

**FACTORS INFLUENCING THE UTILIZATION OF ROUTINE
IMMUNIZATION OF CHILDREN AGED 12 TO 23 MONTHS IN SOMALIA:
A CASE OF GAROWE TOWN**

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REQUIREMENTS FOR THE CONFERMENT OF THE DEGREE OF
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DECLARATION

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

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We confirm that the work reported in this thesis was carried out by the candidate under our supervision

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DEDICATION

This work is dedicated to my family who have held me firmly and consistently as the strongest anchor for keeping me focused and determined.

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ABSTRACT

Routine immunization is a lifesaving intervention which targets preventable diseases which very common in children below the age of 5 years. However, despite its importance Garowe Town in Puntland Somalia, has not achieved the desired immunization impact. This study therefore purposed to interrogate the determinants of utilization of routine immunization coverage for children aged 12 to 23 months in Garowe Town. The specific objectives of the study were to determine the influence care giver factors, interpersonal factors, health facility factors, and policy factors on the utilization of routine immunization among children aged 12 to 23 months in Garowe Town. A cross-sectional research design was the most suitable for the study where a mixed method approach was used. The study used both qualitative and quantitative data which was collected by interviewing mothers or guardians of the children, service providers in selected health facilities and community health workers. A sample size of 384 was determined by use of Fisher formula. Quantitative data was analyzed through univariate methods, descriptive statistics, Chi-square (χ^2) and regression methods while qualitative data was organized and summarized through thematic analysis. The findings showed that individuals factors were negatively and significantly ($\beta=-.001$, $p=0.037$) influenced the utilization of routine immunization in Somalia; care giver factors reduced utilization of routine immunization, while interpersonal factors ($\beta=0.013$, $p=0.046$) and health facility factors ($\beta=0.056$, $p=0.001$) had a positive and significant influence on utilization of routine immunization among children aged 12 to 23 months in Garowe Town. Finally, policy factors were found to have a negative but insignificant ($\beta=-0.002$, $p=0.465$) influence on utilization of routine immunization among children aged 12 to 23 months in Garowe Town. The study concludes that utilization of the routine immunization in Garowe Town was high with 83.8% children having ever had some immunization for polio vaccines, BCG injection among others. However, a significant number of caregivers still leave their children unprotected by failing to observe the routine immunization despite being close to health facilities. Based on these findings, the study recommends that NGOs, governments' agencies and all the stakeholders to do conduct frequent awareness campaigns to equip the residents of Somalia with knowledge with regard to utilization of routine immunization.

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ABBREVIATIONS AND ACRONYMS

ANC	Antenatal Care
DTP3	Diphtheria-Tetanus-Pertussis
GIVS	Global Immunization Vision and Strategy
GVAP	Global Vaccine Action Plan
MDGs	Millennium Developmental Goals
MICS	Multiple Indicator Cluster Survey
NACOSTI	National Commission for Science Technology and Innovation
NGOs	Non-Governmental Organizations
SCI	Save the Children International
SEM	Social Ecological Model
SPSS	Statistical Package of Social Sciences
SSS	Somalia Support Secretariat
UN	United Nations
UNICEF	United Nations Children’s Fund
WHO	World Health Organization
WVI	World Vision

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The World Health Organization (WHO) reports indicate that health systems in developing countries are insufficient and this is a great barrier to the achievement of essential healthcare. However, some of these problems are also experienced in some developed countries due to inequitable social protection as well as high costs of the services (Halverson, 2002).

For this reason, the WHO developed a common framework of action consisting of six essential building blocks to strengthening health systems. This study is anchored on service delivery building block (World Health Organization [WHO], 2007). Characteristics of good healthcare service range from quality, effective, affordable and safe (WHO, 2007). Despite the fact that no universally accepted health service delivery mechanisms exist, there is a need to meet various prerequisites such as delivery through well trained personnel, sustainable financing models and in a friendly environment that supports both the providers and users (Hinojosa, 2018). The service delivery building block is concerned with proper organization of resources with an aim of delivering quality, accessible, safe and continuous healthcare services regardless of scope, ailment or time period (Stucki. et al., 2017).

Somalia is located in the Horn of Africa with functional federal government and Five Member States. Puntland is one of the federal member States which is relatively stable and peaceful, located in the Northeastern region of Somalia, with State capital city of

Garowe in the Nugaal region. Puntland has 9 regions; Nugaal, Bari, Karkaar, Mudug, Sool, East Sanag, Hayland, Gardafu and Ayn and 51 districts with total population of three million people.

Strengthening the immunization system in Puntland State remains a priority of the Ministry of Health and Partners including the United Nations agencies such as United Nations Children's Fund (UNICEF) and the World Health Organization. Strengthening the immunization will contribute to strengthening the overall health system (Abdullahi, 2020). The eradication of poliomyelitis and control of other vaccine preventable diseases remain major goals of Ministry of Health and the foundation of these efforts is a strengthened routine immunization system. The Ministry of Health with support from partners has developed various strategic documents setting out strategies to improve immunization. However, despite these commitments routine immunization coverage remains low and disease outbreaks are common. These disease outbreaks are usually brought under control through mass vaccination campaigns such as polio and measles under 5 year's supplementary immunization activities (Abdullahi, 2018).

Garowe Town, the capital of Puntland State is located in the Nugaal region of the state which is located in the North Eastern part of Somalia. The estimated Population of Garowe Town is 150,000 residents (Abdullahi, 2018). It has one General Hospital and 6 Health Centers (HC) namely, Waberi HC, Gargar HC, Barwaqo HC, Gambol HC, Jilab HC, and Jawle HC. The key players in delivery of healthcare in the area are Non-Governmental Organizations and local government. UNICEF and more than 40 Non-Governmental Organizations (NGOs) as well as WHO are involved in the vaccination of under-5 year old children under the Somalia Support Secretariat (SSS) umbrella.

Some of the mandatory schedules for immunization in the country before the age of 9 months is EPI, OPV at birth and Vitamin A at the end of 9 months (Yusuf, 2018).

The routine recommendations for vaccines of under five children was recommended in the year 1974 by WHO. Globally, this is one of the most fruitful and gainful interventions in relation to morbidity and child mortality. It averts up to three million mortality cases annually which would have otherwise resulted in diphtheria, measles or tetanus (Jacobson, 2020). Those receiving these interventions have had an upsurge with statistics revealing as high as 86 percent of infants that is close to 116.5M children getting over 3 doses of the vaccines (DPT) as of the year 2016 to shield them against serious illness, disability and fatality (Etana & Derassa 2012).

In an effort to mitigate some of the impediments to the accomplishment of the program, there was unveiling of the Global Immunization Vision and Strategy (GIVS), a framework spanning 10 years, by WHO and UNICEF in the year 2006 (Jacobson, 2020). It aids in the control of negative outcomes from diseases which can otherwise be prevented through vaccination. The framework stipulates a target of up to 90 percent of children (under 1) being vaccinated at the national level and up to 80 percent at the District level (Wiedermann & Visser, 2019).

There has been commendable progress according to UNICEF in this regard in countries of Eastern and Southern regions of Africa. In this context, comprising 21 countries, up to 14.3M (87 percent) children (under 1) received vaccination and the remaining fraction were unprotected (Kamadjeu, 2017). However, majority of the vaccinated children are from nine countries namely Angola, Ethiopia, Kenya,

Madagascar, Somalia, South Sudan, Tanzania, Uganda and Zambia. In Somalia, reported immunization coverage has been historically low, especially considering that since the year 2009, some areas in the central and southern parts of the country were not accessible for mass vaccination.

In 2013, 194 people were affected by polio and 3,100 cases of suspected measles were reported. Even though measles is one of the top causes of child mortality, it is highly under-reported in Somalia (Raoul, 2017). In the country, there is an average of up to 40% immunization coverage against six critical diseases that is, Tuberculosis (TB), pertussis, measles, polio and tetanus. For Diphtheria (DPT), the immunization coverage for those below 1 year is 31% (Abdirisak et al., 2016). In Somalia the Ministry of Health has implemented the expanded immunization program in Puntland (EPI) a unit that coordinates immunization interventions. Around 72 Health Centers provide vaccination activities supported by World Vision (WVI), Save the Children International (SCI), Somalia Red Crescent Society (SRCS), Medicine and ISDP. In Puntland, 64 % of Penta 3 coverage was achieved in 2016. Globally, the coverage is around 80 percent and hence this fraction is comparatively low (Puntland HMIS Report, 2016).

A study conducted by Mohamud et al., (2014) cross-examined the coverage of immunization in the Jigjiga District of Somalia focusing on children aged between 12 and 23 months. The study findings showed that overall immunization of the children less than 5 years was very low. The study recommended that promotion of health institutions should be undertaken, strengthening of awareness programmes should also be implemented to ensure that mothers can utilize the services.

A study conducted by Ali et al., (2016) focused on strengthening routine immunization in Africa with a specific focus on Polio. The interrogation informed that even though some diseases such as measles still occurred in the country; polio had efficaciously been battled in the preceding 3 years. The DPT1 coverage was established to be 25% which in contrast to the national rate of 90% and global rate of 80% was grim.

1.2 Statement of the Problem

Routine Child immunization in Puntland, Somalia has relatively low coverage according to global coverage despite the fact that vaccines are widely available with support from the global communities including Global Alliance for Vaccines International. (Abdullahi et al., 2020). Globally, Somalia has the highest under five mortality rates (U5MR) which accounts 137 per 1,000 live births with one in seven Somali children dying before they reach their fifth birthday. The EPI coverage in the country has the mandate of enhancing accessibility to vaccines by children, however, the coverage is between 30 and 40 percent for the major six immunizable diseases, which is very grim, against the global rate of 80 percent (Abdullahi, 2018).

Due to low immunization Coverage in Somalia in general and particularly in Garowe Town, compared to the global rate, many Somali children die due to disease outbreaks such as the polio outbreak in 2013 which affected 194 people and measles outbreak in Puntland in 2017 where 6,318 cases were reported. The biggest number of measles cases reported from Galkacyo (1,409), Burtline (1044), Bossaso (839) and Garowe (839) (Ministry of Health, Puntland, 2018). This outbreak largely affected urban Towns which had high influx of internally displaced people such as Garowe Town which hosts 15,583 in 17 Camps. The existing literature does not reveal factors underlying the low

level of full immunization coverage in the Garowe, and no study were conducted recently in Garowe Town to know the factors affecting utilization of routine immunization coverage of children aged 12 to 23 months.

1.3 Purpose of the study

The study purposed to establish factors affecting the utilization of routine immunization coverage of children aged 12 to 23 months in the Garowe District in the Nugal region.

1.4 Specific Objectives

To achieve the main objective, the study was guided by the following specific objectives:

- i. To determine the relationship between care giver factors and the utilization of routine immunization among children aged 12 to 23 months in Garowe Town.
- ii. To establish the influence of interpersonal factors on the utilization of routine immunization among children aged 12 to 23 months in Garowe Town.
- iii. To assess the influence of health facility factors on the utilization of routine immunization among children aged 12 to 23 months in Garowe Town.
- iv. To determine the influence of policy factors on the utilization of routine immunization among children aged 12 to 23 months in Garowe Town.

1.5 Research Questions

To achieve the main objective, the study was guided by the following research questions:

- i. What is the relationship between care giver factors and the utilization of routine immunization among children aged 12 to 23 months in Garowe Town?

- ii. What is the influence of interpersonal factors on the utilization of routine immunization among children aged 12 to 23 months in Garowe Town?
- iii. To what extent do health facility factors influence the utilization of routine immunization among children in Garowe Town?
- iv. What is the influence of policy factors on utilization of routine immunization among children aged 12 to 23 months in Garowe Town?

1.6 Justification of the Study

Annually, grim statistics indicate a high mortality rate among under five in LMIC. One of the sad causes of their deaths is limited access to life saving interventions regarding preventable childhood illnesses. As many research and experience showed, half of the children who die every year in the world, die due to lack immunization. Immunizing infants below 5 years is important for their survival. To counter some of the impediments to the accomplishment of the program, there was unveiling of the Global Immunization Vision and Strategy (GIVS), a framework spanning 10 years, by WHO and UNICEF in the year 2006. It aides in the control of negative outcomes from diseases which can otherwise be prevented through vaccination regardless of the age group of the person.

The initiative purposes to sustain the present immunization coverage echelons, expand the coverage to those who have not reached, present new inventions and technologies in immunization along with collaborating immunization and additional healthcare delivery interventions. Notwithstanding, only a meagre funding exists for immunization programmes in Puntland which is supported by GAVI or other EPI donors. However, a lot of effort has been put to eradicate polio in Somalia. Remarkable

success has been achieved to control polio outbreak. Polio program has assets and funds that have been used to support and strengthen routine immunization. Therefore, it is important to understand the factors that influence the utilization of immunization among children aged 12 to 23 months in Garowe Somalia. Recommendations were given to develop strategies and plans that could raise routine immunization coverage as we strive to reach the target of universal immunization coverage.

1.7 Limitations of the Study

The study was also limited to the population of Garowe Town may not be representative of other regions in Somalia hence limiting the generalization of the study to other regions with similar challenges. However, the researcher conducted a pre-test of the instruments in a neighboring town to ensure reliability and validity of the research instruments. The pre-test was analyzed and necessary actions taken to avoid bias.

