FACTORS ASSOCIATED WITH THE UPTAKE OF THE MEASLES IMMUNIZATION PROGRAM IN LUDERITZ DISTRICT, NAMIBIA

by

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DECLARATION

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Factors associated with the uptake of the measles immunization program in Lüderitz district, Namibia.

I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the dissertation to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other education institution.

31 July 2020

SIGNATURE **DATE**

ABSTRACT

Measles immunization coverage in Namibia has not yet reached the WHO target of 90% in all provinces and districts, particularly in Luderitz district. The study aimed to determine the factors associated with the uptake of measles immunization among children in Luderitz district. A quantitative cross-sectional study was conducted among 150 parents/caregivers and their children who visited Luderitz clinic during July 2019 to August 2019. A developed questionnaire collected data on the several factors including child-related ,health service related and the perception of parents/caregivers. Data was analysed using STATA 14. Measles immunization uptake was 61% and significantly associated with child's age (p=0.001) and gender (p=0.003), parents/caregivers age (p≤0.0001), gender (p=0.021), marital status (p≤0.0001) and employment status (p=0.009). Barriers to measles immunization were mainly inconvenient vaccination time (44%) and forgetfulness (25%) while suggested cues to action, were sending the reminders (30%), providing immunization the whole day (40%) and health education and promotion.

Keywords: measles, immunization, uptake, children, demographics, health service, perceptions ,parents/caregivers, Luderitz district, Namibia.

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DEDICATION

To my husband, Kudzai Nyamupfukudza as well as parents, Mr M Kasuso and the late Mrs F Kasuso.

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LIST OF ABBREVIATIONS

AFRO	Regional Office for Africa
AIDS	Acquired Immune Deficiency Syndrome
CDC	Centre for Diseases Control
CFR	Case Fatality Rate
DHIS	District Health Information System
DoH	Department of Health
EPI	Expanded Programme on Immunization
GAVI	Global Alliance for Vaccines and Immunization
GIVS	Global Immunization Vision and Strategy
HIV	Human Immunodeficiency Virus
MCV1	Measles-containing-vaccine first-dose
MDG	Millennium Development Goals
MoHSS	Ministry of Health and Social Services
NGOs	Non-Governmental Organisations
NIDs	National Immunization Days
PHC	Primary Health Care
RED	Reach Every District
SIAs	Supplementary Immunization Activities
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VPDs	Vaccine Preventable Diseases
WHA	World Health Assembly
WHO	World Health Organisation

DEFINITIONS OF KEY TERMS

Coverage: The percent of people who receive one or more vaccine(s) of interest in relation to the overall population (British Columbia, Centre for Disease Control 2012).

Caregiver: (*Cambridge Dictionary* 2018a : sv " caregiver") Someone who takes care of a person who is young, old, or sick.

Demographics: (Cambridge Dictionary 2020: sv "demographics") the number and characteristics of people who live in a particular area or form a particular group, especially in relation to their age, how much money they have and what they spend it on.

Immunization: Defined by the WHO (2013b:4) as a "process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine".

Road to health card is a card which records the immunizations and growth care of infants from when they are born to the age of five. It is issued to mothers when their baby is born in both government and private hospitals (DoH, 2014).

Uptake: : (*Cambridge Dictionary* 2018b : sv " uptake") In the acceptance of measles program and immunization is the rate or act of accepting something.

Vaccine: This refers to "any preparation intended to produce immunity to a disease by stimulating the production of antibodies" (World Health Organisation Regional Office for South-East Asia [WHO–SEARO] 2013).

Supplementary Immunization Activities: These are immunizations given after routine schedules. For measles the vaccine supplementary administration is done every third year, which normally goes together with vitamin A drops and anti-helminths (MoHSS 2013:6).

OPERATIONAL DEFINITION OF KEY TERMS

Socio-economic factors: Factors that influence how a particular group, or socioeconomic class, act within society towards uptake of the measles immunization.

Behavioural factors: Factors stemming from human behaviour, which might be due to personality, the situation, or are a reaction to the environment and the way it affects acceptance of the measles immunization programme.

Independent variable: Factors associated with the uptake of the measles immunization in children aged between 9 to 59 months program at Luderitz District, Namibia.

Dependent variable: Low measles immunization uptake in Luderitz district Namibia.

Reaching every district approach: A combination of strategies to assist in improving primary immunization at the district level, including: re-establishing outreach services, improving supportive supervision, strengthening community links with service delivery, improving monitoring and use of data for action, and increasing planning and management of resources.

STRUCTURE OF THE DISSERTATION

- **Chapter 1: Orientation to the study (introduction)**

This chapter covers immunization coverage and barriers associated from a global perspective. In particular, immunization related to measles is the focus, as well as the immunization status in the selected district of the study. The gap, rationale and purpose of the study are discussed in this chapter.

- **Chapter 2: Literature review**

This chapter focusses on the application of the Health Belief Model; a theoretical framework chosen to study the perception of caregivers on the uptake of immunization, in addition to the associated factors. The chapter expands on the epidemiology immunization status on a global level as well as in Africa and Namibia.

- **Chapter 3: Research design and methodology**

The methodology of the study is elaborated under this chapter; from the use of a cross sectional study to quality insurance and ethical consideration.

- **Chapter 4: Results**

This chapter display the results in a form of charts, graphs and tables. The demographics, health service related and the perception of parents/caregivers. The factors associated with immunization status are performed using a chi-square and logistic regression analysis.

- **Chapter 5: Discussion and conclusion**

The results are discussed in this section compared to other studies conducted in developing and sub-Saharan countries. The conclusion is drawn based on the objective of the study. Limitation and recommendations are also presented in this section.

CHAPTER 1

ORIENTATION OF THE STUDY

INTRODUCTION

1.1 AN OVERVIEW OF IMMUNIZATION; COVERAGE AND BARRIERS

Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine World Health Organization (WHO, 2020). Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease (WHO, 2020). According to the World Health Organization (WHO, 2020), immunization is a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to avert between two to three million deaths each year. Furthermore, immunization is one of the most cost-effective health investments, with proven strategies that make it accessible to even the most hard-to-reach and vulnerable populations. It has clearly defined target groups, can be delivered effectively through outreach activities and vaccination does not require any major lifestyle change (WHO, 2020).

Vaccination has been used to eradicate or reduce the incidence of many vaccine-preventable diseases (Esposito, Principi, Cornaglia & Group 2014:26). However, the coverage of many highly recommended vaccines is still frequently inadequate and children continue to suffer from diseases that could have been prevented (Tao, Petzold & Forsberg 2013:6). The problem is in contradiction more evident among children at risk of infectious disease-related complications. Nonetheless, healthy children have been reported to experience infectious disease related complications,

at least in the case of some vaccines (Tao et al 2013:6). Vaccine-preventable diseases continues to be one of the major causes of under 5 years' morbidity and mortality worldwide. Several authors cited vaccination against childhood communicable diseases through the Expanded Programme on Immunization (EPI) as one of the most cost-effective public health interventions available and was a key to achieve Millennium Development Goals (Madhi, Bamford & Ngcobo 2014:228).

During the 20th century, various vaccines were developed that protect against once commonly fatal infections such as pertussis, diphtheria, polio, rubella measles, and several other communicable diseases. Based on the emerging success of the smallpox programme, in 1974, the WHO launched the EPI. The initial EPI goals were to make certain that all children received protection against six childhood diseases by the time they turn one year old and to give tetanus toxoid vaccinations to women of childbearing age to protect them and their newborns against tetanus. By 1990, vaccination was protecting over 80% of the world's children from the six main EPI diseases, and other new vaccines are continually being added to the EPI programmes in many countries (WHO, 2018a:Module1). In 1999, Global Alliance for Vaccines and Immunization (GAVI) was formed to spread EPI services and to help the poorest countries introduce new and under-used life-saving vaccines into their national programmes. Although about 24 million infants are still not receiving the full complement of EPI vaccines in the first year of life, the success of the EPI can be arbitrated by the decline in worldwide cases of measles (WHO, 2018a: Module 1).

In 2003, WHO and the United Nations Children's Fund (UNICEF) have set up the Global Immunization Vision and Strategy (GIVS) in response to challenges in global

immunization (Global immunization vision and strategy 2006-2015). The chief goal of GIVS was to reduce illness and death due to vaccine-preventable diseases by at least two-thirds by 2015 or earlier. The Task Force on Immunization in Africa (TFI) recognized from the outset the need for high vaccination coverage to counter the disproportionate burden from vaccine-preventable diseases in the African Region, and therefore set challenging goals for 2001–2005. These goals aimed to ensure that the immunization performance of the African Region caught up with other regions' performance (WHO, 2007:421).

1.1.1 Immunization Coverage

Despite the tremendous progress recorded by immunization programmes, coverage of immunization services has remained suboptimal in the African Region. The past four decades have witnessed advancements in expanding the reach of immunization programmes, and in developing and introducing new vaccines (Mihigo, Anya, Okeibunor, Poy & Nshimirimana 2015:2). In the past immunization programmes focused on the infants using mainly a limited number of traditional vaccines. Today, the world of immunization has expanded and there are development and availability of many new vaccines targeting various age groups and populations and more vaccine preventable diseases (Duclos, Okwo-bele, Gacic-Dobo &Cherian 2009:52).

WHO and UNICEF as a framework from strengthening national immunization programmes towards optimising the benefits of immunization and achieving a vision of expanded access to vaccines and immunization in an equitable manner developed the GVAP 2011-2020 (Global Vaccine Action Plan 2013:31). In Africa, the WHO Regional Committee in its 64th session endorsed the Regional Strategic Plan

for Immunization (RSPI) 2014-2020, with similar goals and targets as the GVAP (WHO, 2014). The targets include 90% national coverage and at least 90% in 80% of the districts for vaccines, especially the dose of Diphtheria-Tetanus-Pertussis (DTP3) containing vaccines (Global Vaccine Action Plan 2013:31). The RSPI has been employed in developing Country Multi-Year Plans (CMYP) for strengthening national immunization systems to achieve high and equitable immunization coverage in Africa (Mihigo, Okeibunor, Anya, Mkanda & Zawaira 2017:Suppl 3).

Other efforts at boosting the benefits of immunization in the African Region include the facilitation of countries to establish functional National Immunization Technical Advisory Groups (NITAG), to guide policy makers in making evidence-based immunization related policy decisions in the context of local epidemiology and cost effectiveness, thus reducing dependency on external bodies for policy guidance. In addition, the WHO African and East Mediterranean Regional Offices, in conjunction with the African Union Commission held a Ministerial Conference on Immunization in Africa aimed at sensitizing the political leaders on the benefits of immunization and their role in achieving the global and regional targets (Mihigo, Okeibunor, Malley, Masresha, Mkanda, & Zawarira 2016:5827). The Region has also intensified collaboration with UNICEF and other partners at promoting community ownership of the immunization programmes to create sustainable demand for immunization services (Mihigo et al 2017:Suppl 3).

The above-mentioned efforts are directed towards achieving high coverage and equity in immunization programmes, considered critical to ensuring immunization for all, in line with the global and regional commitments to protect all against vaccine

preventable diseases. Some progress has been recorded in the African Region, following the efforts mentioned above. Immunization coverage has been on a steady rise. For instance, measles related deaths declined by 86% between 2000 and 2014. Polio is now on the brink of eradication Okeibunor, Ota, Akanmori, Gumede, Shaba, Koudio, Poya, Mihigo, Salla & Moeti 2015:1202). Coverage has stagnated at around 70% for a prolonged period in African region (LaFond , Kanagat, Steinglass, Fields, Sequeria & Mookherji 2015:298). Worse still, there has been significant disparity and inequities in coverage, as coverage is improved in some settings and not in others (Pegurri, Fox-Rushby & Damian 2005:1624; Naimoli, Challa, Schneidman, & Kosterman 2008:379; LaFond et al 2015:298).

1.1.2 Immunization barriers

Most African countries are unable to reach the most vulnerable children population in remote and rural communities (WHO, 2010:490; Cooper, White & Siddiqui 2018:12). A systematic review conducted on barriers for childhood immunization in sub-Saharan Africa has reported three domains of barriers. The first barriers are inherent in the parents/caregivers, those specific to the health system and those related to the providers (Bangura, Xiao, Qui, Ouyang & Chen 2020:10). **Health system barriers** include inadequate infrastructures and cold chain maintenance, and poor coordination. **Providers' constraints** include limited human resources and knowledge (Wiysonge, Uthman, Ndume & Hussey 2013:66; Malande, Munude, Afaayo, Annet, Bodo, Bakainaga, Ayebare, Njunwamukama, Mworozi & Musyoki 2019:14).

Parental barriers are the most commonly and consistently identified barriers than providers' health systems. Several of the cited parental/caregivers' barriers are unmodifiable. Parents/caregivers reported barriers include lack of knowledge, misconceptions, hostile attitude of health providers, distance, financial deprivation, lack of partners' support, and distrust of the medical systems. Knowledge of vaccines is very important for effective vaccine acceptance and utilization by parents. Parents with low education and low socioeconomic status attainment showed more uncertainty towards immunization. Other associated factors include the number of offspring, lifestyle, migration, place of residence, long waiting time, parent's forgetfulness, inconvenient time, being a single mother, occupation, language barrier, seasonal farm work, and feeling ashamed of poverty-associated reasons.

Harmsen, Robert, Ruiter, Theo, Paulussen, Mollema, Kok and De Melker (2012:96) state that different studies have revealed reasons as to why parents are critical and why they sometimes refuse vaccination for their children. These reasons are related to anxiety about side effects, to the perception that vaccine-preventable diseases are not serious and to a lack of trust in herd immunity. However, these factors vary between different groups of parents in different circumstances and in different contexts. Hence, to determine the perceptions of parents on childhood immunization, studies to explore factors that affect the low uptake of vaccination, including measles, should be context specific (Harmsen et al 2012:96).

1.2 MEASLES

1.2.1 What is measles?

Measles is a highly contagious and serious disease that is caused by a paramyxovirus and it is normally spread through direct contact and air transmission. It begins by infecting the respiratory tract then spreads throughout the body. In 1980, before widespread vaccination, measles caused an estimated 2.6 million deaths annually throughout the world. The disease continues to be one of the chief causes of death among young children worldwide, despite the availability of safe and effective vaccine. Nearly 134 200 people died from measles in 2015 globally, most of which were children under the age of five (WHO 2017a:286).

1.2.2 Complications of measles

The WHO (2017a:286) has reported that measles complications are common in children under the age of 5 years, which includes blindness, encephalitis, severe diarrhoea, dehydration and pneumonia. Measles is a leading cause of blindness in African children (CDC 2016:13). Further clinical manifestations of measles include high fever, runny nose, cough, red and watery eyes, small white spots inside the cheeks known as kopliks spots and rash which starts appearing on the face then spreads on the body. Severe measles is more likely among poorly nourished, young children especially those with vitamin A deficiency or whose immune system has been weakened by Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (HIV and AIDS) (WHO 2017a:286).

