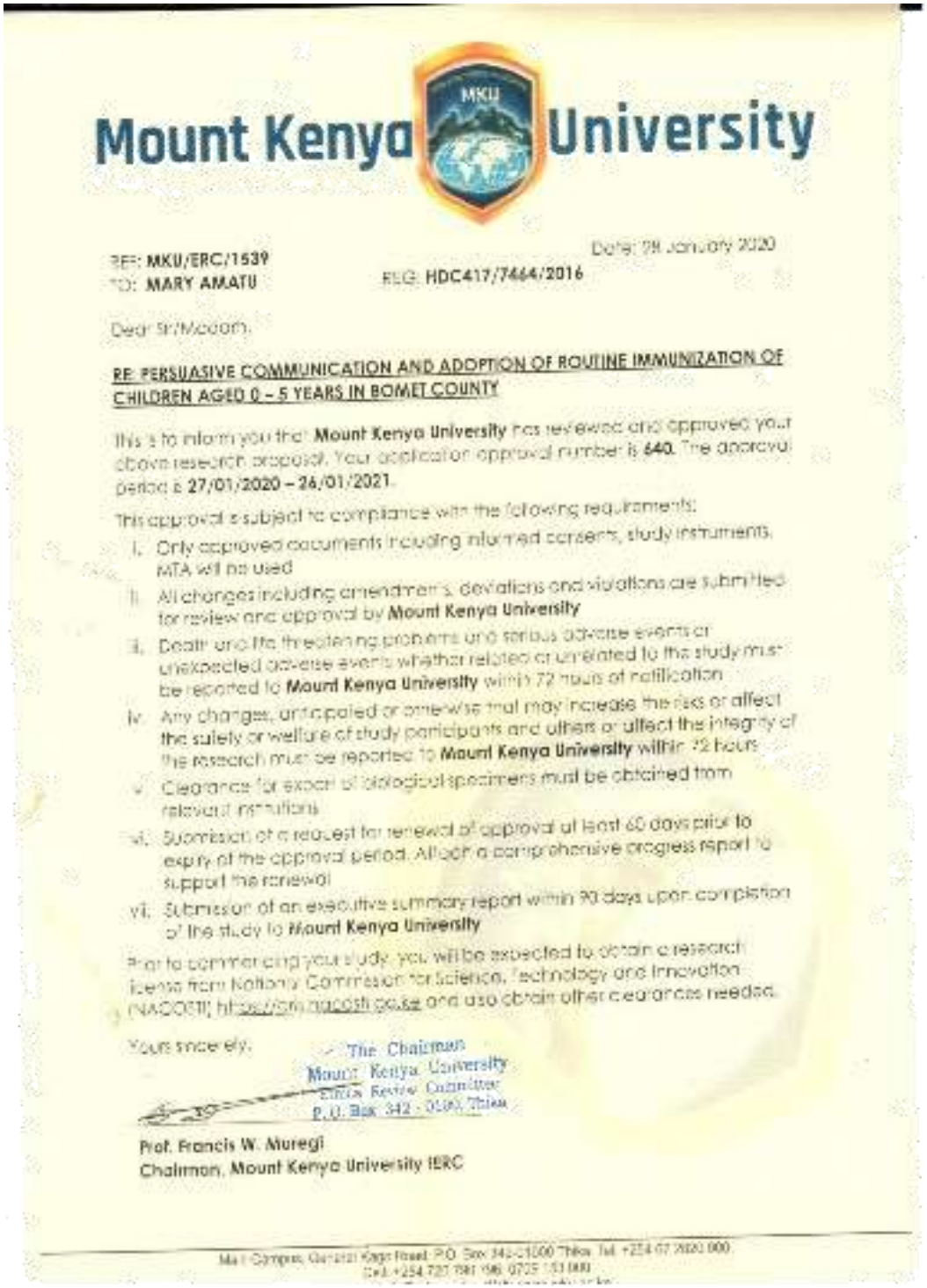
			Know any vaccines given to children		Total
			Yes	No	
Knowledge of the Measles vaccine	Yes	% within Know any vaccines given to children	54.3%	0.0%	53.5%
	No	% within Know any vaccines given to children	45.7%	100.0%	46.5%
Knowledge that it protects measles	Yes	% within Know any vaccines given to children	30.2%	0.0%	29.8%
	No	% within Know any vaccines given to children	69.8%	100.0%	70.2%
Knowledge of when the Measles vaccine is given (9 months and 18 months)	Yes	% within Know any vaccines given to children	7.4%	0.0%	7.3%
	No	% within Know any vaccines given to children	92.6%	100.0%	92.7%

Appendix VII: Reasons for Children Not Immunized

			Knowledge caregivers that dont take their children for vaccination		Total
			Yes	No	
Religious Reason	Yes	Count	149	10	159
		% within Knowledge of caregivers that dont take their children for vaccination	78.0%	62.5%	76.8%
	No	Count	42	6	48
		% within Knowledge of caregivers that dont take their children for vaccination	22.0%	37.5%	23.2%
Total		Count	191	16	207
Long distances	Yes	Count	141	5	146
		% within Knowledge of caregivers that dont take their children for vaccination	72.7%	31.3%	69.5%
	No	Count	53	11	64
		% within Knowledge of caregivers that dont take their children for vaccination	27.3%	68.8%	30.5%
Total		Count	194	16	210
Lack of money	Yes	Count	146	9	155
		% within Knowledge of caregivers that dont take their children for vaccination	75.3%	56.3%	73.8%
	No	Count	48	7	55
		% within Knowledge of caregivers that dont take their children for vaccination	24.7%	43.8%	26.2%
Total		Count	194	16	210
		% within Knowledge of caregivers that dont take their children for vaccination	100.0%	100.0%	100.0%
Family members don’t agree	Yes	Count	143	3	146
		% within Knowledge of caregivers that dont take their children for vaccination	73.7%	18.8%	69.5%
	No	Count	51	13	64