1.8 Delimitation of the Study

The study focused on only four variables, caregiver factors, interpersonal factors, health facility factors and policy factors all other factors that could also influence the utilization of routine immunization coverage of under five children in Garowe were excluded.

1.9 Significance of the Study

This study findings will be a useful source of information for the Ministry of Health, United Nations (UN) Agencies and International Organizations working in health in general, but particularly in immunization programs in Garowe. This study findings will also help the EPI managers/researchers to understand the immunization coverage and

associated factors that influence utilization among children aged below two years. The study is expected to contribute towards strengthening health systems especially in scaling up the provision of immunization coverage in Garowe Town and inform policy formulation and implementation of immunization services to children aged 12 to 23 months.

1.10 Operational Definition of Terms

Attitudes: Is the predispositions to have certain reactions in different situations or interpret events based on different predilections

Bacillus Calmette Guerin (BCG): A vaccine given to infants and young children in many countries to reduce the risk of serious complications of tuberculosis.

Child aged < 5 years: in this study meant children who are either newly born or 4 years 11 months and 29 days old.

Coverage of vaccination: Percentage of the population that has been vaccinated.

Eligible child: Child aged < 5 years who has not begun or completed the vaccination schedule for his or her age; who has no real contraindications for receiving one or more vaccine doses; and who, given the date of administration of a previous dose or doses, is eligible to be vaccinated by the health personnel during the visit to the health facility on the day of the study.

Expanded Program on immunization (EPI): is a program proposed by the WHO to vaccinate all children.

Knowledge: refers to the aptitude to obtain, recollect and make use of info comprising of understanding, judgement and dexterity.

Missed Opportunity for Vaccination (MOV): refers to the circumstances whereby a child who is supposed to be vaccinated and visits a health facility fails to be vaccinated.

National Immunization Days (NIDs): these are the campaigns conducted nationwide geared towards administering oral doses of vaccines such as poliovirus.

Pentavalent Vaccine: refers to a blend of five vaccines into one and administered to children below the age of five with an aim of combating deadly diseases.

Practices: refers to applying guidelines and as well as the knowhow which would determine various actions.

Routine immunization (RI): refers to reliable link between those administering vaccines and those receiving it to ensure that those supposed to be vaccine are fully immunized.

Target population: is the specific units of people included in the immunization services.

Under vaccinated child: are children below the age of 5 eligible to be vaccinated but lack one or more vaccines according to the required schedules.

Unvaccinated child: are children below the age of 5 eligible to be vaccinated but have never been immunized.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter sketches the theoretical prose assessment, the theoretical framework for implementing routine immunization coverage and the conceptual framework for the study. The chapter provided empirical literature review on utilization of routine immunization among under five years children.

2.2 Routine Immunization Coverage for Children Under Two Years

For a period spanning 40 years, there has been incredible efforts to refine the coverage of vaccination in Africa in an unbiased and cost-effective way. Mihigo (2015) attributes this feat to collective effort of various organizations such as not for profit organizations, governments, UCII, GAVI, MDGs declaration, GIVS as well as GVAP. As of the year 2013, the national DTP3 coverage, based on data from WHO and UNICEF, was as a minimum 80 percent, a feat which shows improvement from 2 out of a hundred (1980), 42 out of hundred (1990) and 67 out of hundred in the year 2010.

A study conducted by Mohamud et al., (2014) cross-examined the coverage of immunization in the Jigjiga District of Somalia focusing on children aged between 12 and 23 months. The study findings showed that overall immunization of the children less than 5 years was very low. The study recommended that promotion of health institutions should be undertaken, strengthening of awareness programmes should be implemented to ensure that mothers can utilize the services.

A study conducted by Ali et al., (2016) focused on strengthening routine immunization in Africa with a specific focus on Polio. The interrogation informed that even though

some diseases such measles still occurred in the country; polio had efficaciously been battled in the preceding 3 years. The DPT1 coverage was established to be 25% which in contrast to the national rate of 90% and global rate of 80% was grim. An interrogation by Kamadjeu et al. (2011) concentrating on the control of measles in Somalia cited the difficulties in provision of measles vaccination in a conflict-stricken environment which make the efforts unfeasible.

2.3 Care Giver Factors

Kidane (2006) interrogated these factors in an area of Dhaka Bangladesh and focused on those below the age of 2 years. It was demonstrated that the mother's education, knowledge, practices, attitude, income level and conditions of living were critical. The most likely not to complete the vaccinations were mothers with low level of education, low income level and slum dwellers. In Cuttack city India, a study by Prusty et al., (2013) focusing on children between 12 and 23 months reasoned that slightly above two thirds of the children (65 percent) had been fully vaccinated, a third (33 percent) were partially vaccinated and 2 percent had not been vaccinated whatsoever. However, 95 percent of the caregivers were in agreement that it was important to vaccinate the children based on self-belief, media and healthcare workers awareness. The caregivers knowledge, practices and attitude regarding immunization was high.

Focusing on children aged between 12 and 35 months, Anonh et al., (2017) interrogated the antecedents to vaccination of this category of children in Laos Peoples Democratic Republic and established that the level of vaccinated children was still low compared to the national coverage as a result of factors ranging from ethnicity, knowledge,

practices, attitude, level of education and the notifications of the date of vaccinations by the officers.

A survey conducted in the peri-urban setting in the area of Kaptembwo, Githima and Mwariki in Kenya among children aged between 12 and 23 months by Maina, et al., (2013) demonstrated that the coverage of immunization in the area was 67 percent with measles having the lowest rate at 77.4 percent. It was also shown that by 12 months, only 87.5 percent of the children had been immunized. Among the mentioned critical factors was the education level of the caregivers, knowledge, practices, attitude of caregivers, place of birth and the kind of information and advice given during antenatal visits.

In Ethiopia, Yihunie et al., (2015) through a cross sectional study of children between 12 and 23 months established a coverage of full immunization rate of 24 percent in regard to DPT3, 36.5 percent for Polio3, 44.3 percent for Measles and 55.7 % for BCG which are lower than the national average of 66 percent. For those who had cards, less than a third of them (29 percent) had fully vaccinated their children. Among the determining factors was the education level of the mother (57 percent higher for educated mothers) as well as geographical area (48.2 percent in the urban and 20.4 percent in the rural). Others were their knowledge, practices and attitude.

A Nigerian study by Ogwumike et al., (2012) on the other hand reasoned that the knowledge, attitude and beliefs of the mother were essential in enhancing children vaccination of poliomyelitis in Zamfara State. Up to 65.4 percent of the caregivers had good knowledge of poliomyelitis while 55.3 percent had positive attitude extended

towards the children suffering from poliomyelitis. It was also ascertained that the determining factors of knowledge consumption regarding the same was the nature of employment and the age with both the employed and young ladies having more knowledge. Obinna (2017) determine the role of socio-economic determinants on immunization coverage in Nigeria and demonstrated that children related factors such as the household size, context of birth, birth order and availability of health cards for the child were critical determinants. Maternal related antecedents ranging from age of the mother, religion, marital status and education were also critical determinants.

Still in Nigeria, Temitope and Muyiwa (2016) interrogated the same concept in a different State and established that up to 69.5 percent of those who participated in the study had been vaccinated before and the under five children who had been vaccinated translated to 73 percent. Of the determining factors, it was indicated that the care givers education, occupation, income, religion, knowledge, attitude, practices and area were critical factors. The number of antenatal visits as well as post-natal visits was also significant. The importance of knowledge (the attitudes as well as the information) regarding vaccination is a crucial factor in vaccination. Based on an interrogation by Olumuyiwa et al., (2008), it was reported that a high number of knowledgeable mothers fully immunized their children, 99 percent felt that it was important to immunize their children and above half of them, were able to know the symptoms of a vaccine preventable disease.

In Luanda Angola, Falcao et al., (2014) determined the determining factors for vaccination in under 5 children and revealed better coverage (55 percent) in under 1 but up to 52 percent of the children (both sexes) had missing records. The determining

factors were level of education, household size and income level. A formative research was done in between March 2014- June 2014 in five districts in four regions of South Central Somalia. The study has been conducted by SIMAD University and coordinated by UNICEF and MoH Federal government of Somalia. The findings were based on analysis of in-depth interviews conducted in South Central Zone with 40 mothers, 24 key informants, i.e. community leaders, religious leaders, school teachers, and 16 FGDs with elder women and men. The analysis of eight health care provider's interview gives perspective on their effectiveness, motivation and capacities to perform the task of behavior change communication and assigned duties and responsibilities. The findings of this study were 80% mothers reported that they had immunization card for their children and 20% did not have it. Around 80% mothers reported that they did not know the importance of getting their children immunized against major diseases. Reported reasons by mothers for not getting their children immunized, 80% reported that they did not know the importance of getting the child immunized, 40% reported that they did not know where it was done, 20% reported thought that it was painful for the child, 20% felt that the child would not get well after the vaccination, 10% did not have trust in the vaccinators and believed that vaccinators don't seem to have much health benefit, 10% did not know how many times a child needs to be vaccinated, 10% reported that elders in the family would not allow (UNICEF Formative research Report, 2016).

The study was in collaboration with UNICEF Somalia and Ministry of Planning with the aim of providing critical information to aide in monitoring of children and women in the State. The survey targeted 4,954 households and revealed that the coverage of immunization in the State was still low. It was demonstrated that only 3% of the children aged between 12 and 23 months had obtained full immunization. Of this, it

was shown that only 23% had BCG vaccination and 25% had measles vaccination. Up to 66% of the children had not received any form of vaccination. A cross-sectional descriptive study on knowledge, attitude and practice was undertaken in the year 2012 in Karkar region of Puntland Somalia by Save the Children International. The study design was utilized to provide information on key knowledge, attitude and practice variables related to maternal, newborn and child health with 422 households visited in 5 districts (Save the Children and Essence International LTD, 2012). Multiple Indicator Cluster Survey (MICS) was conducted in 2011 in Northeast Zone of Somalia.

2.5 Interpersonal Factors

Lydia et al., (2017) through their survey of under five in Kaduna State Nigeria, demonstrated that there was low vaccination coverage linked to lack of information as well as low maternal knowledge. The study based on the outcome, recommended an improvement in the channels for information dissemination by the State Government of Kaduna. The study also recommended an improvement in the awareness creation mechanisms for routine immunization through print media such as pamphlets in the local language. Akwataghibe et al., (2019) cross-examined the determining factors for child immunization in two wards, Ilara and Ipara in Nigeria. A mixed method was adopted where both questionnaires and interviews were used to collect data. Through Wage model analysis, the study established that community links and networks as well as household decision making patterns determined child immunization in the contexts interrogated.

Etana and Deressa (2012) explored the critical factors that determine complete immunization coverage focusing on children between 1 and 2 years in Ambo Woreda,

Central Ethiopia. Through bivariate and multivariate regression models, it was revealed that even though care giver factors and health facility factors were significant determinants, factors such as religious and social support systems were not significant. Rahman and Obaida-Nasrin (2010) focusing on Bangladesh, sought to find out what factors contributed to (or not) to complete immunization coverage in under 5. The study through a logit model showed that caregivers' factors such as mothers' health and education were critical. It was also shown that awareness, religious factors and social networks were not significant determinants. Ibnouf et al., (2007) established the influencing factors for immunization coverage focusing on under five children in Sudan. The study indicated that both socio-economic factors and cultural factors played a role in child immunization. The attitudes towards vaccination strongly determined the vaccination rate.

Bangura et al., (2019) cross examined the barriers immunization of children in Sub-Saharan Africa. The study conducted a review of published materials from journals. The review showed that low coverage campaigns, lack of social support, inadequate infrastructural network and distrust in the vaccination programs hindered immunization of children in the SSA region. Russo et al (2015) conducted a cross-sectional survey to find out the determining factors for incomplete vaccination in children between one month and 23 months in Cameroon. Through an odds regression model, it was established that factors such as negative attitudes, cultural factors and social networks for information dissemination were marginally significant. Oliveira et al. (2014) found out the factors which determined vaccination coverage among under five children in Angola. A household survey was conducted and it was revealed that among the important factors was the social network as well as cultural background of the mothers.

2.6 Health Facility Factors

An interrogation conducted in Bangladesh by Mosiur and Sarker (2010) established that those mothers who were able to access information from the media such as TV and Radio had higher probabilities of vaccinating their children compared to those without. It was also established that the quality of service provided is a determinant of whether the mothers will seek vaccination or not. Characteristics of a good healthcare service range from quality, effective, affordable and safe (WHO, 2007). Despite the fact that no universally accepted health service delivery mechanisms exist, there is a need to meet various prerequisites such as delivery through well trained personnel, sustainable financing models and in a friendly environment that supports both the providers and users.

This block is concerned with proper organization of resources with an aim of delivering quality, accessible, safe and continuous health care services regardless of scope, ailment nor time period. Somalia is located in the Horn of East Africa with functional federal government and Five Member States. Puntland is one of the federal member States which is relatively stable and peaceful federal State located in the northeastern region of Somalia, with State capital city of Garowe in the Nugaal region. Puntland has six regions; Nugaal, Bari, Karkaar, Mudug, Sool and East Sanag and 30 districts with total population of 3 million people. Negussie et al., (2015) investigated the factors which led to incomplete immunization among under five children in Ethiopia. The study was a qualitative study which ascertained that the unavailability of vaccines on the dates appointed for vaccination discouraged the mothers thus contributing to partial vaccination.