1.2.3 Epidemiology of measles

According to WHO estimates in 2000, measles accounted for approximately 777 000 deaths worldwide, of which around 60% occurred in sub-Saharan Africa (Arevshatian, Clements, Lwanga, Misore, Ndumbe, Seward & Taylor 2007:449). Recent reports indicated that approximately 1.5 million children below the age of five die each year, globally, because of diseases that could have been prevented by routine immunization. In other words, an estimated 17% of total global mortality in children under five years is preventable (WHO 2013a:378). According to CDC (2016:13), measles in developing countries has led to high attack rates amongst children younger than 12 months of age and a case-fatality rate (CFR) of around 25%. Sub-Saharan Africa (SSA) accounts for 11% of the total population of the world, and is responsible for half of all maternal and child deaths worldwide (Chauke-Moagi and Mumba 2012:3).

The number of cases reported to WHO/UNICEF dropped from 520 000 in 2000 to 316 000 in 2005 (Arevshatian et al 2007:449). These data suggest that considerable progress has been made in reducing regional mortality from this disease, although the regional objectives have not yet been achieved. The joint WHO/UNICEF 2001 measles mortality reduction plan focuses on 45 priority countries that account for almost 95% of global measles deaths. With support from the Measles Partnership, a consortium of nongovernmental and UN-based organisations, African Region countries have made outstanding progress towards the World Health Assembly goal of a 50% reduction in measles mortality worldwide. By 2004, there was an estimated reduction in measles mortality of 60% in the African Region from 1999 baseline levels (WHO 2007:85).

A remarkable progress has been made in child survival worldwide, and millions of children under 5 years of age are more likely to survive today than in 2000 (UN, 2020:3). The under-5 mortality rate has fallen by 49 per cent from 77 deaths per 1,000 live births in 2000 to 39 deaths in 2017. The total number of under-5 deaths dropped from 9.8 million in 2000 to 5.4 million in 2017. Half of those deaths occurred in SSA and another 30% Southern Asia. The disparities among the under-five year's children and neonatal mortality persist across regions and countries. In 2017, 118 countries already had a mortality rate below the target of 25 deaths per 1,000 live births among under-five children. Many of these deaths could be prevented through interventions such as vaccinations, exclusive breastfeeding, proper nutrition, appropriate treatment of common childhood infections, as well as reductions in air pollution and access to safely managed drinking water and sanitation (UN 2020:3).

1.3 PROBLEM STATEMENT

The National Immunization Days (NID) in Namibia discovered constant challenges related to children being immunized under the Reaching Every District Approach (RED) in both urban and very remote settings. This has indicated a need for more efforts in advocacy and social mobilisation in order to reach every child who need to be immunized (WHO 2012:6).Immunization against the major infectious diseases is one of the eight elements of the Primary Health Care (PHC) approach that has been adopted by the Ministry of Health and Social Service (MoHSS) in Namibia. The EPI within the MoHSS was formally established in June 1990. The programme aimed at achieving and maintaining a vaccine coverage above 90% in all the provinces and districts of Namibia for all antigens especially measles by the year 2010 and beyond.

Namibia is one of the seven African countries to execute an accelerated measles control strategy commencing in 1996 this has led to a plunge of measles incidence from 1996 to 2008. In fact, during 1989–2008 period, the first routine dose of measles vaccine coverage rose from 56% to 73%. However, the country has experienced an outbreak in 2009 and 2011 in the northern part of the nation mainly due to importation of immigrants from neighbouring Angola with cases characterised measles virus genotype B2 diagnosed predominantly among Angolans.

From 1980 to 2012, the measles administration rate performance for Namibia was below 80%, and in 2013, the country reached the rate of 82% for the first time (WHO-UNICEF 2013). Vaccine coverage in Namibia has not yet reached the WHO targeted 90% in all provinces and districts as distinguished in Karas region, which consists of three districts, namely Keetmanshoop, Karasburg and Luderitz. 2013 measles coverage statics shows that Luderitz had 62% Keetmanshoop 82% and Karasburg had 85% (MoHSS 2014). The measles coverage in the region in 2014 was 99% in Karasburg, 86% in Keetmanshoop and lower in Luderitz with a 68% (MoHSS 2015). Another source shows that in 2015 the coverage for measles was 92%, 70% and 57% for Keetmanshoop, Karasburg and Luderitz districts respectively (DHIS 2016).

These above-mentioned statistics highlight a need for intensified research investigation regarding the immunization uptake status in Luderitz district. In addition, a number of barriers to measles immunization uptake have been reported in Namibia. Studies in other districts of the country have shown that the barriers of immunization uptake emerged from the interrelationship among these factors: individual, socio-cultural, socio-economic, health system and vaccine factors (Tjiveze

2012:102; Lifalaza 2016:66). Thus, this study aimed to determine factors associated with the uptake of measles immunization among children and further assess the caregivers' perceptions on the uptake in Luderitz district.

1.4 AIM AND OBJECTIVES OF THE STUDY

1.4.1 Research questions

- What are factors associated with the uptake of measles immunization among children in the Luderitz District?
- What is the perception of caregivers on the uptake of measles immunization in Luderitz District?

1.4.2 Aim of the study

- To determine the factors associated with measles immunization uptake among children and further assess the perception of caregivers on immunization in the Luderitz District, Karas Region.

1.4.3 Objectives of the study

- To identify the factors associated with the uptake of measles immunization among children in the Luderitz District.
- To assess caregivers' perceptions on measles immunization in Luderitz District.

1.5 SIGNIFICANCE OF THE STUDY

It is critical to continuously investigate whether the country such as Namibia is achieving the goal of 90% uptake of measles immunization set by WHO, and if not,

what could be the associated factors. The results of this study will quantify the uptake of measles immunization among children and identify associated factors that hinders the achievement of 90% uptake among children. The parental barriers play a role when it comes to immunization. Hence, this study will further report on the perception of caregivers on the uptake of measles immunization among children. It is envisaged that the results of the study will contribute information on the magnitude, associated factors and caregivers' perception on the uptake of measles immunization in Luderitz district. Henceforth, promote interventions that will increase measles uptake in the district, through the mobilisation of resources from line ministries, stakeholders and NGOs.

1.6 SUMMARY OF THE CHAPTER

This chapter introduced the concept of immunization as a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to avert between two to three million deaths each year. Furthermore, immunization as one of the most cost-effective health investments, with proven strategies that make it accessible to even the most hard-to-reach and vulnerable populations has been explained. The chapter has covered the immunization coverage and barriers associated from a global perspective. In particular, immunization related to measles is the focus in this introductory chapter. The chapter explains measles, its complications, immunization, epidemiology, coverage and barriers, mainly in Africa. The gap has been identified as the paucity of data on the associated factors and parents/caregivers perception on the uptake of measles immunization in some districts in Namibia. Considering the fact that the country suffered an outbreak of measles during 2009 to 2012, in

addition to not reaching an immunization coverage of 90% by 2013. Currently, one of the districts of in Namibia; Luderitz, is at 68% measles immunization coverage. Hence, the purpose of the study has been outlined in a form of the aim, research questions and objectives, above.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

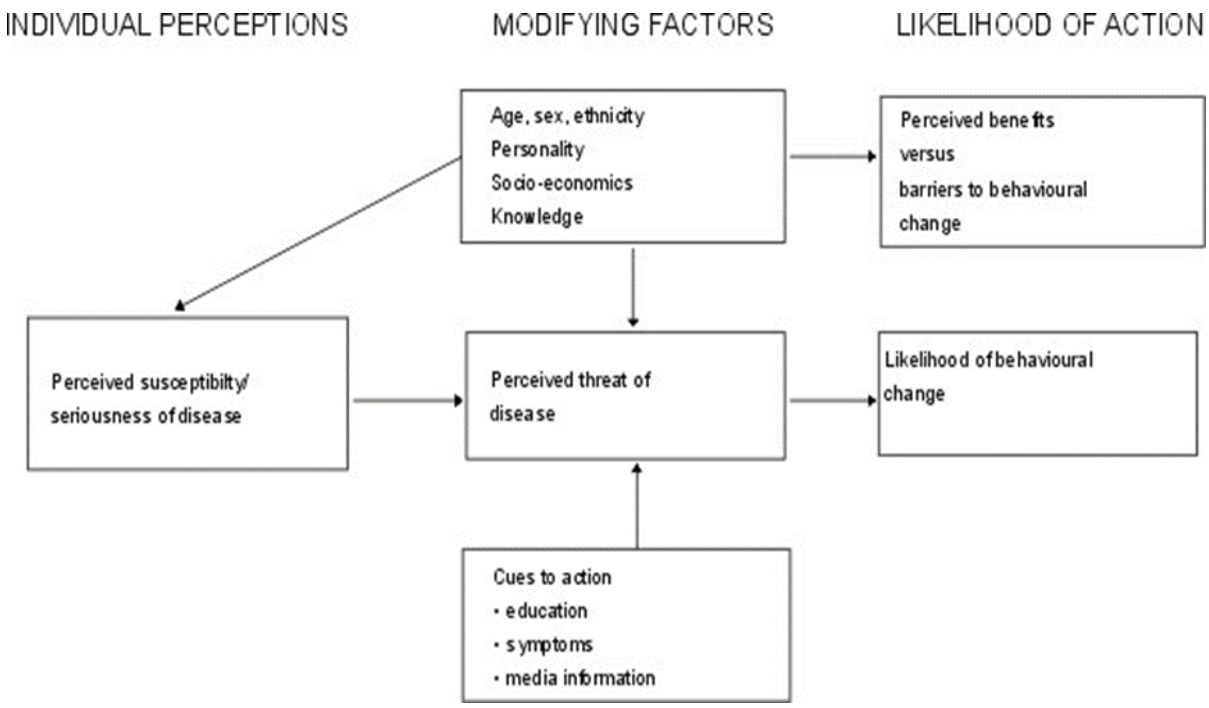
Burns and Grove (2015:192) describe the literature review as a summary of what is known about a particular phenomenon. In this chapter, the researcher discusses the application of the Health Belief Model; as the theoretical framework that was considered during the conceptualization phase of this study. The Health Belief Model is discussed as a theoretical framework for understanding the perception of caregivers on the uptake of measles vaccine among their children and how the first four constructs of the model perceive seriousness, susceptibility, benefits and barriers are applied in understanding health related problems. It also discusses how these constructs will help in understanding the caregivers' position on measles immunization information of children. The chapter further discussed the origin of EPI, global epidemiology of immunization status, immunization status in Africa and Namibia as well as the factors associated with uptake of immunization.

2.2 APPLICATION OF HEALTH BELIEF MODEL

Eisenhart (1991:205) defines a theoretical framework as a structure that guides research by relying on a formal theory constructed by using an established, coherent

explanation of certain phenomena and relationships. The concept of using the Health Belief Model (HBM) to study the uptake of measles immunization has been adopted from the study of Magaji, Dangani, Haruna, Ovosi & Abdullahi (2016:878).

HBM is a psychological health behaviour change model developed to explain and predict health-related behaviours, particularly about the uptake of health services. The health belief model was developed in the 1950s by social psychologists at the United States Public Health service to better understand the widespread failure of screening programs for tuberculosis. According to the HBM, six main constructs influence people's decisions about whether to take action including: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy. The constructs can be used to examine the uptake of immunization information and help immunization information programmers in designing a better immunization information to enhance compliance, which the research found only four of the constructs relevant: Perceived Susceptibility, Severity, Benefits and Barriers (Magaji et al 2016:878).



The Health Belief Model. Adopted from Magaji et al (2016:878).

2.2.1 Perceived susceptibility

This construct is about an individual assessment of his/her chance of getting a disease. It is very important in order to ensure compliance before parents will accept vaccines for their children. Parents must believe that their children are liable of being infected with the vaccine preventable diseases such as measles and its complications. To ensure compliance, an immunization information we can apply this question: What are the perceptions of parents about their children infected with vaccine preventable diseases and their complications?

2.2.2 Perceived severity

The construct is about the judgement as to the seriousness of the disease as perceived by one. Before parents can comply with immunization information, they must have perceived that vaccine preventable diseases can lead to complications blindness, loss of limbs (legs or hands) deaf/dump and mental disorders. It is very dangerous to ignore vaccine preventable diseases because it increases the chance

of life threating to complication in children. Likely asked question using the construct of perceived severity by immunization information's: How do parents perceived the risk and consequences of vaccines preventable diseases?

2.2.3 Perceived benefits

The construct is the conclusion of one as to whether the new behaviour is better than what he/she is doing. That is how is supersede with the barrier to actions when compared to benefits. Parents must belief that compliance to immunization information will reduce the risk like injection abscess and after fever; there will not be any negative side effect or excessive difficulties to their children. All these are necessary in order to ensure full compliance to immunization in formation. The likely question to be asked by the researcher will be: How do parents make sense of information on the benefits of complying with immunization information?

2.2.4 Perceived barrier

Perceived barriers are considered very important in influencing behaviour change. Even though an individual perceives a health condition as threatening and believes that a certain action will effectively reduce the threat, barriers may avert engagement in the health-promoting behaviour. In fact, perceived benefits must outweigh perceived barriers in order for behaviour change to take place. Parents and caregivers faced convenient time challenges and long waiting periods at the health facility as barriers to take their children for immunization.

2.3 GLOBAL IMMUNIZATION STATUS

Prior to the EPI programme, less than five percent of the world's children were immunized against six killer diseases of polio, diphtheria, tuberculosis, pertussis, measles and tetanus (WHO-UNICEF 2013). The global effort to use vaccination as a public health intervention began when the WHO launched the EPI in 1974. Several efforts have been to embark on over the years the EPI coverage such as:

- Universal Childhood Immunization
- Global Alliance for Vaccination and Immunization (GAVI)
- Millennium Development Goals (MDGs)
- Global Immunization Vision and Strategy (GIVS)
- Global Vaccine Action Plan (GVAP).

The initiatives joint with specific regional efforts, such as, the WHO African Region's EPI strategic plans of action for the periods 2001-2005 and 2006-2009, the RED approach and the efforts of national EPIs, led to a surge in the coverage of vaccines such as DPT 3. Whilst on the other hand, low coverage of measles and outbreaks resulted in the initiation of catch-up and follow-up supplementary immunization activities (SIAs) and case-based surveillance (Machingaidze, Wiysonge & Hussey 2013:5). The initiative on SIAs between 1996 and 2000 has saved 24 million children in most countries (Machingaidze et al 2013:5).

A reduced projected global measles mortality rate of 74% from 535 300 deaths in 2000 to 139 000 in 2010 was reported (Simons, Ferrari, Fricks, Wannemuehler, Anand, Burton & Strebel 2012:2178). All the WHO regions except the WHO Southeast Asia region, recorded a decrease in measles mortality of more than three quarters, while India accounted for 47% in 2010 and the WHO African region accounted for 36% (Simons et al 2012:2178). As a result, regardless of the noted hasty progress in measles control from 2000 to 2007, the delayed execution of accelerated disease control and the continued outbreaks in Africa is reported to have decelerated down progress towards the 2010 global measles mortality reduction goal. The Centres for Disease Control and Prevention (CDC 2016:13) report that the measles disease burden demonstrates that 40% of the countries had not reached

the incidence target of less than five cases per million by the end of 2010, making countries with low coverage susceptible to measles outbreaks.