		% within Knowledge of caregivers that dont take their children for vaccination	26.3%	81.3%	30.5%
Total		Count	194	16	210
		% within Knowledge of caregivers that dont take their children for vaccination	100.0%	100.0%	100.0%
Fear of Nurses	Yes	Count	61	30	91
		% within Knowledge of caregivers that dont take their children for vaccination	54.5%	49.2%	52.6%
	No	Count	51	31	82
		% within Knowledge of caregivers that dont take their children for vaccination	45.5%	50.8%	47.4%
Total		Count	112	61	173
		% within Knowledge of caregivers that dont take their children for vaccination	100.0%	100.0%	100.0%
Community members don’t agree	Yes	Count	132	8	140
		% within Knowledge of caregivers that dont take their children for vaccination	68.0%	50.0%	66.7%
	No	Count	58	8	66
		% within Knowledge of caregivers that dont take their children for vaccination	29.9%	50.0%	31.4%
Total		Count	194	16	210
		% within Knowledge of caregivers that dont take their children for vaccination	100.0%	100.0%	100.0%

Appendix VIII: Ethical Clearance Certificate



Mount Kenya University

REF: MKU/ERC/1539
TO: MARY AMATU

Date: 28 January 2020
REG: HDC417/7464/2016

Dear Sir/Madam,

RE: PERSUASIVE COMMUNICATION AND ADOPTION OF ROUTINE IMMUNIZATION OF CHILDREN AGED 0 – 5 YEARS IN BOMET COUNTY

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **640**. The approval period is **27/01/2020 – 26/01/2021**.

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 **Mount Kenya University**
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 **Mount Kenya University** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** 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 **Mount Kenya University**

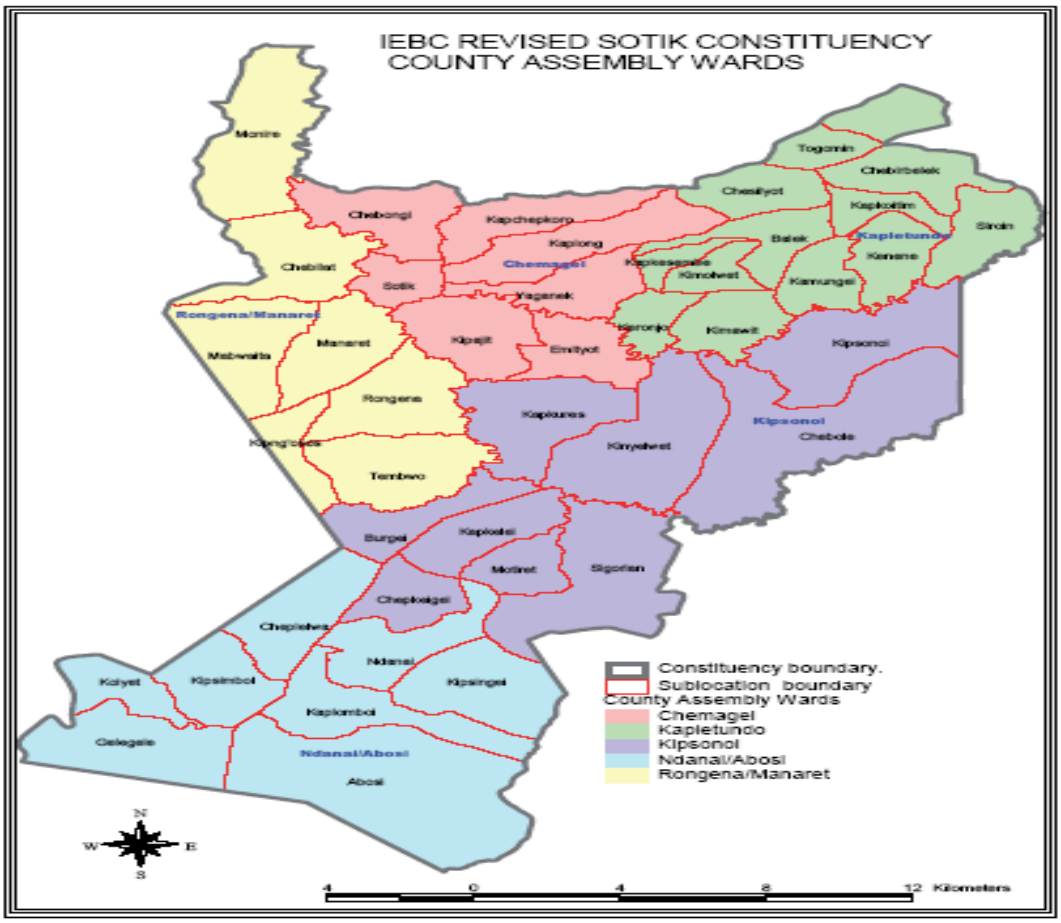
Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) http://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

The Chairman
Mount Kenya University
Ethics Review Committee
P.O. Box 342 - 01000 Thika

Prof. Francis W. Muregi
Chairman, Mount Kenya University IERC

Main Campus, Garissa Kaga Road, P.O. Box 342-01000 Thika, Tel: +254 07 2081 000
Cell: +254 720 781 196, 0725 153 000

Appendix IX: NACOSTI Clearance

Appendix X: Map of Bomet County