Maharani and Kuroda (2018) established the determinants of immunization status among 12-to 23-month-old children in Indonesia using data between the year 2008 and 2013. Through a multilevel analysis, the study indicated that the number of health facilities, village health posts and community health workers determined the immunization rate. Elizabeth et al., (2015) interrogated the causes of low immunization coverage in under 2 children in Kenya's Pokot County. The study indicated that in that county, immunization was low. Among the determining factors was distance to the nearest health facility and availability of drugs.

2.7 Policy and Environment Enabling Factors

A cross-sectional, mixed methodology study was conducted in 5 urban sub-districts of Dili, East Timor, in March and April 2012. The study by Amin et al., (2013) mainly adopted a qualitative approach where interviews were conducted on the staff at the MoH and observations conducted as well as focus group discussions. The study specifically aimed to determine the antecedents of low coverage in immunization in the area. A complete immunization was established among 33 percent of the participants, partial coverage was established among 40 percent and 27 percent had no record of immunization at all. In regard to the service provided, 97 percent of the mothers were satisfied with the services they received. Some of the determining factors highlighted were irregular sessions, lack of awareness regarding vaccination, intolerable behavior and poor attitude by healthcare workers towards the mothers.

Lakew et al., (2015) interrogated the determinant of full immunization among children below 2 years in Ethiopia. It was established that availability of community immunization programmes, government health awareness programmes and a stable health policy led to an improvement in access and utilization of immunization factors.

Njeru et al., (2019) interrogated the extent of utilization of immunization services among children aged under five in Kirinyaga County, Kenya and the determining factors. Some of the bottlenecks to utilization of vaccination included waiting times, postponing of vaccination and clinic return dates, lack of information and clear guidelines for the programme.

Gauri and Khaleghian (2002) interrogated the political and organizational determinants of immunization in developing countries. The study demonstrated that in the scenario of emerging economies, broad changes in the global policy environment affected immunization. Democratic countries recorded higher rates of immunization than autocracies. A country's quality of institutions were significant determinants of immunization. It was also showed that polio eradication campaigns didn't affect immunization rates.

Kennedy et al., (2015) interrogated the political determinants of polio vaccination. Specifically, the study established whether political islamist insurgency affected immunization of polio. The study indicated that islamist insurgency did not have a significant positive relationship with polio vaccination rates since the assassination of Osama bin Laden in 2011 in Pakistan. In Nigeria, Babalola (2009) established the determining factors for uptake of the full dose of DPT3 in northern Nigeria in the context of Boko Haram controlled region. A multilevel analysis indicated that organizing information meetings at schools and communicating with gynecologists might be beneficial however lower uptake was recorded in areas with higher proportion of voters for Religious Political Parties.

2.8 Theoretical Framework

The generic theoretical framework to support as a model of under-five immunization for this study was the health belief model (HBM) and the social ecological model (SEM).

2.8.1 The Health Belief Model

This study found the theoretical constructs of the Health Belief Model (HBM). This model was developed in the 1950s by social psychologists at the U.S. Public Health Service. It provides details of health behavior change process, as well as key personal and environmental factors influencing the decision to utilize health services. This theory also provides foundations for planning, implementing, and evaluating health interventions designed to promote the uptake of services in various socio-cultural contexts.

The model, propounded in the 90s, aimed to interrogate the failure behind the medical screening programs extended in the USA. The model is often applied to understand health-seeking behavior and possible reasons for non-utilization or non-adherence to recommended health measures. It demonstrates that the health seeking behavior is determined by the perception about a disease as well as the alternative chances of decreasing it.

In line with this study, the model helps explain the determining factors for utilization of vaccination. It documents that the health seeking behavior can be determined by personal and environmental factors which in this study can range from care givers factors, policy and environment enabling factors. The model therefore helps understand the effect of these factors on immunization coverage among the under five children.

2.8.2 Social Ecological Model

Socio-ecological model (SEM) was introduced to urban studies by sociologists associated with the Chicago School after the First World War. This was in reaction to the narrow scope of most research conducted by developmental psychologists. The theory acts as a framework through which an understanding of personal and environmental factors which determine the health seeking behavior as well as health promotion among organizations. The model provides five key tenets that is Individual, interpersonal, community, organizational, and policy/enabling environment in the hierarchical order as demonstrated in Figure 2.1. In order to have an effective prevention and control of public health, there is a need to have a blend of all the tenets.

Figure 2.1

The Social Ecological Model.

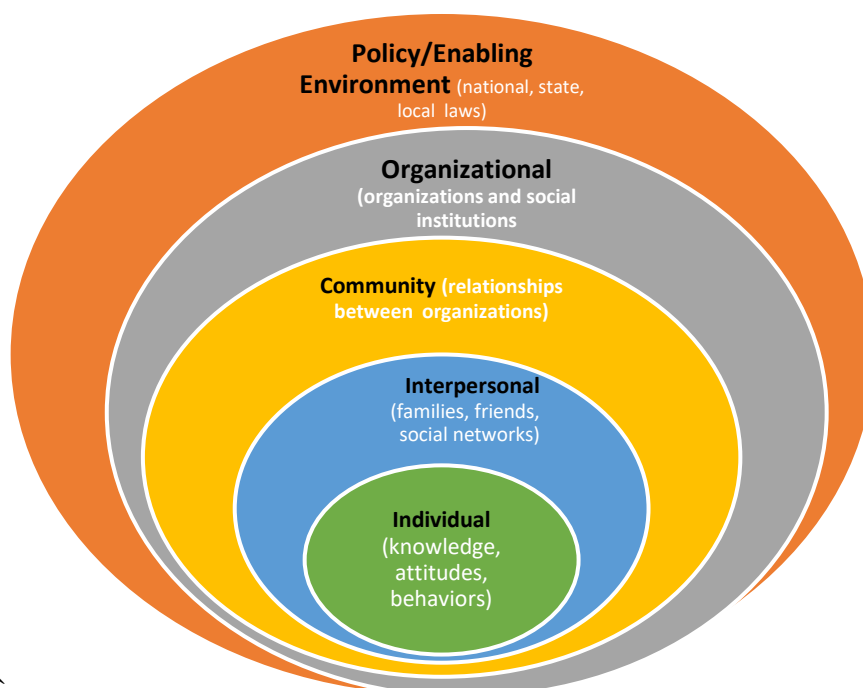


Table 2.1

A Description of Social Ecological Model (SEM) Levels

SEM Level	Description
Caregiver	<ul style="list-style-type: none">• This refers to some of the traits which influence change of behavior and can range from attitude, knowledge, self-efficacy, sexual orientation, values, level of literacy, the religious identity, level of income among others
Interpersonal	<ul style="list-style-type: none">• They are networks, either formal or informal as well as support systems which can play a role in influencing the behavior of individuals and can be family, religion, or even traditions or friends
Community	<ul style="list-style-type: none">• This demonstrates the different interlink between organizations, institutions and networks of information such as within village associations and businesses
Health Facility	<ul style="list-style-type: none">• It includes the organizations which operate within defined rules and regulations to deliver MNCHN services
Policy Enabling Environment	<ul style="list-style-type: none">• Refers to the policies and laws at the national and global level which guide resource allocation for healthcare service

2.8.3 Five nested, hierarchical levels of the SEM

Caregiver Levels: This level comprises of the characteristics which can influence personal behavior, these can be knowledge, beliefs or attitudes. The framework suggests that a person’s behavior can be determined by an active network of factors such as inter and intra personal characteristics, institution related factors as well as public policy. It basically implies that a person is influenced by their environment and this influence is reciprocal of each other.

Interpersonal Level: It comprises of the networks, either formal or informal as well as support systems which can play a role in influencing the behavior of individuals and can be family, religion, or even traditions or friends. In the context of a caregiver, some of the factors in this category are age and income.

Community level: This demonstrates the different interlink between organizations, institutions and networks of information such as within village associations and businesses as well as parks.

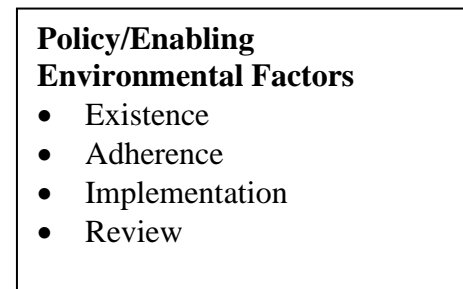
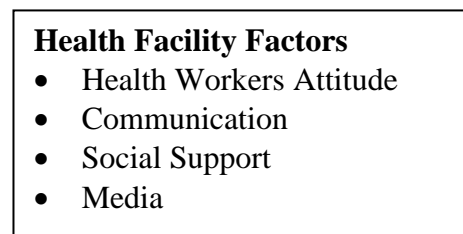
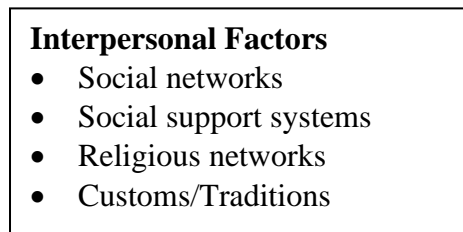
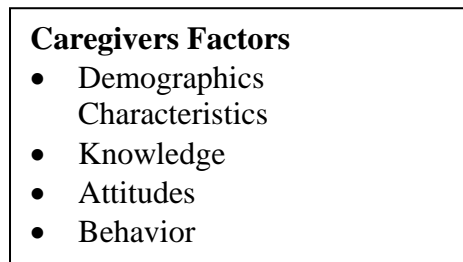
Health Facility Level: It includes the organizations which operate within defined rules and regulations to deliver mother neo-natal, child health services. It can be referred to as the system, policies and structures for delivery of healthcare services.

Policy/Enabling Environment Level: Refers to the policies and laws at the national and global level which guide resource allocation for healthcare service. It can also refer to policies which are restrictive in determining access to healthcare such as higher fees and taxes. In line with this study, the model helps to provide a link between personal and environmental factors and the health seeking behavior as well as health promotion among organizations. Since the study interrogated the link between caregivers' personal factors and utilization of immunization, the model sheds more light on the link from a theoretical point of view. The conceptual framework of the study is shown in Figure 2.2.

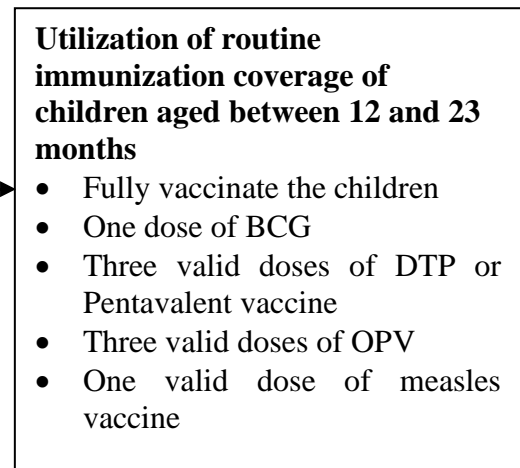
Figure 2.2

Conceptual framework

Independent variables



Dependent variable



Source: Author (2020)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter contains research design, target population, sampling procedures, preparation of data collection instruments/instrumentation, data collection procedures and methods of data analysis.

3.2 Research Design

This study applied a cross-sectional based Survey to guide the research process. The proposed design used was mixed approaches whereby both qualitative and quantitative methods were adopted. The quantitative approach information was used for descriptive and inferential purposes, the qualitative approach was used to obtain in-depth information used in validating descriptive and inferential statistics. Open-ended questions were useful in enhancing validity of the data by allowing respondents to express their experiences and perspectives.

3.3 Study Area

This interrogation was done in Garowe Town which is the Capital Puntland State in the Northeastern part of Somalia. The area comprises of 7 villages namely Wadajir, Waberi, Hantiwadag, Hodan, Horseed, and Israac. The estimated Population of Garowe Town is 150,000 residents. The reason Garowe Town was selected was because Garowe Town has highest population in Garowe District, it has the highest number of health facilities in the district (6 out of 10 Health Centers are located in Garowe). Time and budgetary limitations also contributed to the selection of the study area.

3.4 Target Population

The primary participants included mothers of children under-Two years of age. The study focused on the immunization status of children of the target age. The study also targeted health service providers in selected health facilities such as Nurses/Community Health Workers (CHWs) who were directly involved in immunization services. These participants were targeted as key informants and expected to provide in-depth information on factors affecting utilization of immunization coverage in the community, as well as appropriate strategies to improve uptake of immunization services.

3.5 Sample Size Determination and Sampling Techniques

3.5.1 Sample Size Determination

A formula. Fisher *et.al* (1991) was adopted based on the recommendation by Kothari

$$\text{Sample size } n = \frac{z^2 pq}{d^2}$$

Definitions being:

n = the sample size whenever the population is above 10,000

z = Z score of a normal distribution at 5% SL

p = the proportion of population traits in the sample. Considered to be half (50%) when not known

d = the level of error or accuracy set at 5%

q = undesired characteristics

the sample size was;

$$n = \frac{1.96^2 \cdot 0.5 \cdot 0.6}{0.05^2} = 384$$

6 Key informant interviews with Health Services providers (Nurses/Community Health Workers) were conducted and one focus group discussions were conducted.