Figure 2.1 shows the global annual reported incidence of measles and immunization coverage between 1980 and 2000 (WHO 2018a: Module 1). There has been a steady increase in routine measles coverage from 71% to 82% globally between 2000 and 2009, and from 56% to 73% in the 47 countries with the greatest burden of measles deaths. Immunization prevents an estimated 2.5 million child deaths a year, but in spite of the successes, millions of children in developing countries almost 20% of all children born every year do not complete immunizations scheduled for their first year of life (Lyimo 2012:10).

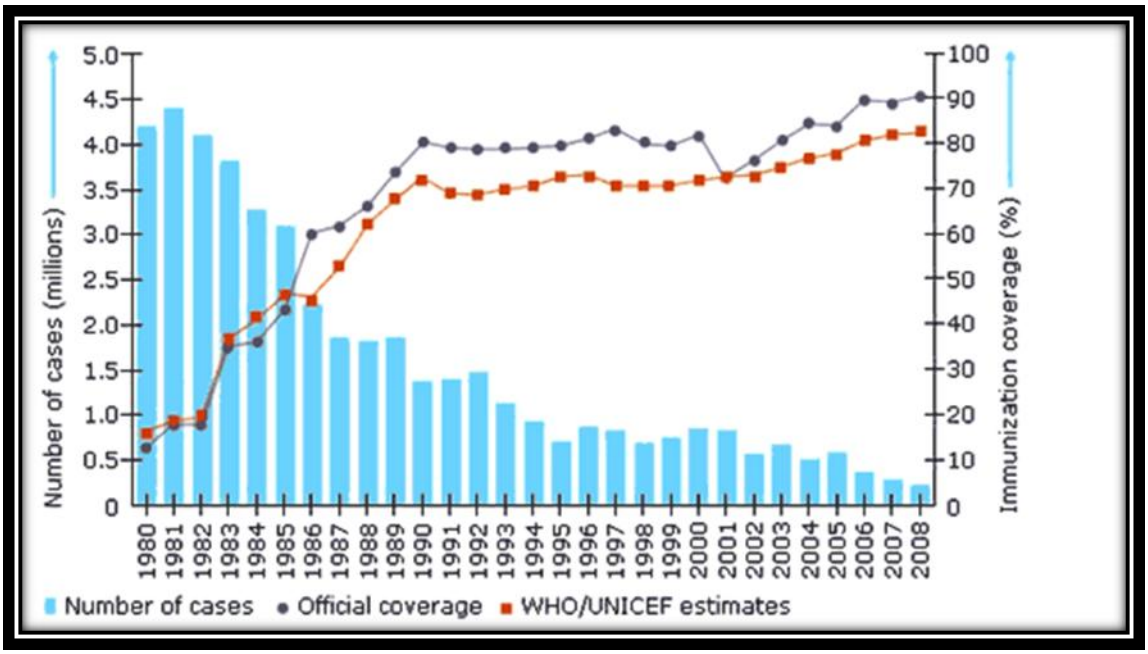


Figure 2.1 Global annual reported incidence of measles and immunization coverage between 1980 and 2008 (WHO, 2018a)

2.4 MEASLES IMMUNIZATION STATUS IN AFRICA

The Global Vaccine Action Plan 2011-2020 highlights that the number of deaths caused by traditional vaccine-preventable diseases have fallen from 0.9 million in 2000 to 0.4 million in 2010 (WHO 2013a:378). The WHO reported that one in every five children is not being reached with vaccination (WHO 2013a:378). Moreover, it is reported that in some nation's measles vaccine coverage in rural areas is lower than in urban areas. Such reports are of great importance when one regard socio-economic status being associated with vulnerability to vaccine-preventable diseases. In addition, the data indicate that communities are still not fully protected from the threat of Vaccine Preventable Diseases (VPDs).

The immunization in Sub-Saharan Africa and Southern Asia have not reached 90% (UNDP 2013:4). It is reported that measles cases, after decreasing from 2000 to 2008 and remaining constant in 2009, took an upward turn in 2010. Hence, the year 2010 is viewed to have been a challenging year for the Measles Initiative. Africa and Southern-Eastern Asia were among the reported regions with large outbreaks (UNDP 2013:4). Lifalaza (2016:12) reported that large measles outbreaks were reported in Angola, Burkina Faso, the Democratic Republic of Congo, Ethiopia, Mali, Namibia and South Africa. According to WHO (2017b:17) in an attempt to improve stagnating immunization coverage and effectiveness in Africa, the RED approach was introduced in 2002 by the WHO, the UNICEF and other partners GAVI (WHO 2017b:17). Figure 2.2 shows the measles coverage for Southern Africa countries between 2012 and 2016 (WHO 2017b:17).

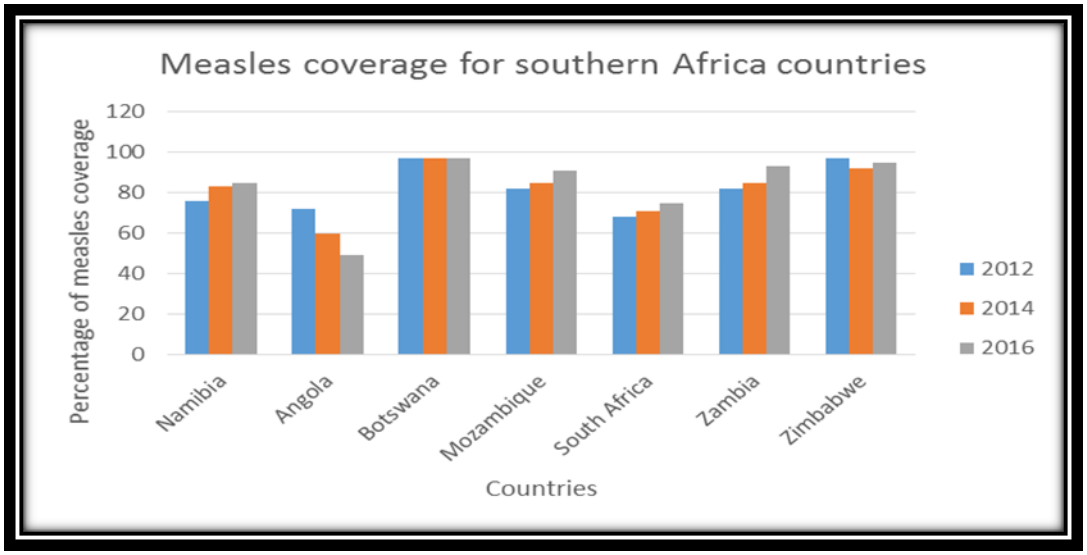


Figure 2.2. Southern Africa countries measles coverage (WHO, 2017b)

2.5 MEASLES IMMUNIZATION STATUS IN NAMIBIA

Measles coverage for Namibia was reported to be 78% according to 2006/2007 vaccination coverage, indicating that not all children are reached (MoHSS 2013). In Namibia, RED strategy was adopted and is still being implemented (MoHSS 2012). This WHO recommended strategy focuses on district health care and has five operational components, namely re-establishing outreach services; supportive supervision; community involvement; proper planning and management of resources; and data management and use of data for monitoring programme performance (Hugo 2014:30). Figure 2.3. Shows the number of measles cases reported and measles coverage from 1990 to 2016 in Namibia.

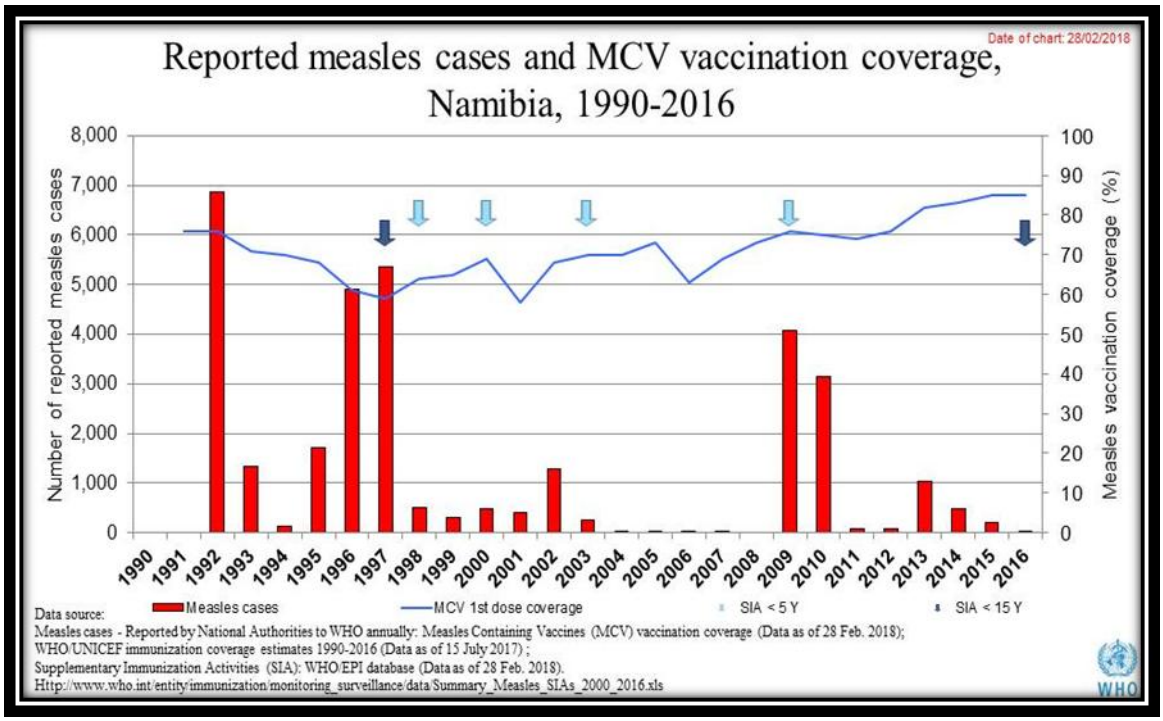


Figure 2.3. Number of measles cases reported and measles coverage from 1990 to 2016

2.5.1 Policy and coverage regarding measles immunization uptake

The National EPI Policy in Namibia related to measles immunization uptake is that each child should receive one dose of measles vaccination at 9 months. This policy recommends that every health facility have to conduct immunization services on a daily basis. In addition, its goals are to ensure full immunization of children less than one year in every district and to reduce measles-related deaths (MoHSS 2013). The immunization coverage in Namibia usually requires vaccine administration data that is provided by health facilities during immunization services on a monthly basis.

It is useful to measure immunization coverage at local levels, as immunization coverage is not homogenous within states and localities. The programme aims to achieve and maintain vaccine coverage above 90% for all antigens with a dropout

rate of less than 5% (MoHSS 2013). In addition, MoHSS adopted the supplementary immunization activities (SIAs) which complement the routine vaccination to address coverage inequities and rapidly close population immunity gaps in targeted age groups (MoHSS 2014:541). However, MoHSS recently introduced the Maternal Child Health Days (MCHDs), instead of SIAs, which are conducted twice a year to trace missed opportunities for vaccination.

2.5.2 Measles immunization status in Karas region, Luderitz

Namibian vaccine coverage has not reached the WHO targeted 90% yet in all provinces and districts as eminent in Karas region which consists of three districts, namely Keetmanshoop, Karasburg and Luderitz. 2013 measles coverage statics shows that Luderitz had 62% Keetmanshoop 82% and Karasburg had 85% (MoHSS 2014). In 2014, the measles coverage in the region was as follows; Karasburg (99%), Keetmanshoop (86%) and Luderitz (68%) (MoHSS 2015). Another source shows that in 2015 the coverage for measles was 92%, 70% and 57% for Keetmanshoop, Karasburg and Luderitz districts respectively (DHIS 2016). These statistics highlight a need for investigative research regarding the repeated low measles uptake in Luderitz district. Hence, this study aims to explore factors associated with low measles uptake in Luderitz district. Figure 2.4. shows the measles coverage per district in the Karas region during 2013 to 2015 (DHIS 2016).

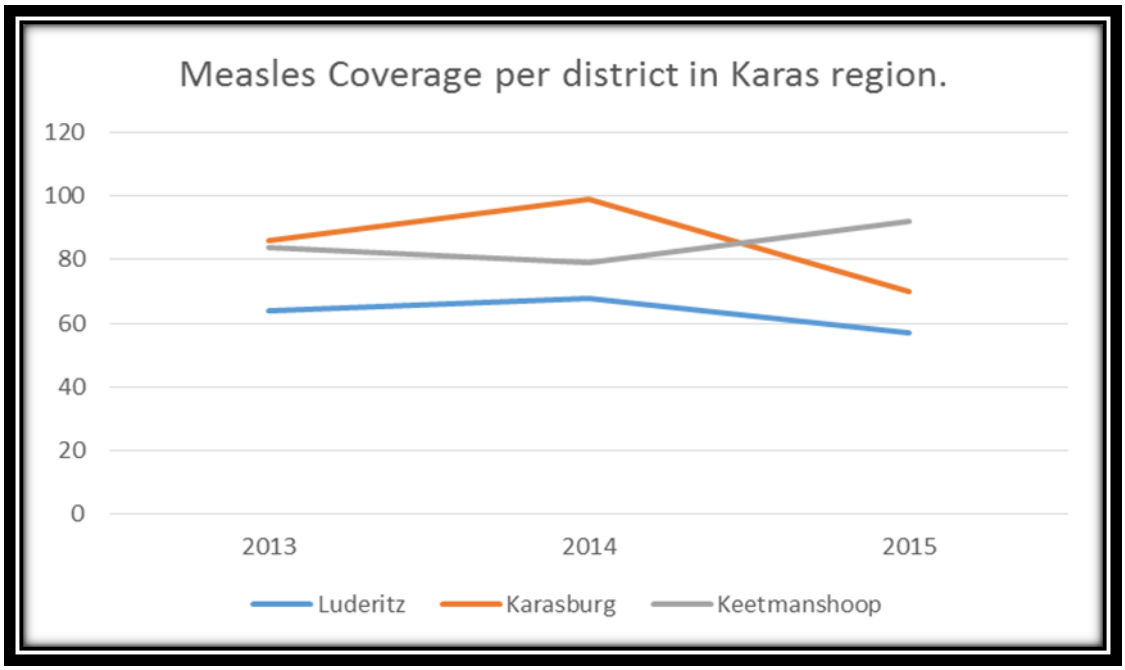


Figure 2.4. Trends of routine measles coverage in Karas Region, 2013 to 2015 (DHIS 2016)

2.6 FACTORS ASSOCIATED WITH MEASLES IMMUNIZATION UPTAKE

These factors are categorised as individual factors, socio-cultural factors, socio-economic factors, health system factors and vaccine related factors (Tjiveze 2012:30; Lifalaza 2016:12).

2.6.1 Individual factors

Numerous factors influence the decision for the parent or caregiver to take the child for follow- up measles immunization. These factors include;

2.6.1.1 Understanding and beliefs on the benefits of measles immunization

The understanding and beliefs of a parent or caregiver may affect their perceptions on measles vaccination benefits. In Namibia, lack of understanding of vaccine may discourage some parents from having their children immunized (Lifalaza 2016:12). In Zambia, 99% of respondents understood why it was necessary for their children to

receive vaccinations. The respondents believed that vaccines had a potential of protecting children from various diseases. Thus, it indicated the willingness of community members to accept and participate in immunization services as long as they were able to access the health centre or health post (Lifalaza 2016:13).

Another study in Nigeria showed a low demand for immunization at the family and community level due to lack of understanding were among the stipulated reasons for the low rates of vaccine coverage. The study further showed that a number of immunization decision makers and caregivers mentioned that only polio immunization was required to render immunization of a child against all other childhood illnesses (Ophori, Tula, Azih, Okojie & Ikpo 2014:67-75). People who were least likely to demonstrate high levels of correct knowledge were those that did not use public health facilities for the treatment of common illnesses, those that could not access public health facilities and the illiterate (Ophori et al 2014:67-75). Further studies based on focus group interviews in two Nigerian states revealed lack of knowledge and negative attitudes about vaccination (Cockcroft, Usman, Nyamucherera, Emori, Duke, Umar & Anderson 2014:46).

A study conducted in Ghana found that despite the high level of awareness of vaccination and the National Immunization Days among parents and caregivers of children aged 1 month to 5 years, parents had poor awareness of the vaccination benefits and knowledge gaps on the benefits of EPI vaccines for diseases prevention (Ansong, Tawfik, Williams, Benson, Nyanor, Boakye, Obirikorang, Sallah, Arthin, Boaheng, Amuzu, Asibey & Dickerson 2014:7-15). While in Sudan, lack of information together with lack of motivation was identified as obstacles that had an

effect on immunization coverage (Ismail, El-Tayeb, Omer, Eltahir, El-Sayed & Deribe 2014:1-8).

2.6.1.2 Education level

Education has been identified as having an influence on caregivers' decision to immunize or not to take their child for immunization. Forty percent (40%) of respondents who had never been to school were not knowledgeable about child immunization in Zambia, suggesting that the more educated the respondents, the more likely they were to be knowledgeable about measles and vice versa (Cheelo 2011:40). These findings were supported by a study conducted in Kenya, which reported that mothers or guardians with at least a secondary education were more likely to have fully immunized children compared to mothers with primary or no schooling (Koskei, Tabu, Malalu, Marete, Too, Peter & Tenge 2014:617). The higher the education levels of parents, the higher the vaccination coverage of their children (Tjiveze 2012:30).

2.6.2 Social-cultural factors

Culture is seen as playing a major role in vaccination demand and the lack of in-depth understanding of the role of cultural practices by health workers results in a communication and knowledge gap regarding the use or non-use of vaccines. In other words, community beliefs may influence the acceptance or rejection of vaccination services. A study conducted on measles resurgence in Southern Africa revealed that nomadic population practices in Namibia were reported to have caused suboptimal vaccination coverage, which is viewed to have contributed to outbreaks among at-risk sub-populations (Shibeshi, Masresha, Smit, Biellik, Nicholson,

Muitherero, Shivute, Walker, Reggis & Goodson 2013:6). Children from ethnic groups with a more traditional way of life in Namibia were less likely to be immunized (Tjiveze 2012:41). The findings revealed that Himba children were not completing their immunization compared to other tribes such as Vambos. The Himba and Herero ethnic group share a common identity related to their love for animals in addition to their nomadic lifestyles; they tend to be mobile in nature and due to the fact that they are always on the move, little importance is attached to immunizing their children (Tjiveze 2012:8).

The context in which vaccinations are given also has an impact on immunization. In Nigeria, a visit to an immunization assembly point is an occasion that is viewed to be a social event and most likely to be associated with group movements, singing, dancing and social networking, as nursing mothers meet the people in their neighbourhoods, friends or those who gave birth at the same time. These immunization centres are viewed to stimulate the interest of nursing mothers to attend it as a social event while at the same time it is viewed as creating a demand for immunization (Jegede and Owumi 2013:215). However, the authors state that despite the strong active and social demand for immunization, concerns are still expressed by some parents. The concerns are reported to focus on two issues, namely, the perceived objective of immunization and the perceived side effects, as it is perceived by some to be a means for fertility control (Jegede and Owumi 2013:215). Despite immunization being permitted in their culture, some people believe that herbs are good substitutes for immunization in Nigeria (Lifalaza 2016:16).

2.6.2.1 Family and social support structures

The responsibility for taking children for immunization is a societal expectation that is left to women. However, their socially subordinate role does not avail them with the means to get the immunization services, since they depend mostly on social networks to access them. In other cultures, women reported that they needed permission from their husbands to take their children for immunization (Jegede and Owumi 2013:215). While others reported that, the social structures were the most influential factors in immunization decision making, including the support from a spouse and community announcements with a public address system (Ansong et al 2014:9). Other researchers reported that mothers of children who were fully immunized were reported to have received financial and moral support from their husbands (Amin, De Oliveira, Da Cunha, Brown, Favin & Cappelier 2013:417).

2.6.2.2 Religious beliefs

Although in other countries such as Saudi Arabia, parents reported that child immunization was not prohibited by their religion (Yousif, Albarraq, Abdallah & Elbur 2013:2015) in countries such as Nigeria the greatest challenge to the acceptance of immunization is a religious one especially among the northern Nigerian Muslims (Ophori et al 2014:73). This impact is evident in the immunization coverage, where Christians are reported to have had 24.2% immunization coverage compared to only 8.8% for Muslims. The apostolic religious communities' reluctance to accept vaccinations for faith-based reasons in Zimbabwe, Malawi, Botswana, Swaziland and South Africa are reported to have resulted in sub-optimal vaccination coverage and to outbreaks in measles resurgence in Southern Africa (Shibeshi et al 2013:6). An additional study in Zimbabwe also revealed that the majority of measles cases

(75%) were from the Apostolic faith that refused immunization and western or traditional medicine based on their religious beliefs, and as a result such communities are reported to have missed immunization during routine and supplementary immunization activities (WHO 2014).

2.6.3 Socio-economic factors

The socio-economic status of caregivers has been revealed to have an influence on the uptake of vaccination. Factors such as employment and poverty are among the determinants of uptake of vaccination. In Uganda, parents with higher incomes were able to cater for the costs involved in repeated visits, while household with low income and where the parents were not married showed less urgency for them to take their children to complete immunization schedules (Lifalaza 2016:18). Hence, measles vaccination was still a challenge. Similarly, in Malawi, caregivers were unable to vaccinate their children despite their willingness to do so due to cost (Minetti, Kagoli, Katsulukuta, Huerga, Featherstone, Chiotcha, Noel, Bopp, Sury, Fricke, Iscla, Hurtado, Ducomble, Nicholas, Kabuluzi, Grais & Luquero 2013:206). While in Namibia, poverty has been reported the leading contributing factor to the inability to pay transport to take children for immunization (Shikongo 2010:24). As a result, adequate financial support has been mentioned as one of the requirements for increasing immunization rates (Tjiveze 2012:25). These findings are supported by a study conducted in Uganda; this study states that most women cited support from partners when they took their children for immunization such as money for transport (Babirye, Rutebemberwa, Kiguli, Wamani, Nuwaha & Engebretsen 2011:10). Lack

of money was identified as one of the reasons for partial immunization in Nigeria (Abdulraheem, Onajole, Jimoh & Oladipo 2011:198).

2.6.3.1 Other factors

Other factors includes forgetfulness, lack of commitment, alcohol use. According to a study in Nigeria cited by Cheelo (2011:35) the commonest reported reason for immunization defaulting by mothers who had sick children was related to 9forgetfulness to take the child for follow-up dose after recovery from an illness. The study findings in rural Nigeria also indicated that forgetfulness was among the reasons for partial immunization; mothers were reported to have forgotten the days when immunization was offered (Abdulraheem et al 2011:194-203). The link between education and mothers forgetting the dates when their children were due for their next immunization was demonstrated in a study in South Western Nigeria (Jegede and Owumi 2013:215).

Researchers have revealed that other reasons for defaulting may be related to conflicting activities where other activities in the household had to be prioritised over childhood vaccination (Cockcroft et al 2014:72). The findings from other studies revealed that the mothers whose children were not vaccinated were likely to be influenced by other factors such as laziness, ignorance, or alcohol use. Ignorance among mothers was reported to be one of the main reasons for dropout or non-immunization of children (Lifalaza 2016:19). Lifalaza (2016:19) also cited a study, which indicated that ignorance of the value of vaccinations was among the reasons identified for why some children failed to complete immunizations.

2.6.4 Health system related factors

Studies have shown that health system factors such as long distances to health facilities, shortage of vaccine, shortage of staff at health facilities, attitudes of health workers and patient health provider relationship are barriers to immunization uptake (Ismail et al 2014:5).

2.6.4.1 Long distances to health facilities

Travelling long distances to health facilities may have impact on vaccine uptake. A study carried out in Malawi revealed that caregivers were willing to vaccinate their children, but due to reasons such as distance, they did not take their children for vaccination (Minetti et al 2013:202). In Sudan, mothers implicated non-immunized and partially immunized children on obstacles such as the place of immunization being too far (Ismail et al 2014:3). Long distances to the health facility were also reported to be a contributing factor for low measles immunization coverage by 80% of respondents in Zambia (Cheelo 2011:30).

In Namibia, 85% of children with caregivers who had to travel for one hour or less were usually vaccinated against measles, compared to 46% of children whose parents had to travel for more than one hour (Tjiveze 2012:41). EPI coverage and associated factors among children of 12-23 months on the predictors of immunization, found that the mothers' perception of accessibility to vaccine site and knowledge about the vaccine schedule were among these factors (Animaw et al 2014:1-10). Furthermore, Animaw et al (2014:6) noted that in their study, more than 76.1% of children whose mothers perceived the vaccine site to be accessible to their residential area were fully immunized, compared to only 41.7% for those who perceived them to be inaccessible.

2.6.4.2 Availability of services and vaccines

Availability of services and vaccines has an effect on immunization coverage. The poor coverage of measles between 1998 and 2005 in Nigeria was blamed on vaccine shortage and administrative problems that were related to political problems (Ophori et al 2014:73). A study done in Zimbabwe identified a contributing factor to measles outbreak related to cold chain issues where vaccines could not be maintained at correct effective temperature levels, and to lack of funds over a five-year period, which hindered the provision of outreach services to reach areas and communities. Additional reasons for incomplete immunization, which were given by mothers in Sudan, including inconvenient times for the immunization and unavailability of vaccines (Ismail et al 2014:1-8). Jegede and Owumi (2013:215) also identified factors such as long waiting times; lack of information about immunization the days and the absence of personnel at the health facility in rural Nigeria.

2.6.4.3 Shortage of staff at health facilities

The absence of health personnel at health facilities was among the cited reasons for the respondents failing to immunize their children at least twice in Kenya (Koskei et al 2014:619). In Namibia, staff shortage such as the availability of one nurse per clinic has been reported to contribute to gaps in service delivery and to a high employee burn out (UNICEF-Namibia, 2013). The findings are consistent with other reports that 80% of the respondents reported that measles coverage among under five years was low due to inadequate staff in Zambia (Cheelo 2011:31).

2.6.5.3 Attitudes of health workers

Effective interaction between health professionals and parents is viewed to be a motivating factor, since it can address concerns for the parents who are willing to

vaccinate their children, while poor communication can contribute to rejection of vaccines (Leas, Kinnersley, Jackson, Cheater, Bedford & Rowles 2012:8-10). Lifalaza (2016:19) reported that mothers are usually reproved by health care workers for having wrong practices, wrong information and asking questions. The attitude was very evident where mothers had missed immunization sessions. Mothers who had missed sessions were judged, and as a result, this discouraged mothers not to get the services after missing one session (Lifalaza 2016:19).

However, in a study by Jegede and Owumi (2013:215), the findings revealed different views from the community members, despite complaints from some mothers who were still discouraged at times by the behaviour of some clinic staff. The blame was shifted from the staff to the government. The cited complaints included clinic staff being rude, not treating them with respect, and not coming promptly to the clinic on many occasions, which in turn contributed to prolonged waiting periods at the clinic and no apologies offered when the clinic staff arrived (Jeged & Owumi 2013:215).

2.6.5.4 Patient-health provider relationship

The relationship between patient and health provider may influence the immunization rates. A study conducted on factors associated with measles immunization coverage in Namibia reported that client friendly services was one of the factors identified as having the potential to increase immunization rates (Tjiveze 2012:38). A lack of a trusting relationship with health professionals has also been reported to have had an adverse effect on immunization decision-making (Lifalaza 2016:21).

2.6.6 Vaccine related factors

2.6.6.1 Knowledge of vaccine effectiveness and schedule

There is a relationship between low uptake of vaccination and caregivers being not knowledgeable about the month of vaccination and about the importance of supplementary vaccination (Lyimo 2012:45). This suggests that being knowledgeable about the vaccine has an effect on the health seeking and exposure to knowledge among caregivers. According to the study conducted South Africa, parents and /or caregivers were positive about immunization and about their experience within the health service environment. However, their knowledge about the purpose of and contra-indications for immunization was insufficient, although most parents reported an experience of side effects after immunization.

According to Abdulraheem et al (2011:200), only 14.1% of mothers knew that the vaccination against childhood killer diseases should be completed at the age of nine months with yellow fever and measles, suggesting that most mothers were not aware of the completeness of the childhood vaccine schedule. As a result, the researchers have pointed that less than half (37.2%) of the mothers completed routine immunization schedules for their children by the age of 9 months.

Meanwhile, in Ghana, knowledge gaps regarding the benefits of the practice and adherence to recommended vaccine schedules were noted through decreased follow up visits for later vaccines, despite universal awareness of immunization conduct among the respondents (Ansong et al 2014:20). The researchers identified that, despite the noted high level of awareness of vaccination and the National

Immunization Days among parents and caregivers in the community, there was inadequate awareness of the 23 benefits of vaccination and of diseases that were prevented by the EPI vaccines. As a result, it was observed that despite the noted positive attitude of respondents, the scheduled vaccines rates were generally very low. In Ethiopia, mothers of children who were not fully immunized did not know the local vaccine schedule compared to those with fully immunized children (Animaw et al 2014:41).

This construct will help shape compliance to immunization information, because the opinion of an individual as to what will stop him/her from adopting the new behaviour, and a belief that benefits of complying with immunization information far weighs the barriers of action. For instance, parent who belief in complications of vaccines injectable like abscess and after fever, then other barriers like distance and cost but realized without having their child immunized, the child will fall sick and suffer complications after, may comply with immunization information. The likely question that the construct of perceived barriers can be asked by the researcher is; do parents overcome challenges experience in their attempt to comply with immunization information?

2.6.6.2 Vaccine side-effects

The children's reaction to vaccinations may discourage some mothers from taking their children for follow-up vaccination. Some contributing factors to low immunization were possible vaccination reaction, which included fever, pain on the injection site and irritability (Lifalaza 2016:21). Furthermore, pain was also identified as a primary factor that influenced the mothers to decide on the number of vaccines that could be received by their children (Hill 2013:32). Many groups blamed side

effects from vaccination, such as fever and local soreness, among the reasons why some parents did not take their children for vaccination, while others are reported to have had fear and misconceptions related to vaccination, such as the belief that vaccinations could lead to infertility or even death of their children (Cockcroft et al 2014:41).