3.5.2 Sampling Techniques

Both scientific and non-scientific methods were adopted. Cluster sampling was applied where Garowe Town was divided into six villages as above mentioned. The data was collected in all six clusters with equal sample size. In each cluster 64 caregivers were interviewed with children aged 12 to 23 months of age making total respondents to 384 in all six villages (clusters) of Garowe Town. In each cluster (village), the research team comprising of the researcher and his assistants randomly identified the first house to be visited using existing listings of household names for Cluster units. The team then applied random methods such as spinning-the-pen technique to identify random directions to ensure geographical representation.

3.5.3 Inclusion Criteria

Children had lived together with their caregivers in the area of study a minimum of 12 months before the survey period along with those children aged between 12 and 23 months.

3.5.4 Exclusion Criteria

The study excluded children with their caregivers who had lived in Garowe Town for less than 12 months before the date of data collection and caregivers with children whose age was less than 12 months old. The study was conducted for a duration of three months, that is, May, June and July 2019 after the successful defense of the research proposal and necessary ethical approvals to collect data.

3.6 Instrumentation

The tools for data collection adopted by the study was semi-structured questionnaires. Kombo and Tromp (2006) postulate that some of the traits for a good instrument should be its cost, speed, accuracy and efficiency. The questionnaire comprised of both structured and free response questions. Structured and free response questions were designed and moderated for ethical considerations. Permission to carry out the survey was sought, piloted and distributed to the sampled respondents. The closed ended questions adopted a five-point Likert scale. The structure of the questionnaires was as follows: section a carry background information on the respondents while subsequent sections were based on each specific objective. The study further used interview guide to collect data from the Key Informant Interviews (KII) and Focused Group Discussion (FGD).

The data was collected from the Garowe Town that was purposively selected. The primary participants included mothers of children under-five years of age. Information to collect includes individual, organizational, inter personal and policy factors affecting the utilization of immunization, immunization status of the children and other factors influencing coverage in the area. Child health cards were scrutinized to aid in the assessment of the immunization status of the children. In the absence of the child health cards, mothers/caretakers of the respective children were asked to recall the immunization.

3.7 Pre-Testing the Data Collection Tools

Before the actual data collection, the research instrument was pre-tested during the pilot test, to test whether the instrument was reliable and valid in gathering the information

required. The pre-test was conducted in the neighbouring Burtinle District. The pre-test consisted of 10% of the sample size which were 38 caregivers from Burtinle District. The choice of Burtinle District for pre-testing was informed by the fact that it is neighbouring Garowe hence had same social, economic and political factors. Statistics on immunization under age 2 in Burtinle District indicates similarity with Garowe hence the suitability for pre-test study. The caregivers in the two regions had almost similar conditions hence ideal for pre-testing.

3.7.1 Validity Tests

Validity is the degree of congruency between the explanation of the phenomena and the world reality (Oluwatayo, 2012). Cooper and Schindler (2014) categorizes validity into content validity, criterion-related validity and construct validity. Construct validity involves an approximation to validate measures of behaviours that cannot be observed directly, content validity refers to the inclusivity of the different meanings within the relevance of the concept (Babbie, 2004). Construct validity was determined by distributing the objectives into numerous minor segments according to the conceptual framework as grounded in literature. Two experts in the matters were also used to establish the content validity of the instrument to ensure relevance, clarity and meaningfulness.

3.7.2 Reliability Tests

The data collected from pilot test was tested for internal consistency through Cronbach's Alpha. In this test a threshold of 0.7 was used as the indicator of reliability. Variables with Cronbach's Coefficient of above 0.7 were considered reliable while those below 0.7 were considered to be unreliable. In case of unreliability modification

of the research instrument was required to remove the indicators that led to unreliability. On the other hand, validity was guaranteed through expert's reviews and use of tested and proven indicators based on literature review.

3.8 Methods of Data Collection

Pre-designed and pre-tested and Somali translated questionnaires were used for the data collection exercise. KII, in-depth interviews, FGDs and questionnaires were used to collect data.

3.9 Methods of Data Analysis

The data was cleaned and keyed into SPSS version 25 for analysis. Scores per key element under every specific objective and in the dependent variable was measured. The scores from each independent variable was then analyzed singly against the dependent variable to find the existing relationships and then together. The study used both qualitative and quantitative data analysis techniques. Qualitative data collected using interviews and FGD was analyzed using content analysis while descriptive and inferential statistics was used in analysis of quantitative data. Since the data was measured on binary scale the study opted for binary logistics model to establish the link and relationships between the key variables.

$$Y (\text{Yes/No}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu$$

Where;

- Y= utilization of routine immunization
- Caregiver factors, Interpersonal Factors, health facility factors and Policy Factors respectively
- e= residual error,

- B_0 = Y intercept
- B_1, B_2, B_3, B_4 = regression coefficients.

The results guided the conclusions whereby an R^2 value of 0 indicated no relationship while a value of 1 showed perfect relationships. If a beta coefficient was positive, then a relationship of the independent variable with the dependent variable was positive and the contrary was true. The research results were expected to determine immunization coverage and main factors affecting the utilization of immunization coverage to develop a strategy to deal with low coverage. The research provides recommendations that may contribute to improved immunization coverage in Garowe district of Nugal region of Puntland State of Somalia.

3.10 Ethical Considerations

Ethical approval was given by the Science, Ethics, and Research Committee of Kenya Methodist University and the Puntland Ministry of Health Ethical Review Board. Given the non-patient or human subject procedures related to the study there were less risks to the patients and caregivers. Verbal informed consent was obtained from all study participants using the current informed consent form prior to collecting any information. Confidentiality of every participant was protected where the individual names and contacts were not shared. All information obtained from this study will only be used for purposes of this study.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The results from the data collected and analysed was presented in this section. Descriptive statistics including percentages and frequencies as well as chi-square was used in testing the association between independent variables and dependent variables. Charts and tables were used in the presentation of the results.

4.2 Response Rate

The study administered a total of 384 questionnaires to randomly selected caregivers of children less than two years of age. In each cluster 64 caregivers were selected making total respondents 384 in all six villages (clusters) of Garowe Town. The response rate of 100% was achieved in this research. This response rate was attributed to early mapping and constant follow-ups on the selected respondents. The study further conducted 6 key informant interviews with health services providers (Nurses / Community Health workers) and one focus group discussions was conducted.

4.3 Reliability Test Results

Reliability was interrogated using internal consistency measure where Cronbach Alpha was adopted. The threshold used was 0.7 and as indicated in Table 4.1.

Table 4.1*Summary of Reliability Statistics*

Variable	No of Items	Cronbach's Alpha
Care giver factors	2	0.731
Interpersonal Factors	4	0.752
Health Facility Factors	2	0.745
Policy Factors	5	0.776
Utilization of Routine Immunization	11	0.756

4.4 Demographic Characteristics

This section presents the demographic physiognomies describing the study participants ranging from age, gender, marital status and their occupation. The results are presented in Table 4.2.

Table 4.2*Demographic Characteristics*

Characteristics	Category	Frequency	Percent
Gender	Male	73	19.0
	Female	311	81.0
	Total	384	100.0
Age	<18yrs	59	15.3
	19-45yrs	264	68.8
	>46	61	15.9
	Total	384	100.0
Marital Status	Married	259	67.4
	Single/Unmarried	45	11.7
	Divorced	49	12.8
	Widowed	31	8.1
	Total	384	100.0
Caregivers Primary Occupation	Livestock Keeping	44	11.5
	Employed with salary	152	39.6
	Licensed business owner	78	20.3
	Unlicensed business owner	25	6.5
	Farming	8	2.1

Mixed farming/house wife	43	11.2
Other (Specify)	34	8.8
Total	384	100.0

The results in Table 4.2 indicate that 264 (68.8%) of the respondents were between 19 and 45 years, 61 (15.9%) were over 46 years while 59 (15.3%) were below 18 years. The finding showed that majority of the caregivers interviewed were middle age adults. The results presented in Table 4.2 shows that majority 311 (81%) of the respondents were female while 73 (19%) were male. The findings implied that majority of the caregivers of children less than two years in Garowe Town were female. The findings further indicated that caregiving for children were roles established for women.

The results also showed that 259 (67.4%) of the respondents were married, 49 (12.8%) were divorced, and 45 (11.7%) were single/unmarried while 31 (8.1%) were widowed. The findings implied that marriage was still valued by majority of the people living in Garowe Town which could be attributed to strict Islamic traditional practices by majority of the residents in the study area. The results indicate that 152 (39.6%) of the respondents were salaried employees, 78 (20.3%) were formal business owners, 44 (11.5%) practiced livestock keeping while 43 (11.2%) practiced mixed farming. The finding implied that the study respondents had different occupations hence it was representative.

4.3 Utilization of Routine Immunization in Garowe Town

The study interrogated the extent of utilization of routine immunization among the children under years living in Garowe Town in Somaliland. The study sought to establish whether the caregivers utilized routine immunization to prevent the children

from dying due to dangerous diseases such as polio, measles among others. Somalia has relatively low coverage according to global coverage despite the fact that vaccines are widely available being supported by global communities including GAVI.

4.3.1 Routine Immunization Among Children

The section interrogates whether the children had obtained vaccination in the routine of health service. The results are shown in Table 4.3.

Table 4.3

Whether Children / Child received Immunization

Has your child/children ever received any vaccination through routine health services in his/her life?	Frequency	Percent
Yes	322	83.8
No	62	16.2
Total	384	100

The results in Table 4.3 show that 322 (83.8%) of the respondents agreed while 62 (16.2%) disagreed that they had had their child or children vaccinated through routine health services. According to these findings, majority of the residents in Garowe Town had at least had their children vaccinated during the routine health services. The findings of this study were consistent with those by Anonh et al., (2017) which demonstrated that the coverage of the immunized was till lower than that of the national level. The study findings also agreed with Mohamud et al., (2014) who interrogated immunization in Jigjiga District of Somalia and recommended that promotion of health institutions should be undertaken, as well as awareness to encourage mothers to utilize health services. Ali et al., (2016) which specified prevalence of measles in Somalia.

4.3.2 Type of Vaccines Ever Received by Children Under 23 Months

The study sought to find the type of vaccines received by the children. The results in Table 4.4 below show that 204 (53.1%) had received BCG, OPV, Pentavalent, Measles, BCG 17 (4.5%), OPV 24 (6.3%) as shown in Table 4.4. The results showed that BCG, OPV, Pentavalent, Measles was the most common forms of immunization children less than two years received in Garowe region of Somalia.

Table 4.4

Type of Vaccines Ever Received by Children

Type	Frequency	Percent
BCG, OPV, Pentavalent, Measles.	204	53.1
BCG	17	4.4
OPV	24	6.3
Pentavalent	19	4.9
Measles	19	4.9
NO Vaccination	62	16.1
BCG, OPV	17	4.5
OPV, Pentavalent	11	2.9
OPV and Measles	11	2.9
Total	384	100

4.3.3 Number of Children Who Had Received BCG Injection

The study further sought to find out whether the children had received BCG injection. The results are shown in Table 4.5.

Table 4.5

Number of Children who had Ever Received BCG Injection

Statements		Frequency	Percent
Has your child ever received an injection to protect against tuberculosis (BCG)?	Yes	261	68.0
	No	123	32.0
	Total	384	100

In the left upper arm, or should, which usually causes a scar?	Scar seen	234	60.9
	No scar seen	150	39.1
	Total	384	100

The findings in Table 4.5 show that 261 (68%) of the respondent indicated that their children had received BCG injection while 123 (32.0%) indicated they had not received BCG Injection. Lack of this kind of immunization could be among the causes of early death among the Children in Garowe region. The results show that 27 of the children indicated they had received BCG vaccination but no scars were seen. The reasons mentioned for scar not being seen include ineffective BCG vaccination and caregivers misunderstood the type of vaccination given to their children.

These findings corroborate with the report that indicate that Somalia has highest under five mortality rates (U5MR) which accounts 137 per 1,000 live births with one in seven Somali children dying before they reach their fifth birthday. The study support Yihunie, *et al.* (2015) which encouraged the government MoH to exert efforts in ensuring that the coverage area had increased by targeting those areas which had received less attention in Ethiopia.

To further confirm whether the children had received the BCG injection, the research sought to see the scar which is left as a result of the BCG injection. The results show that 234 (60.9%) had scar seen, 150 (39.1%) had no scars. These findings reinforced the fact that a large majority of the children had not received BCG injection hence were in danger of being infected with diseases such Tuberculosis at a very tender age. The study findings agreed with Mohamud *et al.*, (2014) whose study findings in Somalia showed that overall immunization of the children less than 5 years was very low. The

study recommended that promotion of health institutions should be undertaken, strengthening of outreach activities of the health institutions should be undertaken to encourage mothers to utilize health services.

4.3.4 Number of Children who had Received Tetanus, Whooping Cough, or Diphtheria Immunization

The study further sought to establish whether the children in Garowe, Somalia had received Tetanus, Whooping Cough, or Diphtheria Immunization. The results are shown in Table 4.6.

Table 4.6

Number of Children who had Received Tetanus, Whooping Cough, or Diphtheria Immunizations.