Mothers, whose children defaulted on measles immunization due to illness, are believed to have had misconceptions that minor illness was an absolute contra-indication to vaccination. This is based on the likelihood that they lacked information, education and communication on contra-indications to measles immunization (Cheelo 2011:35). Concern of parents on immunization safety has led some parents to object or disagree with the concept (Abdulraheem et al 2011:199). Misunderstanding of vaccine side effects and the child being sick during vaccination time are some of the factors that might contribute to low uptake of measles-containing vaccine (,Hu, Li, Luo, Lou, Qi, & Xie 2013:39).

2.7 SUMMARY

This chapter has demonstrated the application of the theoretical model (HBM) chosen to study the perception of caregivers on the uptake of immunization, in addition to the associated factors. The chapter has expanded on the global epidemiology immunization status, and the immunization status in Africa and Namibia. More importantly, this chapter discussed in details several factors associated with the uptake of immunization as documented in the literature. Three categories of such factors, namely individual factors, health system related factors and vaccine related factors that may promote or inhibit the uptake of measles

immunization have been outlined with supporting findings in several African countries.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The research methodology provides an entire strategy and defines structures within which the study is implemented (Burns and Grove 2015:547). The methodology of this study was informed by the constructs in the HBM to achieve the objectives of the study. This chapter describes the strategies and the structures in which research was implemented to answer the research questions that were presented in this study. A detailed description of study designs employed and the rationale for selecting the design, study settings and populations are presented. In addition, the method and procedures followed for sampling and selection of the study sample are well explained. The data collection tools, methods, and procedures including the recruitment procedures followed are described. The procedures and processes for data analysis as well as strategies to attain validity, reliability, and bias are explained. Finally, the ethical considerations observed in the study are outlined.

3.2 RESEARCH DESIGN AND METHOD OF APPROACH

3.2.1. Study design

The research design is the blueprint for conducting a study that maximizes control over factors that could interfere with the validity of the findings or the entire strategy followed from identification of the problem to final plans for data collection (Burns & Grove 2015:539). A cross section design was used to determine the associated

factors and the perception of caregivers on the uptake of measles immunization among children.

3.2.2. Method of approach

The method of approach was quantitative defined as a formal, objective, systematic process in which numerical data are used to obtain information, and used to describe variables, examine relationships among variables and to determine cause-and-effect interactions between variables (Burns & Grove 2015:539). In this study, a structured questionnaire was administered to the caregivers to obtain information on the uptake of measles immunization among children.

3.3 STUDY POPULATION

This subsection describes the population used in this study and the study setting.

3.3.1 Population

Brink, Van der Walt & Van Rensburg (2016:132) defines a population as the entire group of persons or objects that is of interest to the researcher meeting the criteria needed to achieve the objectives of the study. The population of interest was parents/caregivers whose children aged between 9 and 59 months, and either immunized or not immunized against measles during the period of July and August 2019. These caregivers were attending Luderitz health care facility for various reasons.

3.3.2 Study setting

Luderitz district is located on the south-west coast of Namibia, in the Karas region. The district clinic where the study was conducted is called Luderitz clinic; where majority of residents' access immunization services. Luderitz clinic is situated in Luderitz hospital in-between residential suburbs of Nautilus and New Development suburbs. Luderitz Hospital is within a 15-minute walk from the Luderitz town. The setting has a population approximated at 27041 and the headcount for Luderitz clinic is (MoHSS 2019). The district is mainly made up of urban area were people are working in factories and mines with a few population staying in the surrounding farms. The hospitals and clinics are within walkable distance for the majority of the population. The distance is however far for those staying in the farms but these people are catered for through outreach activities, which are conducted at a monthly basis in the district under the Namibia Ministry of Health Social Services. The study respondents were caregivers/parents of children who met the eligibility criteria. Figure 3.1. Shows the Karas region in Namibia and the location of the Luderitz district.

Figure 3.1 Karas region map, Namibia **(MoHSS 2016)**

3.4 SAMPLING

Polit and Beck (2012:742) define sampling as the process of selecting a portion of the population to represent the whole population. In this study, probability sampling was used for the reason that the sample selected was much more likely to represent the population and reflect the variations in the population. In probability sampling, every individual from the population has an equal probability of being selected, thus ensuring that the sample would be representative of the population (Brink et al 2016:136).

3.3.1 Sampling approach and recruitment

A systematic random sampling was used to select the participants who visited Luderitz clinic at the time of the study (i.e. July to August 2019). Systematic sampling is a type of probability sampling method in which sample members from a larger population are selected according to a random starting point but with a fixed, periodic interval. This interval, called the sampling interval, is calculated by dividing the population size by the desired sample size (Hayes 2020:19). The sampling interval K of 9 was calculated using the following formula: K equals N (N=1374) divided by n (n=150) (Brinks et al 2016:136). Using the Luderitz clinic reception register, every 9th child on the list was selected for the study. Caregivers of children were then approached and contacted individually at time they came to the clinic for consultation.

3.3.2 Sample size

A sample is a subset of a population consisting of those selected to partake in a study (Polit & Beck 2012:742). In this study, the sample was drawn from the population of caregivers of children aged between 9 and 59 months attending health services in Luderitz clinic at the time of the study. A sample size of 150 was obtained for this study. The inclusion criteria for the study was set. Burns and Grove (2015:539) define criteria for inclusion into a study as a list of characteristics essential for eligibility in the target population. The study-included parents/caregivers of children aged 9 to 59 months who were immunized or not, and visited the Luderitz clinic in July 2019 to August 2019. Only parents/caregiver who gave a written consent were allowed to participate in the study.

3.4 DATA COLLECTION

According to Burns and Grove (2015:535), data collection is the process of choosing research subjects and collecting data from them. It involves the steps, procedures and strategies for gathering as well as analysing data in a research investigation.

3.4.1 Data collection tool

An interviewer-administered questionnaire was used to collect data on factors associated with the uptake of measles immunization. The questionnaire was developed from literature using various studies (Tjiveze 2012:99-102; Lifalaza 2016:53-64). The study further considered the various components of the HBM, which are the individual's perception perceived susceptibility, benefits and barriers, and the modifying factors (sociodemographic, perceived severity) and cues to action was collected (Magaji et al 2016:878).

The principal researcher identified the two research assistants, who were final year nursing students to assist with data collection. The research assistants were trained and were conversant with the three languages used by the participants, which are English, Oshiwambo and Afrikaans. Training was emphasized on the ethical principles and quality of collecting data. The research assistants undertook a confidentiality binding. Data was collected on the demographic and socioeconomic status of the caregivers, characteristics of the children, the health services factors and the perceptions of caregivers regarding immunization. Data collection took place between the July and August 2019. Using the Luderitz clinic reception register, every 9th child on the list was selected for the study. Caregivers of children were then approached and contacted individually at time they came to the clinic for consultation. Data collection was done after caregivers were done with their initial consultation that brought them to the clinic. This was done in a private room at the clinic which was meant for data collection to avoid interruption of the normal flow of activities at the heath facility.

3.4.2 Pilot study

A pilot study is a small version or trial done in preparation for a major study. It serves the purpose of identifying any problems with the design, sequence of questions, and procedure for recording responses (Polit & Beck 2012:737). A questionnaire was pretested among 10 caregivers in another clinic and those participants were not included in the main study. The pilot study enlightened the researcher as to the duration of each interview and the appropriateness of the setting as well to establish adequacy of study methods and procedures, as explained by De Vos, Strydom,

Fouché and Delport (2014:237). In summary, the outcome of this pilot study informed subsequent efforts to improve and refine the practical aspects of the main study, although at a minimal level.

3.5 RESEARCH RIGOR

Brink et al (2016:97) mentioned that rigour is a principle of truth-value of the research outcome and strives for excellence. It involves two aspects, which are precision and accuracy. Accuracy is comparable to validity in that it addresses the extent to which the instrument measures what it is intended to in a study while precision is the degree of reproducibility of measurements made with physiological instrument. Precision is comparable to reliability (Burns & Grove 2015:334).

3.5.1 Reliability

Reliability is the consistency with which a measuring instrument yields a certain result when the entity being measured has not changed (Saunders, Lewis & Thornhill 2009:165). This study adhered to the standard procedures of data collection to ensure that the tool produces stable and consistent results (i.e. reliability).

Three aspects of reliability applied in this study were stability, equivalence and homogeneity (Burns & Grove 2015:333). Stability is concerned with consistency of repeated measures of the same attribute with the use of the same scale or instrument and referred to as “test-retest reliability’. Equivalence involves the comparison of two versions of the same instrument or two observers measuring the same event. Lastly, homogeneity is a type of reliability testing used primarily instrument or scales to address the correlation of each question to the other

questions within the instrument (Burns & Grove 2015:333). In this study, the researcher established specific measures to ensure reliability of the data collection instrument. The interviewer-administered questionnaires were tested and retested before the main study was conducted. The researcher translated the developed questionnaire from English into two local language. The researcher interviewed five caregivers, and a second person interviewed the same five caregivers. The results were then compared to find out if the interviewer-administered questionnaire met the test-retest reliability.

3.5.2 Validity

Validity is the extent to which the instrument measures what it is supposed to measure (Saunders et al 2009:167). This study adhered to the standard procedures of data collection to that the tool measured what it is supposed to measure (i.e. validity).

Face validity refers to whether the instrument appears to be measuring the target construct (Polit & Beck 2012:336). The researcher established face validity by submitting the questionnaire to the Primary Health Care Supervisor (PHCS) and/or the Senior Medical Officer. They were asked to evaluate the questions and the thesis outline in relation to the objectives of the study. They gave their inputs and helped to make the questionnaire clear and respondent friendly yet measuring what they were intended to measure. Content validity examines the extent to which measurement includes all the major elements relevant to the construct being measured (Burns & Grove 2015:335). The construct in this study were adopted from the HBM in addition to other elements such as caregiver/parent socio-economic factors. In this study, the

researcher measured content validity by submitting the instrument to experts in the field to evaluate it before the main study. The supervisor also assisted in checking the data collection instrument in this regard.

3.5.3 Bias

Bias is defined as any tendency, which prevents unprejudiced considerations of sampling or data collection (Burns & Grove 2015:339). Selection bias was minimized by using a systematic random sampling. Information bias was minimized by using the same questionnaire to all participants. Potential recall bias, which refers to the phenomenon in which the outcomes may be confused by the participants' inability to recollect events accurately, was reported in the limitations of the study since the parents/caregivers might not recall all the factors were measured. The questionnaire was researcher-administered to minimize bias because there is potential for participants to give socially desirable responses.

3.6 DATA ANALYSIS

Data analysis is a consolidation of information with systematically applying statistical and logical techniques to describe, illustrate and evaluate data to present a clear picture, but without disclosing the implications (Rebar, Gersch, MacNee & McCabe 2011:154). After data collection, all data were captured in the Microsoft Excel spreadsheet 2013. The researcher cleaned, validated and coded the collected data. Data was imported into small STATA version 14 for statistical analysis. From the descriptive analysis, frequencies and percentages were computed. Inferential statistics included comparison by Chi-square and generation of the associations using logistic regression analyses. Bivariate and multivariate logistic regression

analyses were used to determine the associated factors with the uptake of immunization. Independent variables that had a p-value of 0.2 were used in the multivariate logistic regression with a stepwise backward elimination procedure controlling for confounders. Adjusted odds ratios (AOR) with a 95% confidence interval (CI) were generated and used to determine the independent strength of the relationship. Significance was considered at $p<0.05$.

3.7 ETHICAL CONSIDERATIONS

Firstly, the researcher obtained the study ethical approval letter to conduct the research from the UNISA, Health Sciences Research Ethics Committee (Annexure A). Upon receipt of the ethical approval certificate, the facility permission letter was sought from the Biomedical Research Ethics committee and Research Management Committee of Namibia (Annexures B). Permission to conduct study was granted by the Biomedical Research Ethics committee and Research Management Committee of Namibia (Annexures D). Thereafter, application was submitted to the Senior Medical Officer of the Luderitz Hospital and the Primary Health Care Supervisor of Luderitz district requesting permission to conduct the study at the selected clinic (Annexure C). The study site authorities gave a written approval to for data collection of the study (Annexure J).

- ***Informed consent***

The researcher designed a comprehensive information sheet concerning the study in English and native languages to accommodate respondents who cannot understand English. The risks, benefits, and the rights of the subjects, were explained to all potential study respondents in either English or native language. No one was

coerced in any form to participate in the study. The children's caregivers voluntarily participated in the study. Verbal consent was sought from parents/caregivers of children after which they signed either a consent form or verbally agreeing to participate in the study. The researcher counter signed the consent form, confirming that the content of the study has been explained to the participant.

- ***Confidentiality, anonymity and privacy***

The researcher maintained confidentiality and anonymity by making sure that respondents' identity gets protected at any stage of the research, by not linking the study unique codes to the study respondents names and surnames. The researcher only knew the unique code. To maintain privacy, patients were only approached to participate in this research in the separate room where there was privacy and individualised care. Patients who agreed to participate in the research were interviewed in private at a place most convenient to the respondents. Information collected during data collection was kept in strict confidentiality. Both paper based and electronic based data did not have any markers, which could identify the respondents. Data collectors signed confidentiality forms, which bound them to maintain strict confidentiality concerning all information gathered during this study.

The study adhered to the following ethical principles:

- ***Justice*** (there was a fair selection of participants for the study by ideal distribution of benefits and risks).

The purpose, benefits and risks of the research were discussed with the study respondents and the respondents had an option to withdraw from the research if

they chose to do so. There were no negative consequences regarding access to health services, even if the caregiver declines the consent to be part of this study. It meant that respondents were selected fairly with due consideration of the problem under study. Subjects in this study were selected randomly not based on sex, social status, health status and any other preference by the researcher.

- ***Beneficence and non-maleficence*** (the study ensured that no harm was done to participants)

Beneficence imposes a duty on researchers to minimise harm and maximise benefits. In this case, the questions were structured to collect precise data yet not causing emotional harm or distress to the respondents. Respondents did not incur costs because of their participation in this study. Respondents were free not to answer questions they felt uncomfortable to do so. There was no covert data collection, meaning no data was collected without respondents' knowledge and consent. The researcher and data collectors pledged that they would not be deception prior to commencement of the study. All necessary information relating to the study was provided to the respondents. This was ensured this by having the same the principal researcher or research assistant involved in data collection from the beginning to the end of the data collection period.

- ***Principle of respect to persons*** *(whereby participant's rights were respected and they willingly made a decision to participate in the study, had a chance to withdraw from the study at any time if they felt uncomfortable and they were not going to be harmed or treated unfairly).*

Participation in this research was purely voluntary and individuals were not penalised or prejudiced for their decisions. Respondents who opted to participate in this research had a right to withdraw at any time in the study. The respondents had freedom from coercion of any nature. No incentives were given in this study to prevent financial coercion.