		Frequency	Percent
Has your child ever received an injection in their left upper thigh to protect against tetanus, whooping cough, or Diphtheria	Yes	263	68.5
	No	121	31.5
	Total	384	100
How many total times was Penta/DPT vaccine received?	One time	46	17.5
	Two times	61	23.2
	Three times	95	36.1
	Four times	39	14.8
	More than four times	22	8.4
	Total	263	100

The results in Table 4.6 show that 263 (68.5%) of the respondent indicate their children had received this immunization while 121 (31.5%) indicated they had not. The findings confirmed that many children in Garowe region were living unprotected from Tetanus,

Whooping Cough, or Diphtheria disease which also explains high mortality rate prevalence among the children in Somalia.

The study further sought to establish the number of times the children had received Penta/DPT Vaccine. This question was asked to only caregivers, 263 (68.5%) indicated that their child had received Pentavalent-DPT vaccines. The results show that 95 (36.1%) indicated three times, 61 (23.2%) indicated two times while 46 (17.5%) indicated just once. The findings further show that many caregivers failed to comply with the number of times a child should receive these vaccines. The study findings agreed with Mohamud et al., (2014) whose study findings in Somalia showed that overall immunization of the children under 5 years was very low. The study recommended that promotion of health institutions should be undertaken, strengthening of outreach activities of the health institutions should be undertaken to encourage mothers to utilize health services.

4.3.6 Number of Children who had received Polio Vaccines

The study sought to establish whether the caregivers had given their children polio vaccines and the number of times the child had received the vaccines. The results are presented in Table 4.7.

Table 4.7

Number of Children who had Received Polio Vaccines

		Frequency	Percent
Has your child ever received drops in their mouth to protect against polio ("OPV") at MCH/outreach?	Yes	293	76.3
	No	91	23.7
	Total	384	100
	One time	65	22.2

How many total times were polio drops received at MCH/outreach?	Two times	71	24.2
	Three times	79	27.0
	Four times	51	17.4
	More than four times	20	6.8
	Don't know	7	2.4
	Total	293	100

The results presented in Table 4.7 show that 293 (76.3%) of the respondents indicated that their children had received Polio Vaccines while 91 (23.7%) indicate they had not received Polio Vaccines. These findings show that polio vaccination had penetrated Garowe region more than any other vaccination but significant number of children still remain unvaccinated. Ali et al., (2016) indicated existence of measles in Somalia despite full combating of Polio. According to the findings in Table 4.7 only half 150 (51.2%) of the children had received polio vaccines more than three times which further showed that residents had embraced the polio vaccination more than any other vaccination. According to the WHO (2016), the requirements for immunizing a child is at least four doses of Polio vaccines, this means that the caregivers in Garowe had not adhered to WHO recommendation on polio vaccinations to their children aged between 12 and 23 months.

4.3.7 Number of Children who had Received Measles Vaccines

This section shows the findings on whether the children had received measles vaccines.

The results are presented in Table 4.8.

Table 4.8*Number of Children who had Received Measles Vaccines*

		Frequency	Percent
Has your child ever received an injection in his/her left upper arm at age 9 months or older to prevent him/her from getting measles?	Yes	253	65.8
	No	131	34.2
	Total	384	100

The results in Table 4.8 indicates that 253 (65.8%) of the respondents indicated that their children had received Measles vaccines while 131 (34.2%) indicated that their children had not received this vaccination. The findings show that many children are still unprotected from measles attack in Garowe region making them prone to this disease. Measles is among the leading cause of death among children under the age of five years and its of greater importance to have the children vaccinated.

The study support Yihunie, et al., (2015) who supported concerted efforts by the federal government of Ethiopia in enhancing awareness for vaccination. The study findings agreed with Mohamud et al., (2014) whose study findings showed that in Somalia, overall immunization of the children less than 5 years was very low. The study recommended that promotion of health institutions should be undertaken, strengthening of outreach activities of the health institutions should be undertaken to encourage mothers to utilize health services.

4.3.8 Number of Children Who Had Completed All Eligible Vaccines

The study sought to establish whether the children below the age of two years in Garowe region had completed all the eligible vaccines. The results are shown in Table 4.9.

Table 4.9

Number of Children who had completed all eligible vaccines <1 Year

		Frequency	Percent
Does your XX child complete of all eligible vaccines before reaches one-year-old?	Yes	212	55.2
	No	172	44.8
	Total	384	100

The results in Table 4.9 show that slightly above average, 212 (55.2%) of the respondents agreed. These findings further confirmed that Somalia is still battling with the challenges of children immunization which leaves many children exposed to various diseases that could be prevented through vaccinations. The study supports the findings by Yihunie, et al., (2015) in Ethiopia. The study conducted FGD to establish whether the caregiver understood the importance of the routine immunization. The FGD participants were all female caregivers who had children less than 24 months. Majority of the caregivers that participated in the FGD agreed they understood the benefits of routine immunization and indicate that they routinely immunized their children. One of the FGD participants noted that:

“... immunization is necessary it protects the child against all the disease, boost the child immune systems, reduce mortality rate among the children. Routine immunization is the entry point in primary health care ...” (FGD participant in Garowe)”

4.3.9 Availability of Vaccination Cards

The researcher analysed the vaccination cards of the children to verify the information provided by the caregivers. The results are presented in Table 4.10.

Table 4.10*Availability of Vaccination Cards*

Availability of Vaccination Cards		Frequency	Percent
Do you have a card where XX child vaccinations are written down? If yes, may I see it please?	Yes, seen	182	47.4
	Yes, not seen	82	21.4
	No	120	31.2
	Total	384	100
Why don't you have a vaccination card for him/her right now?	Card not given to the mother/care giver.	11	13.3
	Card not available now / outside house	10	11.7
	Card lost	41	49.6
	Card not available at the MCH	6	7.2
	Mother / caregiver asked to pay for card	7	8.4
	Child never went to MCH	8	9.8
	Total	82	100

The results show that 182 (47.4%) of the respondents agreed that they vaccinated their children while 82 (21.4%) failed to provide their vaccination cards. The unavailability of vaccination cards implied that the number of children that had not been given relevant vaccination could be higher than reported. This agrees with the report that Routine Child immunization in Puntland, Somalia is relatively low coverage according to global coverage despite the fact that vaccines are widely available with support from the global communities including Global Alliance for Vaccines International (GAVI). Results show that 41 (49.6%) of the respondents indicated that their children vaccination cards were lost. The study support Yihunie, et al., (2015) in Ethiopia.

4.4 Caregiver Factors and Utilization of Routine Immunization

The first objective of the study was to determine the effect of care giver factors on utilization of routine immunization for children aged 12 to 23 months in Garowe region of Somalia. The care giver factors were divided into knowledge and perception and demographic factors.

4.4.1 Knowledge on Utilization of Routine Immunization

The study sought to find the effect of knowledge of caregivers on the utilization of routines immunization in Garowe. The results presented in Table 4.11a shows the relationship between knowledge of the caregivers and routine utilization of the immunization.

Table 4.11

Reasons for not vaccinating the Child

	Frequency	Percent
Knowledge	90	52.3
Traditional/Cultural Beliefs	25	14.5
Institutional Factors	17	9.9
Family Support to caregivers	40	23.3
Total	172	100.0

Results in Table 4.11 show that 212 children had completed the routine immunization. The results show that lack of knowledge was indicated by 90 (52.3%) of the caregivers as the main reasons why they did not vaccinate their children followed by lack of family support indicated by 40 (23.3%) of the caregivers, poor institutional factors was indicated by 17 (9.9%) while 25 (14.5%) indicated traditional and cultural beliefs as the reasons why they failed to vaccinated their children. This finding confirmed that

there was lack of adequate knowledge on routine immunization among the caregivers of children less than two years in Garowe region. The study further interviewed the Community Health Workers on some of the challenges the routine immunization faced. Respondent KII 002 interviewed indicated that:

“ ... lack of adequately trained staff, lack of supportive supervision and feedback, limited training on immunization, supply chain management, low mother knowledge on immunization schedule, Poor health workers attitude towards caregivers as some of the main challenges of utilization of routine immunization in Somalia ... ” KII 002

The health workers interviewed further revealed that caregiver listened to them more than anyone else and that they provide adequate information in regards to routine immunization. World Health Organization (2007) supported the use of trained personnel in delivery of health care as well as provision of a conducive environment for the same. The study findings agreed with that of Mohamud et al., (2014) conducted in Somalia and showed that overall immunization of the children less than 5 years was very low. The study recommended that promotion of health institutions should be undertaken; strengthening of outreach activities of the health institutions should be undertaken to encourage mothers to utilize health services.

The results of chi-square revealed that reasons for not vaccinating the child significantly influenced as shown by $\chi^2= 375.979$ ($p=0.001$) utilization of routine immunization by residents of Garowe region. The finding coincides those of Olumuyiwa et al., (2008) which cited knowledge as a critical determinant of utilization of vaccination services in Nigeria.

4.4.2 Influence of Demographic Factors on Utilization of Routine Immunization

The study further sought to establish the relationship between demographic factors and utilization of routine immunization by residents of Garowe, region in Somalia. The results in Table 4.12 indicate the relationship between age and utilization of routine immunization.

Table 4.12

Demographic Factors and Utilization of Routine Immunization

		Utilization of Routine Immunization			Chi-Square Tests
		Yes (n)	No (n)	Total (n)	
Age	<24yrs	33	26	59	$\chi^2= 2.571$ (p=0.276)
	25-45yrs	151	113	264	
	>45	28	33	61	
	Total	212	172	384	
Gender	Male	43	31	74	$\chi^2= 0.312$ (p=0.577)
	Female	169	141	310	
	Total	212	172	384	
Marital Status	Married	145	114	259	$\chi^2=14.581$ (p=0.002)
	Single				
	/Unmarried	34	11	45	
	Divorced	22	27	49	
	Widowed	11	20	31	
Relationship with the child under one year	Total	212	172	384	$\chi^2=10.751$ (p=0.030)
	Mother	155	117	272	
	Father	16	26	42	
	Grandmother	14	15	29	
	Grand Father	6	7	13	
	Other (Specify)	21	7	28	
Father's education level	Total	212	172	384	$\chi^2=16.955$ (p=0.002)
	Islamic	57	57	114	
	Primary	23	32	55	
	Secondary	29	32	61	
	College	27	19	46	
	University	76	32	108	
	Total	212	172	384	

The results presented in Table 4.12 show that majority of the respondents were between 18 and 45 years. The study did not find any significant relationship between age of the caregiver and utilization of routine immunization ($\chi^2= 2.571$ (p=0.276). Respondent KII 003 interviewed further noted that:

“ ... Some of the caregivers are very young and don't understand the importance of routine immunization which makes them not to utilize or take their children for vaccination ... ” (KII 003)

The findings harmonize that of a study by Falcao et al., (2010) which demonstrated that a mother's age, education, income level and household size are critical determinants of vaccination in Latin America.

The results show that majority of the caregivers interviewed were female. The results of the chi-square $\chi^2= 0.312$ (p=0.577) revealed that gender of the respondents had insignificant relationship with utilization of routine immunization by caregivers in Garowe region of Somalia. The study further asked the community health workers and nurses on the effect of gender on routine immunization and they reported that majority of the caregivers that utilized routine immunizations were female. Respondent KII 004 interviewed explained that;

“ ... In our culture, it is the responsibility of the women to take care of the young ones and therefore it is also their responsibility to ensure that their children are fully immunized and vaccinated. Majority of the men just offer little support in terms of providing the means to the health facilities ... ”
(Respondent KII 004)

The study further sought to establish whether there was a significant relationship between marital status and utilization of routine immunization by caregivers of children less than 2 years in Garowe region in Somalia. The results show that majority of caregivers were married and that marital status had significant relationship with utilization of routine immunization as indicated by chi-square $\chi^2= 14.581$ ($P = 0.002$). Those that were single and unmarried were not the mother of the children but were caregivers who were present at the time research. The findings show that utilization of routine immunization was related to marital status of the caregivers. Obinna (2017) also reasoned that age, occupation as well as the level of education of the caregiver were critical in immunization coverage in Nigeria. The results show the test on the relationship between caregiver relationship with child and utilization of routine immunization in Garowe. This study found a significant relationship between caregiver relationship with the child and utilization of the routine immunization ($\chi^2= 10.751$, $p=0.030$). The study finding show that caregiver relationship with the child influenced child routine immunization. The findings harmonize that of a study by Falcao et al, (2010) which demonstrated that a mother's age, education, income level and household size are critical determinants of vaccination in Latin America.

Table 4.13***Fathers' & Mothers' Education and Utilization of Routine Immunization***

	Utilization of Routine Immunization			Chi-Square Tests	
	Yes (n)	No (n)	Total (n)		
Father's education level	Islamic	57	57	114	$\chi^2=16.955$ (p=0.002)
	Primary	23	32	55	
	Secondary	29	32	61	
	College	27	19	46	
	University	76	32	108	
	Total	212	172	384	
Mother's Education Level	Islamic	67	54	121	$\chi^2= 16.415$ (p=0.006)
	Primary	37	40	77	
	Secondary	41	38	79	
	College	22	9	31	
	University	44	31	75	
	Total	211	172	383	

The results in Table 4.13 indicates the fathers' and mothers' education level and its influence on utilization of routine immunization among children under 2 years. Results revealed that fathers' education was significantly related to utilization of routine immunization ($\chi^2= 16.955$, p=0.002). The findings implied that children with more educated fathers underwent routine immunization compared to children with less educated fathers. The results show that father level of education was a significant factor that influences children routine immunization in Garowe region of Somalia. On the relationship between the level of education of fathers and mothers Respondent KII 005 interviewed noted that:

“...Mothers and fathers that have gone to school understand the importance of routine immunization and are more likely to ensure that all their children are properly vaccinated unlike parents who do not have any formal education ...”. Respondent KII 005

The findings support those of Obinna (2017) conducted in Nigeria that indicated that age, occupation as well as the level of education of the caregiver were critical in immunization coverage.

Similarly, results indicated that the mothers' education was significantly related to utilization of routine immunization ($\chi^2= 16.415$, $p=0.006$). The findings implied that children with more educated mothers underwent routine immunization compared to children with less educated mothers. The results show that mother's level of education was a significant factor that influences children routine immunization in Garowe region of Somalia. The findings support that of Obinna (2017) who rated factors such as the caregivers' age, religion and education as determinants of vaccine utilization in Nigeria.

Table 4.14

Mother or Child Reading Skills and Caregivers' Primary Occupation and Utilization of Routine Immunization

	Utilization of Routine Immunization			Chi-Square Tests	
	Yes (n)	No (n)	Total (n)		
Mother or Child Reading Skills	Very easily	144	104	248	$\chi^2= 14.209$ ($p=0.003$)
	With some difficulty	50	55	105	
	Not at all	18	13	31	
	Total	212	172	384	
Caregivers' primary occupation	Livestock Keeping	22	22	44	$\chi^2= 8.998$ ($p=0.174$)
	Salaried Employee	86	66	152	
	Formal business owner	40	38	78	
	Informal business owner	14	11	25	
	Farming	6	2	8	
	Mixed farming / house wife	28	15	43	
	Other (Specify)	16	18	34	
	Total	212	172	384	

The study further sought to establish whether mother/child ability to read significantly influenced routine immunization of children in Garowe. The study results show that mother or child reading skills had a significant relationship with utilization of routine immunization among the caregivers in Garowe. The findings implied that mothers that could read utilized routine immunization for their children compared to those that could not read ($\chi^2= 14.209$, $p=0.003$). Temitope and Muyiwa (2016) also rated the caregivers' education level as well as occupation as critical factors in Ethiopia. The study also sought to find out whether the caregiver primary occupation significantly influences the utilization of routine immunization among the residents of Garowe as shown in Table 4.14. This research findings establish insignificant relationship between ($\chi^2= 8.998$, $p=0.174$) caregiver primary occupation and utilization of routine immunization.

4.5 Influence of Interpersonal Factors on Utilization of Routine Immunization

The second objective of the study was to determine the effect of interpersonal factors on utilization of routine immunization in Garowe. Among the interpersonal factors studied are family support, decision making in family, father contribution and traditional/religion influence.

4.5.1 Family Support/Encouragement and Utilization of Routine Immunization

The results in Table 4.15 show that family support and encouragement was significantly related to utilization of routine immunization ($\chi^2=52.722$, $p=0.001$). The findings established that caregivers with very supportive families utilized routine immunization for their children compared to those that lack family support. The finding showed that family support was instrumental in utilization of routine immunization among the caregivers in Garowe.

Table 4.15***Family Support and Utilization of Routine Immunization***

		Utilization of Routine Immunization			Chi-Square Tests
		Yes (n)	No (n)	Total (n)	
Family members' encouragement or support caretakers to take their children for immunization?	Yes, very supportive	144	81	225	$\chi^2=52.722$ (p=0.000)
	Somewhat supportive	53	49	102	
	No, they are against immunization	12	36	48	
	Not sure	3	6	9	
	Total	212	172	384	

4.5.2 Family Final Decision Makers on Vaccination

The research further sought to find out whether family final decision makers on vaccination influence utilization of routine vaccination in Garowe. The results are presented in Table 4.16.

Table 4.16***Family Final Decision Makers and Vaccination on Utilization of Routine******Immunization***

		Utilization of Routine Immunization			Chi-Square Tests
		Yes (n)	No (n)	Total (n)	
Family final decision makers on vaccination	You do	35	21	56	$\chi^2= 14.710$ (p=0.012)
	Spouse does	22	34	56	
	Mother	102	73	175	
	Mother-in-law	15	13	28	
	Someone else	32	21	53	
	Don't know	5	10	15	
	Total		212	172	

The results show that family where the mother of the child was the final decision makers utilized routine immunization more. The finding shows that final decision

makers in the family significantly influenced the children routine immunization in Garowe ($\chi^2= 14.710$, $P = 0.012$). Gazibara et al., (2017) in their study of Texas also showed that children whose caregivers received support from husbands/partners were about 8 times more likely to access full immunization than those whose caregivers never received such support.

4.5.3 Fathers Contribution Make Towards Successful Routine Immunization

The study analyzed the relationship between father contributions significantly affected successful routine immunization. It was shown that the families where fathers contributed towards children routine immunization had their children successfully immunized compared to where fathers did not contribute towards the immunization process as shown in Table 4.17.

Table 4.17

Fathers Contribution and Utilization of Routine Immunization

		Utilization of Routine Immunization			Chi-Square Tests
		Yes (n)	No (n)	Total (n)	
Fathers Contribution towards successful routine immunization	Provide permission to vaccinate the child	91	83	174	$\chi^2= 8.819$ ($p=0.012$)
	Provide transportation and other support that mother needs	109	62	171	
	Other, specify	12	27	39	
	Total	212	172	384	

4.5.4 Traditional / Religious Leaders Support for Routine Immunization

The study further sought to establish the relationship between traditional/religious leaders support and utilization of routine immunization. The results are shown in Table 4.18.

Table 4.18***Traditional / Religious Leaders Support and Utilization of Routine******Immunization***

	Utilization of Routine Immunization			Chi-Square Tests	
	Yes (n)	No (n)	Total (n)		
Traditional / religious leaders support for routine immunization	Yes, very supportive	125	76	201	$\chi^2= 15.495$ ($p=0.001$)
	Somewhat supportive	51	48	99	
	No, they are against immunization	10	18	28	
	Not sure	26	30	56	
	Total	212	172	384	

The study findings established that there was a significant relationship between traditional/religious leaders support and utilization of routine immunization ($\chi^2= 15.495$, $p=0.001$). The findings implied that traditional/religious leaders support increased utilization of routine immunization. Respondent KII 006 interviewed noted that:

“... Some traditional practices have played a role in reducing the level of routine immunization among the residents of Garowe. These practices should be abolished to increase the rate of utilization of the routine immunization in Somalia ...” KII 006

4.6 Effect of Health Facility Factors on Utilization of Routine Immunization

The third objective of the study was to analyse the effect of health facility factors on utilization of routine immunization among the caregivers of children less than two years

in Garowe. The study analysed the effect of immunization belief and source of information on utilization of routine immunization in Garowe.

4.6.1 Immunization Belief

The study sought to determine the relationship between immunization belief and routine utilization of immunization in Garowe region of Somalia. The results are presented in Table 4.19.

Table 4.19

Immunization Belief and Utilization of Routine Immunization

	Utilization of Routine Immunization			Chi-Square Tests	
	Yes (n)	No (n)	Total (n)		
Immunization Belief	Can protect the child from diseases	160	106	266	$\chi^2=61.101$ (p=0.000)
	Can give a child a fever	12	17	29	
	Can make boys sterile (unable to have children)	2	9	11	
	Can make girls infertile (unable to have children)	29	21	50	
	Frequently can give a child a disease	7	14	21	
	Can give a child HIV/AIDS	2	2	4	
	Are not halal are made with ingredients that are not halal	0	3	3	
	Total	212	172	384	

The results in Table 4.19 shows that majority of the respondents believed that immunization can protect their children from disease and therefore utilized routine immunization, unlike caregivers that had other forms of beliefs. According to the

results immunization belief had a significant ($\chi^2=61.101$, $p=0.000$) effect on utilization of routine immunization. The findings implied that positive belief about immunization led to increase in utilization of routine immunization among the caregivers of children less than two years in Garowe. Respondent 006 interviewed noted that:

“... Some traditional practices have played a role in reducing the level of routine immunization among the residents of Garowe. These practices should be abolished to increase the rate of utilization of the routine immunization in Somalia ...” Respondent KII 006

4.6.2 Main Source of Information on Vaccines Offered Through Routine Health Services

Similarly, the study sought to establish the effect of the main sources of information on vaccination on utilization of routine immunization among the caregivers of children less than two years in Garowe. The results are indicated in Table 4.20.

Table 4.20

Main Source of Information and Utilization of Routine Immunization

		Utilization of Routine Immunization			Chi-Square Tests
		Yes (n)	No (n)	Total (n)	
Main sources of information about vaccines offered through routine health services.	Medical doctors, nurses or other health service providers	114	72	186	$\chi^2=35.134$ ($p=0.000$)
	Spiritual healers or herbalists	8	12	20	
	Imam/religious leaders	7	3	10	
	Community's traditional leaders/ elders and mobilizers	23	25	48	
	Poster / banner	1	2	3	
	Radio	31	25	56	
	Television	13	8	21	

Newspapers/ Magazines	2	1	3
Husband/family/ neighbor / friends	1	0	1
Not heard of routine vaccination before	1	8	9
Don't know	7	13	20
Specify others	4	3	7
Total	212	172	384

The findings above shows that caregivers got information from various sources including medical staff, radio, and traditional leaders among others. The research findings further show that the main source of information had a significant ($\chi^2=35.134$, $p=0.000$) effect on the utilization of routine immunization in Garowe. These findings implied that caregivers immunized their children depending on where they got their information. Caregivers that got information from medical workers utilized children routine immunization more as compared to those that got information from other sources. The findings agreed with those of Mosiur and Sarker (2010) who showed that source of information affected adoption of routine immunization among mothers in Bangladesh.

4.7 Effect of Policy Factors on Utilization of Routine Immunization

The last objective of the study was to determine the effect of policy factors on utilization of routine immunization in Garowe, Somalia. The study sought to find what has been done by government to ensure availability of the vaccines to residents and whether these factors have contributed to utilization of routine immunization by caregivers of children less than two years.

4.7.1 Distance and Time to Nearest Health Facility

The results presented in Table 4.21 below show that majority of the interviewed respondents were less than 1 kilometre from the nearest health facilities. The findings show that distance from the nearest health facilities had insignificant relationship with utilization of the routine immunization ($\chi^2=1.537$, $p=0.674$). The results for instance show that out 31 respondents who were more than 10 km from the nearest health facilities, 25 of them indicated that they routinely immunized their children. The study findings agreed with Mohamud et al., and Sharma (2014) whose study findings showed that overall immunization of the children less than 2 years was very low in Somalia. The study recommended that promotion of health institutions should be undertaken, strengthening of outreach activities of the health institutions should be undertaken to encourage mothers to utilize health services.

Table 4.21

Distance and Time to Nearest Health Facility and Utilization of Routine

Immunization

		Utilization of Routine Immunization			Chi-Square Tests
		Yes (n)	No (n)	Total (n)	
Distance to nearest health facility	Less than 1km	86	72	158	$\chi^2=1.537$ ($p=0.674$)
	2-5km	74	48	122	
	5-10km	32	38	70	
	More than 10km	20	14	34	
	Total	212	172	384	
How many minutes does it take to walk to the closest community health center hospitals or clinic?	Half an hour	83	63	146	$\chi^2=11.039$ ($p=0.087$)
	1 hours	49	38	85	
	2 hours	27	26	53	
	3 hours	8	13	21	
	4 hours	5	2	6	
	5 Hours	2	1	3	
	Don't know	38	29	67	

Similarly, the results in Table 4.21 show that the time respondent too to reach a nearest health facilities was insignificantly ($\chi^2=11.039$, $p=0.087$) related to utilization of routine immunization in Garowe, region of Somalia. These findings further confirmed that in Garowe, many caregivers interviewed indicated that they were less than two hours away from the nearest health facilities, which implied that health facilities were available hence played insignificant role in determining utilization of routine immunization. Lydia et al., (2017) urged the government to initiate mechanisms through which mothers can be informed through print media in order to utilize these services more.

4.7.2 Availability of Vaccines for All Diseases

The review also examined the effect of availability of vaccines for all disease on utilization of routine immunization in Garowe. The results are indicated in Table 4.22.

Table 4.22

Availability of Vaccines for all Diseases and Utilization of Routine Immunization

		Utilization of Routine Immunization			Chi-Square Tests
		Yes (n)	No (n)	Total (n)	
Availability of vaccination for all diseases	Yes	142	83	225	$\chi^2 = 13.358$ ($p=0.001$)
	No	38	60	98	
	Don't know	32	29	61	
	Total	212	172	384	
Vaccines Stocks outs in Hospitals on Visit	Yes	106	75	181	$\chi^2 = -7.783$ ($p=0.020$)
	No	106	97	203	
	Total	212	172	384	

The finding presented in Table 4.22 established a significant association ($\chi^2 = 13.358$, $p=0.001$) between availability of the vaccinations and utilization of routine immunization. According to this study findings availability of vaccination would positive impacts on utilization of routine immunization by caregivers of children less than two years in Somalia. The finding supported those of Amin et al., (2013) indicating that discrimination or negative attitude in the health facilities discouraged mothers from consuming vaccination services. The study findings agreed with that of Mohamud, et al., (2014) who showed that overall immunization of the children less than 2 years was very low in Somalia. The study recommended that promotion of health institutions should be undertaken, strengthening of outreach activities of the health institutions should be undertaken to encourage mothers to utilize health services.