3.8 SUMMARY

In this chapter, the researcher explained the importance of using a cross-sectional study design using a quantitative approach to determine the factors associated with the uptake of measles immunization among children. The setting of the study and the population were described in detail. The sample size, the sampling procedure, the recruitment, data collection tool and procedures were also discussed. The methods of data analysis using the STATA version 14 as well as approaches to attain validity, reliability, and bias, were discussed in detail. It is essential to adhere to ethical principles in any research and this study indeed adhered to such principles throughout its performance. This study was conducted according to the guidelines laid down in the Declaration of Helsinki taking into consideration the four ethical principles; autonomy, justice, beneficence and non-maleficence.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

A cross sectional study design with a quantitative method was used to determine the factors associated with the uptake of measles immunization among children and further assess the perception of caregivers on immunization. The study was conducted among parents/caregivers and their children who visited the Luderitz clinic, in the Karas region of Namibia, at the time of the study. Data on parents/caregivers' perception (perceived susceptibility, benefits and barriers), the modifying factors (sociodemographic, perceived severity) and cues to action were collected. Data analysis was done using STATA 14 for the descriptive (i.e. means, frequency and percentages) and inferential statistics (i.e. chi-square test and logistic regression analysis).

The objectives of the study were:

- To identify factors associated with the uptake of measles immunization among children.
- To assess the perception of parents/caregivers on measles immunization among children.

Results are presented as follows:

- **Section A:** Characteristics of caregivers and children
- **Section B:** Health services related factors
- **Section C:** Perception of caregivers on measles immunization

- **Section D:** The association of immunization with independent factors

SECTION A

4.2. CHARACTERISTICS OF CHILDREN AND MOTHERS

This section presents the demographic data of parents/caregivers and their children. 150 parents/caregivers whose children visited Luderitz clinic during July 2019 to August 2019 participated in the study. The results are presented in **Figures 4.1 to 4.4.**

4.2.1. Characteristics of children

4.2.1.1. Immunization status

Figure 4.1. Shows the distribution of children by immunization status. Out of 150 children, the results shows that 92(61%) of children in this study were immunized while 58 (39%) were not.

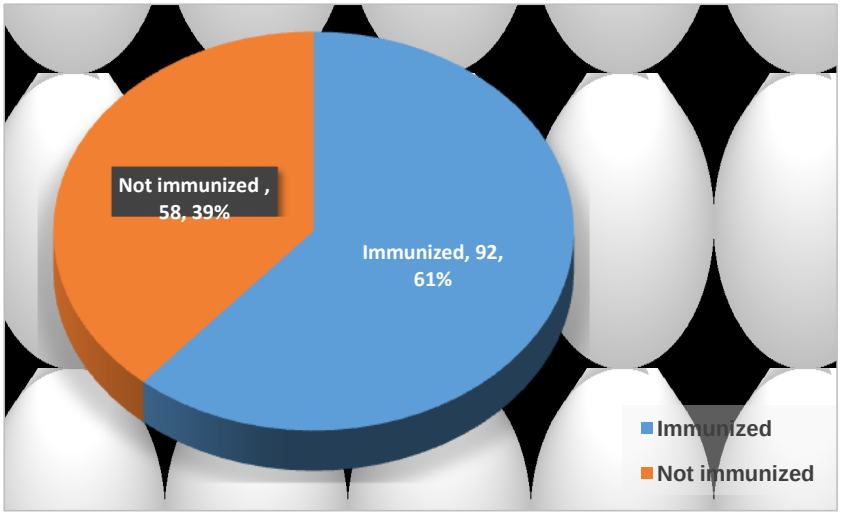


Figure 4.1. Distribution of children by immunization status

4.2.1.2. Gender distribution

Figure 4.2. Shows the distribution of children by gender. Over half of the participants in this study were girls n=92(61%)] while boys were n= 58 (39%).

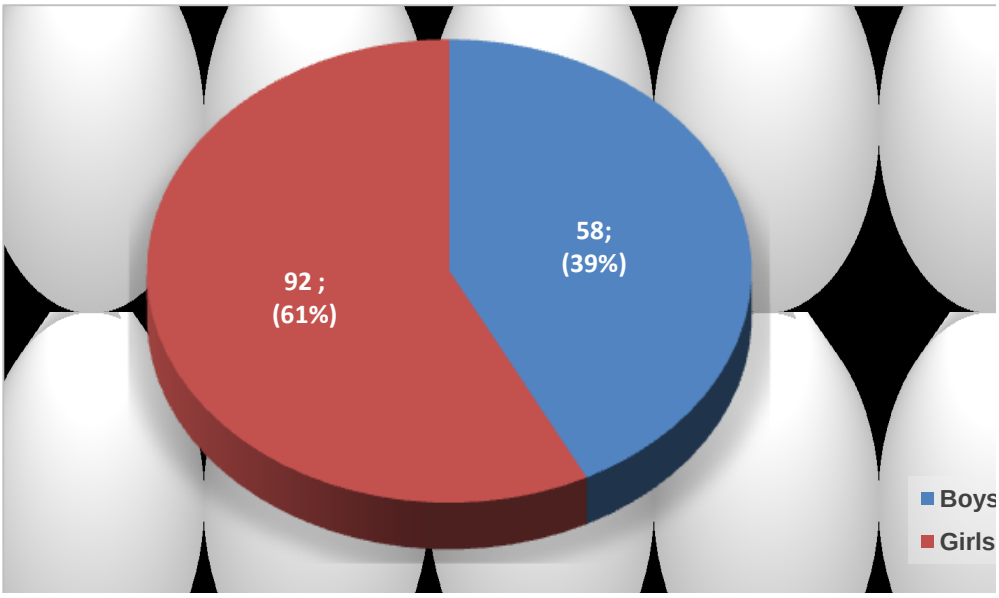


Figure 4.2. Distribution of children by gender

4.2.1.3. Age group distribution

Figure 4.3. Shows the distribution of children by age groups. Most children [n=119(79%)] were aged up to 24months while only 31 (21%) were aged >24 months.

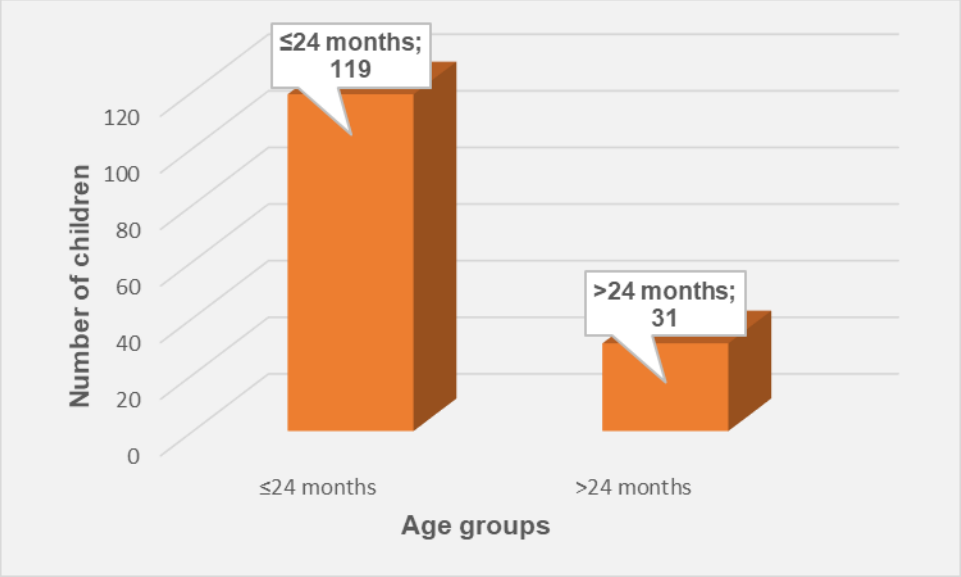


Figure 4.3. Distribution of children by age groups

4.2.1.4. Birth order distribution

Figure 4.4. Shows the distribution of children by birth order. Most of the children were fourth born ([n=43 (29%)] and fifth born [n=58 (39%) than the first born [n=23 (15%)], second born [n=10 (6%)] and third born [n=16 (11%)].

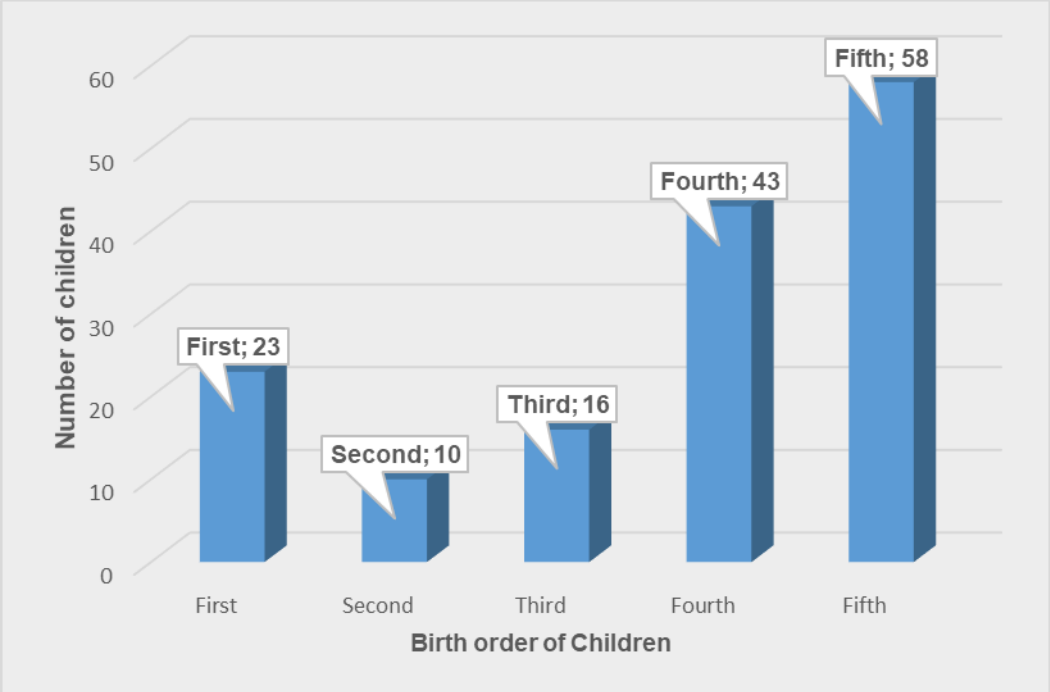


Figure 4.4. The birth order of children

4.2.2. Characteristics of parents/caregivers

The demographics of parents/caregivers (n=150) are presented in **Table 4.1**.

The results on the **relationship of parents/caregivers** shows that majority of the participants were parents [n=105 (70%)] while 45 (30%) were caregivers which included grandmothers, aunts and baby sitters. **Age** is a determinant in most of the areas of research. In this study, it may affect the immunization status of children. Hence, it was collected as one of the demographic variables of the parents/caregivers. The mean age was 36±11years ranging from 18 to 65 years. Parents/caregivers were divided into three age groups; <30years (younger), 30 to 40 years (middle-aged) and ≥40years (older). The younger parents/caregivers were 29(19%), and the middle aged were 76 (51%) while the older were 45 (30%).

Gender distribution of parents/caregivers showed that most of the participants were females [n=142 (95%)] while males were 8(5%) who reported to be fathers of the participants children (**Table 4.1).**

The **marital status** distribution showed that most participants were single [n= 81 (54%)], followed by cohabiting [n=31 (20%)] and lesser of the ever married [n=16 (11%)] and the widowed [n=22(15%)]. **Education level** was distributed into primary, secondary and tertiary education. The results showed that very few participants attained a tertiary education [n=15(10%)] while 82(55%) had primary education and 53(35%) had secondary education. **Employment status** showed that 128 (85%) were employed while others not formally employed (including the part-time, self-employed); as a result were categorized as employed while 22 (15%) were employed. Most participants reported to have a **mode of transport** [n=105 (70%)], Christianity as the common **religion** [n=128 (85 %)] and **drinking alcohol** [n=120 (80%)] versus their counterparts [n=45 (30%)], [n=22 (15%)] and [n=30 (20%)], respectively (Table 4.1).

Table 4.1. Demographic factors of parents/caregivers (n=150)

Variables	Categories	Frequency	Percentages
Relationship to a child	Parents	105	70
	Caregivers	45	30
Gender	Male	8	5
	Female	142	95
Parent/caregiver age	Mean (years)	36±11	
	<30	29	19
	30 - 39	76	51
	≥40	45	30
Marital status	Single	81	54
	Ever married	16	11
	Widowed	22	15
	Cohabiting	31	20
Education level	Primary	82	55
	Secondary	53	35
	Tertiary	15	10
Employment status	Employed full-time	22	15
	Employed part-time	91	60
	Self-employed	15	10
	Unemployed	22	15
Usual mode of transport	Mobile	105	70
	Non-mobile	45	30
Alcohol intake	Yes	120	80
	No	30	20
Religion	Christian	128	85
	Non-Christian	22	15

SECTION B

4.3. HEALTH SERVICES RELATED FACTORS

The results of health services related factors are presented in **Table 4.2**.

4.3.1. Frequency of immunization services

When the participants were asked how often are immunization services provided at their nearest health facility, most of them mentioned that the services are offered mostly in the afternoon [n=90(60%)], followed by the whole day [n=45(30%)] and then in the morning only [n=15(10%)]. (Table 4.2)

4.3.2. Time spent travelling to the facility

The participants were asked about the time they spent travelling to the nearest health facility or outreach point. Most of them said it takes lesser to 30 minutes [n=62 (41%)], while others said it takes then one hour [n=49 (33%)], and [n=25(17%) said more than one hour. Few participants [n=14 (9%)] could not estimate time taken to travel to the facility. (Table 4.2)

4.3.3. Main source of immunization information

The participants were asked about their main source of information on immunization. It is clear from the study that health workers have a great influence on immunization information reaching the community with half of the participants mentioning the nurse [n=75 (50%)]. Although, other participants mentioned parents [n=45 (30%)], media [n=22 (15%)] and church [n=8 (5%)] as their source of information on immunization. (Table 4.2)

4.3.4. Information given at the facility

When participants were asked about the information normally given before a child is immunized, most of them [n=127 (85%)] indicated that they were given information on the antigen that is given to a child, the side effects that a child might experience and the follow up schedule. Few [n=23 (15%)] of the participants could not remember information shared. (Table 4.2)

4.3.5. Waiting period at the clinic

"*How much time do you usually spend in the health facility waiting for the child to be immunized"?* This is the question that most participants ([n=114 (76%)] answered that they spend one to six hours while 19(13%) indicated that they wait for the whole day. Few indicated waiting for less than one hour [n=9 (6%)] and [n=8 (5%)] did not know. (Table 4.2)

4.3.6. Unavailability of vaccines at the clinic

"Is there a time your child was not vaccinated due to unavailability of vaccines"? On answering this question, 86 %(n=129) of the participants were not affected by vaccine while 14% (n=21) reported that they have been affected. (Table 4.2)

4.3.7. Satisfaction with health care workers in the district

About 60% (n=90) of the participants indicated that they were satisfied with the health care workers in the district, while for 10% (n=15) it was undetermined and 30% (n=45) reported that they were not satisfied. (Table 4.2)

Table 4.2. Health services related factors

Variables	Categories	n	%
Frequency of immunization services provided at nearest health facility	Daily, the whole day Daily, morning only Daily, afternoon only	45 15 90	30 10 60
Time spent travelling to the nearest health facility or outreach point	Less than 30 minutes One hour More than one hour I don't know	62 49 25 14	41 33 17 9
Main source of information about immunization	Nurses/health worker Parents Church Media	75 45 8 22	50 30 5 15
Information normally given before child immunization	Antigen given, site effects and follow up I don't remember	127 23	85 15
Time spent in a health facility for immunization	Less than one hour One to six hours The whole day I don't know	9 114 19 8	6 76 13 5
Not immunized as a result of unavailability of vaccines	Yes No	21 129	14 86
Satisfied with health care workers	Satisfied Undetermined Not satisfied	90 15 45	60 10 30

SECTION C

4.4. PERCEPTION OF PARENTS/CAREGIVERS ON MEASLES IMMUNIZATION

This section addresses objective two on assessing the perception of parents/caregivers regarding immunization.