The study further established that vaccines stocks on visits were significantly related to utilization of routine immunization. However, this relationship was negative which implied that increased in stock outs of vaccines on visiting day would negatively impact on utilization of routine immunization in Somalia ($\chi^2 = -7.783$, $p=0.02$). The finding showed that lack of vaccines during health facilities visits lead to reduction in immunization of children in Somalia. The finding supported those of Amin et al., (2013) which indicated that discrimination or negative attitude in the health facilities discouraged mothers from utilizing vaccination services in Dili, Timor- Leste. The study findings also agreed with that of Mohamud et al., (2014) whose study findings showed that overall immunization of the children less than 2 years was very low in Somalia.

Table 4.23***Reasons for Failed Vaccination and Utilization of Routine Immunization***

		Utilization of Routine Immunization			Chi-Square Tests
		Yes (n)	No (n)	Total (n)	
Reason for failed vaccination	Lack of drugs	49	47	96	$\chi^2 = 2.237$ (p=0.897)
	Lack of storage for vaccines	33	27	60	
	Getting to the hospital late	18	16	34	
	Lack of money	12	11	23	
	Long waiting time	29	13	42	
	Other (I get one)	27	24	51	
	NA	44	34	78	
	Total	212	172	384	

The results in Table 4.23 above show that lack of drugs was mentioned by caregivers as one of the reasons why they failed to vaccinate their children. Others reasons mentioned included lack of storage for vaccines, getting late to the health facilities, lack of money and long waiting time. The finding further established that reasons for lack of vaccines in hospitals had a significant effect on utilization of routine immunization of children in Somalia. The study finding support those by Zewdie et al., (2016) who conducted a study on default of immunization in Ethiopia and found that lack of information, high workload on mothers and poor collaboration from health workers contributed significantly on low immunization of children less than five years. The study further supports the finding of Mohamed et al., (2016) who established that children's immunization status in Kenya is influenced by factors at the individual, household, community, and health facility levels, which can best be addressed through collaboration between Ministry of Health and development agencies.

4.8 Binary Logistics Regression Results

The study conducted a multivariate regression analysis to test the joint effect of all the independent variables (individuals' factors, interpersonal factors, organizational factors, and policy factors) on utilization of routine immunization in Somalia. The Results are presented in the following subsections.

4.8.1 Model Summary

The results for regression model summary in Table 4.24 below show that caregivers' factors, interpersonal factors, health facility factors, and policy factors accounted for 56.0% of the utilization of routine immunization in Somalia (Nagelkerke R Square=0.560). The results confirmed that caregiver factors, interpersonal factors, health facility factors, and policy factors are significant predictor variables of utilization of routine immunization in Somalia.

Table 4.24

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	164.546 ^a	.384	.560

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

4.8.2 Regression Coefficients

The results in Table 4.25 present the findings of regression coefficients. These results were used to determine the variables on utilization of routine immunization in Somalia.

Table 4.25***Regression Coefficients***

	B	S.E.	Wald	df	Sig.	Exp(B)
Step						
1 ^a						
Caregivers Factors	-.001	.001	4.371	1	.037	.999
Interpersonal Factors	.013	.007	3.654	1	.046	1.013
Health Facility Factors	.056	.018	10.088	1	.001	1.058
Policy Factors	-.002	.003	.534	1	.465	.998
Constant	-1.271	.282	20.257	1	.000	.281

a. Variable(s) entered on step 1: Caregiver Factors, Interpersonal Factors, health facility factors, and Policy Factors.

The study findings support the finding of Mohamed, et al., (2016) who established that children's immunization status in Kenya is influenced by factors at the individual, household, community, and health facility levels, which can best be addressed through collaboration between Ministry of Health and development agencies.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter covers the summary, conclusion and recommendations made by the study. The summary of the findings was presented based on the specific objectives of the study. The conclusion and recommendation made by the study were purely derived from the study findings.

5.2 Summary of Findings

The purpose of this study was to determine factors affecting the utilization of routine immunization coverage for children 12 to 23 months in Garowe Town and the specific objectives of the study were to determine individual, inter personal, organizational and policy factors affecting the utilization of routine immunization for children aged 12 to 23 months in Garowe Town. A cross-sectional survey design was the most suitable for the study. The study also used both qualitative and quantitative data collected by interviewing mothers, guardians of the children aged 12 to 23 months, service providers in selected health facilities, and community health workers. The selection of the sample was through probabilistic as well as non-probabilistic methods. Before that, the sample size of 384 was determined by use of Fisher formula. The data collection instruments were Semi-structured questionnaires, KII and FGDs. For data interpretation, quantitative data was analyzed through univariate methods, descriptive statistics, Chi-square (χ^2) and regression methods. In addition, qualitative data were organized and summarized in line with the thematic areas; described, followed by thematic analysis.

5.2.1 Care Giver Factors and Utilization of Routine Immunization

The first objective of the study was to determine the effect of care giver factors on utilization of routine immunization for children less than two years in Garowe. This finding confirmed that there was lack of adequate knowledge on routine immunization among the caregivers of children less than two years in Garowe. Lack of knowledge and poor perception significantly influenced utilization of routine immunization by the residents.

The results indicated that father's and mother's education was significantly related to utilization of routine immunization. The findings implied that children with more educated mothers and fathers underwent routine immunization compared to children with less educated parents. The results show that parent's level of education was a significant factor that influences children routine immunization in Garowe. The study further sought to establish whether mother/child ability to read significantly influenced routine immunization of children. The study results show that mother or child reading skills had a significant relationship with utilization of routine immunization among the caregivers in Garowe. The findings implied that mothers that could read utilized routine immunization for their children compared to those that could not read. The study findings showed that age, gender, marital Status, primary occupation and relationship with the child under one year had insignificant effect on utilization of routine immunization.

5.2.2 Interpersonal Factors and Utilization of Routine Immunization

The second objective of the study was to determine the effect of interpersonal factors on utilization of routine immunization in Garowe in Somalia. The findings established

that caregivers with very supportive families utilized routine immunization for their children compared to those that lack family support. The results show that family where the mother of the child was the final decision maker utilized routine immunization more. The finding further showed that final decision makers in the family significantly influenced the children routine immunization.

The results indicate that families where fathers contributed towards children routine immunization had their children successfully immunized compared to those where fathers did not contribute towards the immunization process. The study findings established that there was a significant relationship between traditional/religious leaders support and utilization of routine immunization. The findings implied that traditional/religious leaders support increased utilization of routine immunization.

5.2.3 Health Facility Factors and Utilization of Routine Immunization

The third objective of the study was to analyse the effect of organisational factors on utilization of routine immunization among the caregivers of children less than two years in Garowe in Somalia. According to the results immunization belief had a significant effect on utilization of routine immunization. The findings indicate that positive belief about immunization led to increase in utilization of routine immunization among the caregivers of children less than two years.

The finding shows that caregivers got information from various sources including medical staff, radio, traditional leaders among others. The findings further showed that the main source of information had a significant effect on utilization of routine immunization. These findings indicate that caregivers immunized their children

depending on where they got their information. Caregivers that got information from medical workers utilized children routine immunization much more compared to those that got information from other sources.

5.2.4 Policy Factors and Utilization of Routine Immunization

The final objective of the study was to determine the effect of policy factors on utilization of routine immunization in Garowe, Somalia. The study sought to find what has been done by government to ensure availability of the vaccines to residents and whether these factors have contributed to utilization of routine immunization by caregivers of children less than two years. The findings show that distance from the nearest health facilities had insignificant relationship with utilization of the routine immunization.

The findings established that there was a significant association between availability of the vaccines and utilization of routine immunization. According to this study findings availability of vaccines would positively impact on utilization of routine immunization by caregivers of children less than two years. The study further established that vaccine stocks on visiting days were significantly related to the utilization of routine immunization. However, this relationship was negative which implied that lack of vaccines on visiting day would negatively impact on utilization of routine immunization. The finding showed that lack of vaccines during health facilities visits lead to reduction in immunization of children in Somalia.

5.3 Conclusion

The study concluded that utilization of the routine immunization in Garowe Town had improved from an average of 40 percent to 83 percent since majority of the caregivers had taken their children for polio vaccines, BCG injection among others. However, the study concluded that a significant number of caregivers still leave their children unprotected by failing to observe the routine immunization despite being close to health facilities.

The study further concluded that level of education of mothers and fathers, fathers' contribution, knowledge and perception, immunization belief, main source of information and availability of the vaccinations are some of the factors that contributed to improved utilization of routine immunization in Garowe Town. The study also concluded that individual factors, interpersonal factors and organisation factors were significant in utilization of routine immunization by caregivers.

The study concluded that the decision to vaccinate children is in the hands of the caregivers more than government policies. Caregivers that are more informed on the advantages of immunization routinely immunize their children. Maternal characteristics, sex of child and birth order of the child, place of delivery and antenatal care (ANC) follow up, household income, economic status, knowledge, attitude and practice of caregivers about immunization are the main factors associated with immunization coverage and immunization services utilization for children.

5.4 Recommendations of the Study

The study made the following recommendations;

- i. The NGOs, governments' agencies and all the stakeholders should frequently conduct awareness to equip the residents of Somalia with knowledge in regard to utilization of routine immunization.
- ii. Health workers should educate pregnant mothers and caregivers on the advantages of immunization and dangers of not completing immunization.
- iii. The Ministry of Health and NGOs should train health workers on interpersonal communication skills to enhance positive communication with caregivers.
- iv. The government should ensure that all the health facilities are properly equipped with all the necessary vaccines to ensure that vaccines are available during routine immunization visits.
- v. The government of Somalia should enforce policies that will ensure routine immunization is adhered to by caregivers.

5.6 Suggestions for Further Study

- i. The study findings showed that the caregiver's age, gender, marital Status, primary occupation and relationship with the child had a significant effect on utilization of routine immunization by resident of Garowe region of Somalia.
- ii. The interrogation of health facility factors can be elaborated further by conducting a similar study at health facilities. This can help complement the findings of this study which was conducted at the community level.

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APPENDICES

Appendix I: Informed Consent

Kenya Methodist University

P. O Box 267-60200

MERU, Kenya

SUBJECT: INFORMED CONSENT

Dear Respondent,

My names are **Said Nuriye Abshir** I am a MSc. student from Kenya Methodist University. I am conducting a study titled: **Factors Influencing the Utilization of Routine Immunization in Children Under Five Years in Garowe District, Puntland Somalia**; the findings will be utilized to strengthen the health systems in **Somalia** and other Low-in- come countries in Africa. As a result, countries, communities and individuals will benefit from improved quality of healthcare services. This research proposal is critical to strengthening health systems as it will generate new knowledge in this area that will inform decision makers to make decisions that are research based.

Procedure to be followed

Participation in this study will require that I ask you some questions and also access all the hospital's department to address the six pillars of the health system. I will record the information from you in a questionnaire check list.

You have the right to refuse to participate in this study. You will not be penalized nor victimized for not joining the study and your decision will not be used against you or affect you at your place of employment.

Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and you may stop the interview at any time. You may also stop being in the study at any time without any consequences to the services you are rendering.

Discomforts and risks

Some of the questions you will be asked are on intimate subject and may be embarrassing or make you uncomfortable. If this happens; you may refuse to answer if you choose. You may also stop the interview at any time. The interview will take about 40 minutes.

Benefits

If you participate in this study you will help us to strengthen the health systems in Kenya and other Low-in- come countries in Africa. As a result, countries, communities and individuals will benefit from improved quality of healthcare services. This field attachment is critical to strengthening the health systems as it will generate new knowledge in this area that will inform decision makers to make decisions that are research based.

Rewards

There is no reward for anyone who chooses to participate in the study.

Confidentiality

The interviews will be conducted in a private setting within the hospital. Your name will not be recorded on the questionnaire and the questionnaires will be kept in a safe place at the University.

Contact Information

If you have any questions you may contact the following supervisors: Musa Oluoch +254-20-722483909 and Dr. Wanja Tenambergen Head of Department of Health Systems Management of Kenya Methodist University, Nairobi campus.

Participant's Statement

The above Statement regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will not be victimized at my place of work whether I decide to leave the study or not and my decision will not affect the way I am treated at my work place.

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

Signature.....

Investigator's Statement

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

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

Interviewer Signature.....