4.4.1. Immunization awareness and beliefs

All participants [n=150 (100%)] were aware that a child must be immunized. About 61% (n=91) of parents/caregivers believed that immunization is for a heathy child, while very few participants believed that is for a sick child [n=8 (5%)] and others believed that it was for both healthy and sick children [n=51 (34%)]. Almost all parents/caregivers [n=143 (95%)] believe that immunization is for both boys and girls. The positive thing that [n=143 (95%)] of the parents/caregivers believed about immunization was the fact that it protects the child against diseases and keeps the child healthy. Only 5% [n=7] did not know any benefit.

4.4.2. Immunization substitute and complications

Approximately 75% (n=113) of participants believed that there is no substitute for immunization. However, 10% (n=14) of the participants believed that there is a substitute for immunization while 15% (n=23) did know whether there is or not. Parents/caregivers were aware of the complications of measles immunization which included blindness [n=67 (45%)], body rash [n=23 (15%)], physical handicap [n=14 (9%)] and death [n=8 (6%)]. Surprisingly, 25% (n=38) did not know the complications of measles immunization.

4.4.3. Reasons for immunization defaulting and suggestions for coverage

Nonetheless, parents/caregivers reported that the common reasons for not bringing the child for immunization include inconvenient vaccination time (44%), forgetfulness (25%) and child being sick (11%). Suggestions by parents/caregivers to improve immunization coverage included mostly sending the reminders (30%), providing immunization the whole day (40%) and increasing number of health care workers (15%).

Table 4.3. Perceptions of caregivers regarding the importance of immunization

Variables	Categories	n	%
Awareness that a child should be immunized	Yes No	150 0	100 0
Believe that immunization is for a healthy child or a sick child	Healthy child Sick child Both	91 8 51	61 5 34
Believe that immunization is for a boy or a girl child	Both I don't know	143 7	95 5
Positive things you believe about immunization	Protects the child against diseases and keeps the child healthy I don't know them	143 7	95 5
Believe that there are local substitutes for immunization	Yes No I don't know	14 113 23	10 75 15
Complications of measles you are aware of	Blindness Body rash Physical handicap Death I don't know	67 23 14 8 38	45 15 9 6 25
Reasons for not bringing the child for immunization	Forgot Inconvenient vaccination time Vaccine out of stock Child was sick Child became sick after previous vaccination Vaccine is painful for the child Child had travelled for holiday	37 67 7 16 7 8 8	25 44 5 11 5 5 5
Suggestions to improve immunization coverage	Send reminders Provide immunization the whole day Increase number of health care workers Give more health education Built another clinic in Area 7	45 60 23 8 14	30 40 15 5 10

SECTION D

4.5. THE ASSOCIATION OF IMMUNIZATION WITH INDEPENDENT FACTORS

4.5.1. Associations using a chi-square test

The demographic factors of parents/caregivers and child's factors were associated with immunization status in Table 4.4 using a chi-square test. Immunization status was also associated with health service factors (Table 4.5) and with perceptions of parents/caregivers (Table 4.6)

4.5.1.1 Association of immunization status with demographics of caregivers

Results showed that immunization status was significantly associated with parents/caregivers age ($p \leq 0.0001$), gender ($p=0.021$), relationship to a child ($p \leq 0.0001$), marital status ($p \leq 0.0001$), employment status ($p=0.009$) and mode of transport ($p=0.048$) (Table 4.4).

No significant association of immunization status was observed with education level ($p=0.267$), alcohol intake ($p=0.154$) and religion ($p=0.235$) (Table 4.4).

4.5.1.2. Association of immunization status with child's factors

Results showed that immunization status was significantly associated with child's age ($p=0.001$) and gender ($p=0.003$). No significant association was observed between immunization status and child's birth order ($p=0.469$) (Table 4.4).

Table 4.4. Association of immunization with demographic of participants and child's factors

Variables	Categories	Immunized n (%)	Non-immunized n (%)	P-value
Parents/caregivers' age (years)	<30 30-39 ≥40	18 (30) 35 (38) 39 (42)	11 (19) 41 (71) 6 (10)	**≤0.0001**
Parents/caregivers' sex	Female Male	84 (91) 8 (9)	58 (100) 0	**0.021**
Relationship to a child	Parents Caregivers	53 (58) 39 (42)	52 (91) 6 (10)	**≤0.0001**
Marital status	Single Ever married	55 (60) 37 (44)	57 (98) 1 (2)	**≤0.0001**
Education Level	Low literacy High Literacy	45 (49) 47 (51)	23 (40) 35 (60)	0.267
Employment status	Employed Unemployed	73 (79) 19 (21)	55 (94) 3 (5)	**0.009**
Usual mode of transport	Mobile Non-mobile	59 (64) 33 (36)	46 (80) 12 (20)	**0.048**
Alcohol intake	Yes No	77 (84) 15 (16)	43 (74) 15 (26)	0.154
Religion	Christian Non-Christian	76 (83) 16 (17)	52 (90) 6 (10)	0.235
Child's sex	Girl Boy	59 (64) 33 (36)	23 (40) 31 (60)	**0.003**
Child's age	≤24 months	81 (88)	38 (66)	**0.001**
	>24 months	11 (12)	20 (34)	
Birth order	First Second Third	15 (30) 45 (49) 32 (35)	8 (14) 24 (41) 26 (25)	0.469

4.5.1.3. Association of immunization status with health service factors

Results showed that immunization status was significantly associated with frequency of immunization service (p=0.026), travelling time to a facility (p≤0.0001), source of information on immunization (p≤0.0001), waiting time in a facility (p=0.004), and vaccine unavailability (p=0.047). (Table 4.5).

No significant association of immunization status was observed with information given on immunization (p=0.678) and level of satisfaction with health care workers (p=0.455). (Table 4.5).

Table 4.5. Association of immunization with health service factors

Variables	Categories	Immunized n (%)	Non-immunized n (%)	P-value
Frequency of immunization services provided at nearest health facility	Daily, morning Daily, afternoon The whole day	14 (15) 53 (58) 25 (27)	1 (2) 37 (64) 20 (34)	**0.026**
Time spent travelling to the nearest health facility or outreach point	<30minutes 1 hour >1hour Don't know	52 (57) 29 (32) 6 (6) 5 (5)	10 (17) 20 (34) 19 (33) 9 (16)	**≤0.0001**
Main source of information about immunization	Media/church Health workers Parents	27 (29) 45 (49) 20 (22)	3 (5) 30 (52) 25 (43)	**≤0.0001**
Information normally given before child immunization	Antigen given, site effects and follow up I don't remember	77 (84) 15 (16)	50 (80) 8 (14)	0.678
Time spent in a health facility for immunization	<6hours Whole day	82 (89) 10 (11)	41 (71) 17 (26)	**0.004**
Not immunized as a result of unavailability of vaccines	Yes No	17 (18) 75 (82)	4 (7) 54 (93)	**0.047**
Satisfied with health care workers	Satisfied Undetermined Not satisfied	56 (61) 7 (8) 29 (32)	34 (59) 8 (13) 16 (28)	0.455

4.5.1.4. Association of immunization status with the perception of parents/caregivers

Results showed that immunization status was significantly associated with believing that immunization is for both boys and girls (p=0.001) and positive things they believe that immunization protects the child against diseases and keeps the child healthy (p=0.001). Suggestions of parents/caregivers to increase immunization coverage was significantly associated with a child being immunized (p= 0.020). The suggestions included sending reminders, providing immunization the whole day, increasing number of health care workers, giving more health education and building another clinic. (Table 4.6).

No significant associations of immunization status were observed with the believe that immunization was for healthy, sick or both children (p=0.081), believe that there are local substitutes for immunization, complications of immunization (p=0.148) and the reasons for bring children for immunization (p=0.587). (Table 4.6.)

Table 4.6. Association of immunization with perception of participants

Variables	Categories	Immunized n (%)	Non-immunized n (%)	P-value
Believe that immunization is for a healthy child or a sick child	Healthy child Sick child Both	62 (67) 5 (5) 25 (17)	29 (50) 3 (5) 26 (45)	0.081
Believe that immunization is for a boy or a girl child	Both I don't know	92 (100) 0	51 (89) 7 (12)	**0.001**
Positive things you believe about immunization	Protects the child against diseases and keeps the child healthy I don't know them	92 (100) 0	51 (88) 7 (12)	**0.001**
Believe that there are local substitutes for immunization	Yes No I don't know	11 (12) 71 (77) 10 (11)	3 (6) 42 (72) 13 (22	0.084
Complications of measles you are aware of	Blindness Body rash Physical handicap Death I don't know	42 (46) 13 (14) 5 (5) 7 (8) 25 (27)	25 (43) 10 (17) 9 (16) 1 (2) 13 (22)	0.148
Reasons for not bringing the child for immunization	Forgot Inconvenient vaccination time Vaccine out of stock Child was sick, or sick after previous vaccination, or vaccine is painful for the child or child had travelled for holiday	21 (23) 39 (42) 5 (5) 27 (29)	16 (28) 28 (48) 2 (4) 12 (21)	0.587
Suggestions to improve immunization coverage	Send reminders Provide immunization the whole day Increase number of health care workers Give more health	23 (25) 45 (49) 10 (11) 14 (15)	22 (38) 15 (26) 13 (22) 8 (14)	**0.020**

	education and built another clinic in Area 7			

4.5.2. Associations using logistic regression analysis

Both bivariate and multivariate logistic regression models were preformed to generate the association of immunization with demographic and health related factors.

4.5.1.1. Association of immunization with demographic and child's factors

This section shows the demographic factors associated with immunization status of children. The results showed that immunization status was associated with being a parent, the age of parents, marital status, employment status, mode of transport, alcohol intake, age of a child and sex of a child at $p<0.2$. Marital status data was re-checked to ensure that categories were coded correctly, yet still yielded high odd ratio and 95%CI. All the independent variables that had a p-value below 0.2 were entered in a multivariate logistic regression model for a backward stepwise procedure.

Table 4.7. Shows the associations of immunization status and independent demographic variables using a multivariate logistic regression analysis. The results showed that immunization status was associated with the age of parents, marital status, employment status, mode of transport, child' age and sex at $p<0.2$ controlling for the relationship to children, education level and religion. Children with parents/caregivers aged 30 – 39years were less likely to be immunized [AOR=0.61, 95%CI: 0.01–0.30] than those aged less than 30years. Children of parents/caregivers who were ever married were 30 times more likely to be

immunized [AOR=30.26, 95%CI: 3.35–373.22]. Employment was protective against non-immunization [AOR=17.72, 95% CI: 4.29-73.18]. Children >24 months and boys were less likely to be immunized.

Table 4.7. Association of immunization status with demographics of caregivers and child's factors

Immunization status	Categories	AOR	95%CI	P-value
Age (years)	<30			[Reference]
	30 - 39	0.61	0.01 – 0.30	**≤0.0001**
	≥40	0.94	0.21 – 4.12	0.934
Marital Status	Single			[Reference]
	Ever married	30.26	3.35 – 273.22	**0.002**
Employment	Unemployed			[Reference]
	Employed	9.65	2.21 – 42.09	**≤0.0001**
Mode of transport	Non mobile			
	Mobile	0.08	0.01 – 0.42	**0.003**
Alcohol intake	No			
	Yes	2.52	0.58-11.00	0.218
Child's age	≤24 months			
	>24 months	0.11	0.02 – 0.66	**0.016**
Child's sex	Girl			
	Boy	0.14	0.03 – 0.56	**0.005**

4.5.2. Association of immunization with health services related factors

This section shows the health services related factors associated with immunization status of children. Bivariate regression analysis model was performed between the immunization status and the health services related factors. The results showed that immunization status was associated with the frequency immunization service, travelling time to the facility, source of immunization information and waiting in the facility p<0.2.

Table 4.8. Association of immunization status and health services factors

Immunization status	Categories	Odd ratio	95%CI	P-value
Service frequency	Daily, the whole day			
	Daily, morning only	0.63	0.001 – 0.74	**0.028**
	Daily, afternoon only	0.62	0.001 – 0.65	**0.020**
Travelling time to facility	<30min			[Reference]
	1 hour	0.07	0.020 – 0.24	**≤0.0001**
	>1 hour	0.05	0.02 – 0.33	**≤0.0001**
	Don't know	0.14	0.001 - 0.20	**0.002**
Source of information	Media/church			[Reference]
	Parents	0.05	0.001-0.48	**0.009**
	Health workers	0.03	0.003 – 0.38	**0.004**
Waiting time in facility	Whole day			[Reference]
	Less than 6 hours	4.73	1.35 – 16.57	**0.015**

4.3. SUMMARY OF THE CHAPTER

This chapter has displayed the results in a form of charts, graphs and tables. The demographics, health service related and the perception of parents/caregivers. The factors associated with immunization status have be performed using a chi-square test and logistic regression analysis.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1. INTRODUCTION

The main aim of this study was to determine the factors associated with measles immunization uptake among children and further assess the perception of caregivers on immunization in the Luderitz District, Karas Region. The objectives of the study were (1) to identify the factors associated with the uptake of measles immunization among children, (2) to assess caregivers' perceptions on measles immunization. A cross sectional design was employed using a quantitative approach. This chapter discusses the results of the study in relation to other studies. The coverage, factors associated with measles immunization and the perception of parents/caregivers are discussed.

5.2. THE COVERAGE OF MEASLES IMMUNIZATION

The current study showed that the coverage of measles immunization study among children in Luderitz clinic was 61%. Between 1991 and 2011, the coverage estimates of measles immunization ranged from 59% to 77% in Namibia (Ogbuanu, Muroua, Allies, Chitala, Gerber, Shilunga, Mhata, Kriss, Caparos & Smit 2017:717). It is clear that within the two decades, the country has not exceeded the immunization coverage of 90% set by the WHO. However, the country has also recorded a decrease to less than one case per million in Namibia by 2008 (WHO 2010). According to Ogbuanu et al (2017:715), during 2009 and 2010, Namibia was one of several countries in southern Africa that experienced measles outbreaks following prolonged inter epidemic periods. The likely cause of the outbreak was separate

importations in 2009 and 2010 of measles virus genotypes B2 and B3. Because of an accumulation of unvaccinated, measles-susceptible individuals, these importations resulted in sustained measles virus transmission across multiple districts (Ogbuanu et al 2017:718).