Appendix II: In-depth Interview Questionary (Caregivers)-Tool 1

Interviewer name _____ District: _____ Region _____

Date _____

#	Question	Response
A. Caregiver Socio-demographic Information: Caregiver is Father/Mother/Grandparents/Siblings and extended family		
A1	Age	1. <24 years 2. 25-45 years 3. >45 years
A2	Gender	1. Male 2. Female
A3	Marital status	1.Married 2.Unmarried 3.Divorced 4.Widowed
A4	Relationship to the child under One year	1. Mother 2.Father 3.Grandmother 4.Grandfathe 5.Other (<i>specify</i>) _____
B. Education level		
B1	a) Father education status	1. Islamic 2.Primary 3.Secondary 4. College 5. University
B2	b) Mother education status	1. Islamic 2.Primary 3.Secondary 4.College 5. University
B3	How well can the mother or child in this household read	1. Very easily 2.With some difficulty 3.Not at all
C) Caregivers socio- economic status		
C 1	Caregiver primary occupation	1.Livestock keeping 2.Salaried employee 3.Formal business owner 4.Informal business owner 5.Farming 6.Mixed farming 7. Others (<i>specify</i>)

D. Child Immunization status		
D1	Has your child/children ever received any vaccination through routine health services in his/her life?	<ol style="list-style-type: none"> 1. Yes 2. No Skip to next section(E) – knowledge and Perception of routine immunization
D2	What type of vaccines has your child received?	<ul style="list-style-type: none"> • BGG • OPV • Pentavalent • Measles • BG & OPV • OPV & Measles • BCCG, OPV, Pentavalent and Measles • OPV & Pentavalent • No Vaccination
D3	Has your child ever received an injection to protect against tuberculosis (“BCG”) in the left upper arm, or shoulder, which usually causes a scar? [Probe: “Usually received at or soon after birth”] Check for BCG Scar on the left upper outer arm	<ol style="list-style-type: none"> 1. Yes 2. No <ul style="list-style-type: none"> • Scar seen • Scar not seen
D4	Has your child ever received an injection in their left upper thigh to protect against tetanus, whooping cough, or diphtheria (“Penta” or “DPT”)?	<ol style="list-style-type: none"> 1. Yes 2. No
D5	How many times was Penta/DPT vaccine received?	<ol style="list-style-type: none"> 1. Number of times..... 2. Don’t know
D 6	Has your child ever received drops in their mouth to protect against polio (“OPV”) at MCH/outreach? [Probe: “Not during polio house-to-house campaign”]	<ol style="list-style-type: none"> 1. Yes 2. No
D 7	How many times were polio drops received at MCH/outreach? [Probe: “Not during campaign”]	<ol style="list-style-type: none"> 1. Number of times_____ 2. Don’t know
D 8	Has your XX Child ever received an injection in his/her left upper arm at age 9 months or older to prevent him/her from getting measles? [Probe: “Not during a measles campaign”]	<ol style="list-style-type: none"> 1. Yes 2. No

D 9	Has your XX Child complete of all eligible vaccines before the age of one year	1. Yes 2. No
D10	Do you have a card where XX Child vaccinations are written down? [Probe: Show sample card.] [IF YES] May I see it please?	1. Yes, seen 2. Yes, not seen 3. No
D 11	Why don't you have a vaccination card for him/her right now? [CHOOSE ONE MAIN REASON.]	1. Card not given to mother/caregiver 2. Card not available now/outside house 3. Card lost 4. Card not available at the MCH 5. Mother/caregiver asked to pay for card 6. Child never went to MCH 7. Don't know 8. Other, specify_____
E. Reasons for not vaccinating the Child		
E 1	Why did your XX Child not receive all of his/her vaccinations through routine health services? [Do not read the answers. Choose one main reason based on response.]	1. Unaware of need for vaccination 2. Did not know the need other vaccines 3. Feel vaccination not important 4. Do not trust vaccines 5. Fear of side effect/adverse event 6. Cultural/religious reasons 7. Unaware of place/time of vaccination 8. Place of vaccination too far/difficult 9. Time of vaccination inconvenient 10. Mother too busy 11. Plan to do it later 12. Forgot to take child for vaccination 13. Husband/head of household won't allow 14. Unable to pay for vaccination services 15. Unable to pay for transport 16. Family problem, like illness of mother 17. Child ill, mother refused 18. Child ill, vaccinator refused 19. Vaccine not available at facility 20. Vaccinator absent 21. Long waiting line 22. Poor attitude of health workers 23. Health outreach not regular
F. Interpersonal Factors: Social networks, Social support systems, Religious networks, Customs/Traditions		
F1	Do family members encourage or support caretakers to take their children for immunization?	1. Yes, very supportive 2. Somewhat supportive 3.No, they are against immunization 4. Not sure

F2	In your family, who makes the final decision about whether or not a child should be vaccinated?	<ol style="list-style-type: none"> 1. You do 2. Spouse does 3. Mother 4. Mother-in-law 5. Someone else (Specify: 6. Don't know
F3	In your opinion, what contribution can fathers make towards successful routine immunization	<ol style="list-style-type: none"> 1. Provide permission to vaccinate the child 2. Provide transportation and other support that mother needs 3. Other, Specify
F4	Do traditional/religious leaders in your community support routine immunization	<ol style="list-style-type: none"> 1. Yes, very supportive 2. Somewhat supportive 3. No, they are against immunization 4. Not sure
G. Health Facility Factors: Care Givers Attitude, Communication, Social Support, Media		
G 1	What do you believe giving immunization to your child	<ol style="list-style-type: none"> a. Can protect the child from diseases b. Can give a child a fever c. Can make boys sterile (unable to have children) d. Can make girls infertile (unable to have children) e. Frequently can give a child a disease f. Can give a child HIV/AIDS g. Are not halal/are made with ingredients that are not halal h. Are made with ingredients from cows/beef i. Are made with urine or blood
G 2	What is your main source of information about vaccines offered through routine health services? Do not read the answers. Choose one main source based on response.]	<ol style="list-style-type: none"> 1. Medical doctors, nurse or other health service providers? 2. Spiritual healers or herbalists? 3. Imam/religious leaders? 4. Community's traditional leaders/elders and mobilizers 5. Poster/banner 6. Radio 7. Television 8. Newspapers/magazines 9. Husband/family/neighbor/friends 10. Not heard of routine vaccination before 11. Don't know 12. Specify others

H. Policy/Enabling Environmental factors		
H1	Where is the nearest health facility	1. less than 1km 2. 2-5km 3. 5-10km 4. more than 10km
H2	Does your health facility offer vaccination for all diseases?	1. Yes 2. No 3. Don't know
H3	a) Have you attended hospital and failed to vaccinate your child	1. Yes 2. No
H4	b) What was the reason for failed vaccination	1. Lack of drugs 2. Lack of storage for vaccines 3. Getting to the hospital late 4. Lack of money 5. Long waiting time 6. Other (specify) _____
H5	How many minutes does it take to walk to the closest community health center hospitals or clinic	1. ____ hours ____ minutes 2. Don't know

Appendix III: Key Informant Interview Questionnaires'

(Nurse/Community Health Worker)-TOOL 2

Section A: Interviewee's Particulars

Name of State.....RegionDistrict.....

Village

Date: ____/____/____

Name of Interviewer:

Section B: Respondents' Particulars

- Respondents Name:
 - Age:
 - Sex:
1. Can you mention the types of vaccine given and the respective scheduled time for each? (*Tick all that are mentioned*)

Type of Vaccine	When to be given	Tick if mentioned
BCG& OPV 0	At birth or first contact	
OPV1, Penta 1	6 Weeks	
OPV2, Penta 2	10 Weeks	
OPV3, Penta 3	14 Weeks	
Measles	9 Months of age	
Vitamin A – 1 st dose	9 Months of age	
Vitamin A – 2 nd dose	15 Months of age	
Vitamin A – 3 rd dose	21 Months of age	
TT 1	First contact	
TT 2	1 Month after the 1 st dose	
TT 3	6 Months after the 2 nd dose	
TT 4	1 Year after the 3 rd dose	
TT 5	1 Year after the 4 th dose	

2. Who are target children on immunization schedule?
 - Children under one year
 - Children under Five years' old
 - Children under six months

3. What challenges do you face as a service provider with regard to the current immunization schedule? (list below)
 - I.
 - II.
 - III.

4. Who do you think parents/caregivers listen to and believe in when receiving health/immunization information?

5. After vaccinating a child do you explain key messages to caregivers about immunization? If yes, what do you tell them?

6. What is the main source of information about vaccines that caregivers receive?
 - a) Polio campaign vaccinators
 - b) Loud speaker/Town announcer
 - c) Poster/banner
 - d) Radio
 - e) Television
 - f) Mobile telephone/SMS
 - g) Newspapers/magazines
 - h) Husband/family/neighbor/friends
 - i) Women's groups
 - j) Mosque
 - k) Community leader
 - l) Community mobilizer/VCM
 - m) Don't know

7. What are the main reasons why caregivers fail to bring their children for immunization?
 - Perception that child is too weak for vaccination
 - False beliefs that vaccination does not prevent diseases
 - Lost health card or no card
 - Lack of interest or motivation
 - Mothers are busy
 - Distance of the health facility

- Rumors
- Religious beliefs
- Fear of adverse events
- Economic problems
- Others Specify

8. What are the policy factors (health system barriers) that affects the utilization of routine immunization?

1. Difficult vaccine storage
2. Vaccine and supplies out of stock
3. Few functional health facilities that provide routine immunization
4. Few trained EPI staff are available at the health facility
5. Lack of supportive supervision
6. Lack of updated EPI guidelines and policy

****THANK YOU****

Appendix IV: Focus Group Discussion Questions (Mothers/Caregivers)

Tool 3

A. Knowledge, attitude and perceptions About Child Immunization

1. What type of vaccines should a child to receive before he/she reaches his/her first birth day?
2. By what age should a child receive all of the basic vaccinations
3. Do you know the reasons why immunization is necessary and what are the main diseases that children may have if they are not immunized?

4. What are the main reasons why Caregivers do not take their children for immunization?

1. Perception that child is too weak for vaccination
2. False beliefs that vaccination does not prevent diseases
3. Lost health card or no card
4. Lack of interest or motivation
5. Mothers are busy
6. Distance of the health facility
7. Rumors
8. Religious beliefs

B. Family and Community Support

1. Do family members encourage or support caretakers to take their children for immunization?
Yes
No
2. In your opinion, what contribution can fathers make towards successful routine immunization?

C) Availability and Accessibly of the Immunization Services

1. Is the health facility too far from home? Yes/No
Are the caregivers able to pay the cost of transportation to bring their child/children to the health facility Yes/No
2. Do you wait long time for your child to be vaccinated Yes/No
3. Do you pay to vaccinate your child/children? If yes how much? Yes/N

Appendix V: Ethical Approval Letter



KENYA METHODIST UNIVERSITY

P. O. BOX 267 MERU - 60200, KENYA
TEL: 254-064-30301/31229/30367/31171

FAX: 254-64-30162
EMAIL: info@kemu.ac.ke

22ND OCTOBER 2018

Said Nuriye Abshir
HSM-3-3079-3/2016

Dear Said,

RE: ETHICAL CLEARANCE OF A BACHELORS DEGREE

Your request for ethical clearance for your Masters' Research Thesis titled "Factors affecting the Utilization of Routine Immunization Coverage of Children under Two Years in Somalia: A Case of Garowe Town" has been provisionally granted to you in accordance with the content of your project proposal subject to tabling it in the full Board of Scientific and Ethics Review Committee (SERC) for ratification.

As Principal Investigator, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the project.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the SERC for re-review and approval **prior** to the activation of the changes. The Proposal number assigned to the project should be cited in any correspondence.
3. Adverse events should be reported to the SERC. New information that becomes available which could change the risk: benefit ratio must be submitted promptly for SERC review. The SERC and outside agencies must review the information to determine if the protocol should be modified, discontinued, or continued as originally approved.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by subjects and/or witnesses should be retained on file. The SERC may conduct audits of all study records, and consent documentation may be part of such audits.

5. SERC regulations require review of an approved study not less than once per 12-month period. **Therefore, a continuing review application must be submitted to the SERC in order to continue the study beyond the approved period.** Failure to submit a continuing review application in a timely fashion will result in termination of the study, at which point new participants may not be enrolled and currently enrolled participants must be taken off the study.

Please note that any substantial changes on the scope of your research will require an approval.

Yours sincerely



DR. WAMACHI

Chair, SERC

cc: Director, RI & PGS

Appendix VI: Request to conduct a research in Garowe Town

To:

Abdirizak Abshir Hersi,

CC:

Mohamed Jama, Regional Health Officer, Nugaal Region

SUBJECT: Request for permission to conduct a research in Garowe Town

I, Said Nuriye Abshir , a Master of Science in Health Systems Management in Kenya Methodist University, Nairobi campus hereby kindly request permission to conduct a research in Garowe Town.

The study is entitled *“Factors Influencing the utilization of Routine Immunization Coverage of Children aged 12 to 23 months in Somalia: A Case of Garowe Town”*

If you need further information, do kindly contact Said Nuriye, the researcher, at:

Cell phone: +252907712826

E-mail: saidatom@gmail.com

Regards,

Said Nuriye Abshir

Appendix VII: Approval letter for conducting research in Garowe Town.

DAWLADDA PUNTLAND
EE SOOMAALIYA



حكومة ولاية بونت لاند
الصومالية

WASAARADDA CAAFIMAADKA
Xafiiska Agaasimaha Guud

Puntland Government of Somalia
Office of the Director General

وزارة الصحة

Ref: MOH/PL/DGO/069/19

Date: march 5th, 2019

To: Said Nuriye Abshir, researcher

CC: Abdirizak Abshir Hersi, Director Primary Health Care, Ministry of Health

Re: Request for conducting research in Garowe town

The Ministry of Health of Puntland is hereby approving your above request for conducting research in Garowe town on the subject entitled "Factors Affecting the utilization of Routine Immunization Coverage of Children under two years in Somalia: A Case of Garowe town". The Director of Primary Health Care/EPI Manager copied here is kindly requested to provide any facilitation required in the course of the study.



Dr. Abdirizak Hersi Hassan
Director General
Ministry of Health Puntland State of Somalia

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