The neighbouring country to Namibia, Angola, reported 41% to 74% of measles immunization coverage between 2000 and 2006, and from 77% to 88% between 2007 and 2009 (WHO, 2014). The porous border between Angola and Namibia probably contributed to sustained measles virus transmission among population groups on both sides of the border. In addition to cross-border transmission, nosocomial measles virus transmission probably played a role in sustaining the 2009 to 2011 outbreak (Ogbuanu et al 2017:720).

The Demographic and Health Surveys (DHS) data from sub-Saharan African (SSA) countries showed 477 geographical clusters of low measles vaccination coverage spread across SSA (Brownwright, Dodson & van Panhis 2017:957). These clusters have been implicated to delay elimination programs through weakening herd immunity and causing inequity in disease risk. In SSA, recent measles outbreaks have occurred in subpopulations with low immunization rates, which included Zambia (84.9%) and Malawi (93%). Zambia and Malawi experienced a large measles outbreak during 2010–2011 (Pinchoff, Chipeta, Banda, Miti, Shields & Curriero 2015:121). This outbreak spread from high-risk subpopulations in South Africa to Zambia, Malawi, and to high-risk subpopulations in Tanzania consistent with other geographical clusters (Sartorius, Cohen, Chirwa, Ntshoe, Puren, &

Hofman 2013:180). Trans-border populations with low vaccination coverage can be especially vulnerable to disease importations from one country into another (Pinchoff et al 2015:121).

5.3. FACTORS ASSOCIATED WITH MEASLES IMMUNIZATION

5.3.1. Child factors

The current study showed that child-related factors significantly associated with measles immunization were age and sex. This is consistent with several studies, reported in developing countries (Kassahun, Biks & Tefera, 2015:239; Geremew, Gezie & Abejie 2019:1194). This study showed that children aged ≥24 months were less likely to be immunized (AOR=0.11, 95%CI: 0.02 – 0.66) compared to children aged less than 24months. Furthermore, boys were less likely to be immunized (AOR=0.14, 95%CI: 0.03 – 0.56) compared to girls. Consistent with other studies conducted in Ethiopia and Bangladesh, female children were more likely to be fully immunized (Kassahun et al 2015:239). WHO (2010:490) has reported the sex discrepancies in terms of immunization status among children. Boys were less likely to be vaccinated and that could only be found in certain subgroups such as the least educated mothers, poorest households, when the child was not the first-born (WHO 2010:491). Most parents/caregivers in this study only attained primary school education.

5.3.2. Maternal factors

This study showed the impact of maternal factors childhood immunization coverage similar to other studies (Obiajunwa & Olaogun 2013:95; Kitamura, Komada, Xeuatvongsa & Hachiya 2013:178; Antai 2012:136). In this study, multivariate analysis showed that maternal age, marital status and employment affected immunization. Literature documents that continuation and completion of the required number of vaccinations in children depended on factors such as maternal age, employment status, parental beliefs and attitudes towards immunization (Kitamuru et al 2013:178). There is evidence that ages of mother predicts child immunization.

This could be because elder mothers know the effect and the importance of immunization on children than young women similar to other conducted in Sudan (Ibnouf, Van den Borne & Maarse 2007:14) and in Nigeria (Babalola 2009:550).

The children of employed mothers have been associated with increased fully immunization compared to those of unemployed ones. This might be due to better information access about disease preventions, like immunization in Ethiopia (Tamirat & Sisay 2019:1019). Younger age group reducing the odds of vaccination of a child has been documented in another study in Nigeria (Chidiebere, Uchenna o& Kenechi 2014:139). This may be related to the experience of childcare and knowledge of the importance of vaccination that comes with increasing age. In this study, marital status was significantly associated with immunization status. This is consistent with a study by Falagas and Zarkadoulia (2008:1725). This implies that the marital status of the mothers might influence their decision to go to the health centres to complete the immunization schedule of the child.

The current study showed that maternal education was not significantly associated with children full vaccination. Our study is similar to the study conducted in Uganda, which found no significant association between mother's education and children full vaccination (Sematimba 2016:11). The reason for this might be due to that the participants of the study from Uganda were almost from similar category of educational level, which is the case in the current study. Over half of the parents/caregivers (55%) in this study attained primary education. However, the influence of maternal education has been implicated on immunization status (Onsomu, Abuya, Okech, Moore & Collins-McNeil 2015:1724; Shemwell, Peratikos, Gonzalez-Calvo, Renom-Llonch, Boon, Martinho, Cherry, Green & Moon 2017:234). On the other hand, the odds of full vaccination were higher among children of mothers having an educational level of secondary or higher and primary than children of mothers having no formal education. This is in line with studies conducted in Mozamibique (Shemwella et al 2017:234) and Kenya (Onsomu et al 2015:1724). This could be due to the reason that mothers that are more educated are more informed and aware of the advantage of immunization and its schedule.

Although our study did not show any significant association between religion and immunization status, the influence of religion as a factor has been documented (Ophori et al 2014:67). This could be because 85% of parents/caregivers reported to be Christians while very few (15%) were non-Christians, hence religion had no effect statistically. In Ethiopia, religion was significantly associated with children full vaccination in Ethiopia. Children born to mothers following Catholic or Traditional religions had lower odds of full vaccination than children born to Orthodox religion

following mothers (Kinfe, Gebre & Bekele 2019:11). Other studies conducted in Ghana and Nigeria found significant association between religion and children full vaccination (Adebiyi 2013:6; Adokiya, Baguune & Ndago 2017:28).

Mode of transport was associated with immunization status in this study. Participants using car as means of transportation to reach nearby health facility reduced incomplete vaccination by 90% as compared to their counter parts (Yismaw, Assimamaw , Bayu & Mekonen 2019:241), similar to other studies in other districts of Ethiopia (Kassahun et al, 2015239; Mugali, Mansoor, Parwiz, Ahmad, Safi, Higgins-Steele & Varkey 2017:290). This might be due to that transportation is the main factor to get the service timely and properly because vaccination especially BCG and Measles vaccines are provided with limited time and date to avoid unnecessary wastage. To get these vaccines clients may wait until ten or twenty child may come to open these vaccines and may lead to come again next time this makes clients tired if transport is easily accessible (Yismaw et al 2019:241).

5.3.3. Health services related factors

The current study showed that immunization status was significantly associated with immunization services at the facilities, travelling time to the facility, waiting time at the facility and source of information on immunization.

Malande et al (2019:2) has reported that hard to reach facilities suffer increased waiting time or missed vaccination appointments as caregivers wait for vaccines to be brought. There were reports of situations where there was no readily available transport, thus the vaccines would not be collected in time for the vaccination day.

The poor geographical terrain makes it possible to go to the facility but hard to come back; a factor that also affects caregivers/parents to take their children to the health facility for immunization (Malande et al 2019:2). Parents prefer to stay home, additionally because the journey to and from the facility, plus waiting time will mean a whole day (Malande et al 2019:2). This would indirectly contribute to high dropout rates or delay in the schedule for the affected children because these caregivers may not be able to return on the next rescheduled date. In Uganda, missed opportunities and long waiting time at static and outreach immunization centers greatly contributes to failure to complete immunization schedule (Tugumisirize, Tumwine & Mwonzora 2002:347).

The geographical accessibility of health facilities has been found to motivate immunization uptake. Parents/caregivers who travel for less than an hour to reach their nearest health facility were more likely to have fully immunized children than those who travel beyond one hour (Girmay and Dadi 2019:7). Long distance is a demotivating factor to immunize children. This finding agrees with other studies carried out in Sudan (Ibnoufu et al 2007:14), Kenya (Elizabeth, George, Raphael & Moses 2015:12), and Eastern and Southern Ethiopia (Ebrahim and Salgedo 2015;20234; Animaw et al 2014;8).

Long waiting times for vaccination services was found to be associated with non-uptake of measles immunization. Magodi, Mmbaga, Massaga, Lyimo, Mphuru, and Abede (2019:33) reported that waiting for more than two hours increased the odds of non-vaccination by twofold, compared with waiting time of two hours or less. Similar findings were observed in other studies (Negussie, Kassahun, Assegid & Hagan

2015:27; Vonasek, Bajunirwe, Jacobson, Twesigye, Dahm, Grant, Sethi & Conway 2016:11). This probably was due to lack of community involvement in scheduling time to start vaccination services at respective health facilities.

Taiwo, Abubakar, Waziri, Okeke & Idriss 2016:9) have reported that mothers are less likely to complete immunization schedules if they are poorly informed about the need for immunization, logistics, and the appropriate series of vaccines to be followed. Similar to the findings of this study, the most common source of vaccine information is primary healthcare providers, but research has shown that parents obtain vaccine information from a multitude of other sources as well (Kennedy , Glasser, Covello & Gust 2008:793). However, literature documents that parents who did not view their child's healthcare provider as a reliable vaccine information source were more likely to obtain vaccine information using the Internet (Jones, Omer, Bednarczyk, Halsey, Moulton & Salmon (2012:2). According to Jones et al (2012:4), the information on the Internet may influence parental attitude and behaviour towards vaccines. On the other hand, distrust of vaccination and disapproval of immunization requirements may influence parents to use the Internet as an alternative source of information.

5.4. PERCEPTION OF MOTHERS ON IMMUNIZATION

The perception of parents/caregivers showed that 100% perceived the susceptibility of measles. They were all (100%) aware of the importance of immunization for children. The level of awareness on the importance of immunization has been reported in the study of (Enwonw , Ilika, Ifeadike, Aniemena & Egeonu 2018:61). Participants in this study could perceive the benefits of immunization as important for

both boys and girls (100%) and protecting children against diseases and keeping them healthy (95%). Perceived benefits were significantly associated with immunization status (p=0.001).

Parents/caregivers (75%) in this study perceived the severity of non-immunization for measles such blindness, body rash, physical handicap and death. Furthermore, parents/caregivers indicated that the barriers to bringing children for immunization were mainly inconvenient vaccination time (44%) and forgetfulness (25%) in addition to other child related reasons (26%) and lesser of a vaccination stock (5%). Parents/caregivers suggested cues to action, that immunization coverage requires sending the reminders (30%), providing immunization the whole day (40%), increasing number of health care workers (15%) and health education and promotion. Unlike several studies, some parents perceived that risks of immunization outweighed benefits and that their children would be healthier without being vaccinated (Luthy & Beckstrand 2013:100; McNiel, Mueller, MacDonald, McDonald, Saini, Kellner & Tough 2019:49). While other in studies expressed concern regarding the ingredients of vaccines and a fear of autism, which has been cited in a number of previous studies (Whyte, Whyte, Cormier & Eccles 2011:209; Luthy & Beckstrand 2013:98; Harmsen, Mollema, Ruiter, Paulussen, de Klerk & Kok 2013:1183).

5.5. CONCLUSION

Measles immunization was below the targeted coverage of 90% in Luderitz clinic. Immunization status was associated with several parents/caregivers demographics such as age, marital status, employment and mode of transport. Child factors that

were associated with immunization status were age and sex. Health services related factors included frequency of immunization service, time taken to travel to the facility, waiting time in the facility and source of immunization information.

Awareness of immunization by the participants was very high. Majority had good attitude towards immunization. Parents/caregivers could perceive the susceptibility, severity and benefits of children not being immunized. Firstly, they were aware of the importance of immunization and they could perceive the complications associated with non-immunization. Furthermore, parents/caregivers could perceive the benefits of immunization as a way of protecting a child against diseases and keep the child healthy. The barriers mentioned against access to immunization had more to do with travelling and waiting time at the facility. Most reasons for not bringing the child for immunization had to do with forgetfulness, inconvenient vaccination time and child-related reasons such as a child being sick or absent at the time of immunization. The interesting suggested cue to action for a better immunization coverage, in addition to sending reminders and increase staff, was a need for health education.

5.6. LIMITATIONS

- Due to resistant of participation, a representative sample size was affected.
- Secondly, the study was conducted as a snap shot where data was collected at one point in time.
- Thirdly a cross sectional study can only make inferences of factors associated with immunization status, which is the case in the current study. We could not study causality. However, most of the factors reported in this study have been

reported in other studies indicating a consistency nature of findings, an important aspect of immunization coverage.

5.7. RECOMMENDATIONS

- The role of antenatal clinic as a source of awareness should further be strengthened by training more health care workers.
- To minimize this situation, and taking into account the importance of vaccination in Namibia, healthcare workers at health facilities need to consider prioritizing vaccination services before attending other attending patients during vaccination days.
- Options such as reminder text messages to caregivers can be explored as well as conducting periodic vaccination campaigns to reach the unvaccinated children.
- Intensified interventions are necessary to further increase measles immunization uptake in Luderitz district.

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ANNEXURES

ANNEXURE A: APPROVAL FROM THE UNIVERSITY

UNISA university of south africa

RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES
REC-012714-039 (NHERC)

11 October 2017

HSHDC/721/2017

Dear Nyarai Nyamupfukudza

Nyarai Nyamupfukudza
Student 4894-855-1

Decision: Ethics Approval

Supervisor: Mr MT Mamahlodi
Qualification: MPH
Joint Supervisor: -

Name: Nyarai Nyamupfukudza

Proposal: Factors associated with the uptake of the measles immunisation program in Lüderitz district, Namibia

Qualification: **MPCHS94**

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted from 11 October 2017 to 11 October 2019.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 6 September 2017.

The proposed research may now commence with the proviso that:

1) *The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*

2) *Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee, Department of Health Studies. An amended application could be requested if there*

RECEIVED
2017 -10- 24
Executive Dean
College of Human Sciences

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone +27 12 429 3111 Facsimile +27 12 429 4150
www.unisa.ac.za

ANNEXURE B: APPLICATION TO NAMIBIA RESEARCH COMMITTEE TO CONDUCT STUDY

Keetmanshoop Training Centre
Private Bag 2101
Keetmanshoop
Namibia

28/11/2017

Attention: Chairperson
Biomedical Research Ethics Committee
Private Bag 13198
Windhoek
Namibia

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT LUDERITZ CLINIC, IN LUDERITZ DISTRICT, KARAS REGION OF NAMIBIA

My name is Nyarai Nyamupfukudza. I am a student at the University of South Africa doing Masters of Arts in Nursing Science. The title of my research project is: Factors associated with the uptake of the measles immunization programme in Luderitz district, Namibia.

The aim of the study is to determine and compare the factors associated with the uptake of measles immunization in the Luderitz District, in the Karas region.

This study will be conducted under the supervision of Mr. MT Mamahlodi, Lecturer at the University of South Africa in the Department of Health Studies.

Please find the following attached documents:

1) Copy of the proposal
2) Clearance letter from UNISA
3) Data collection tool
4) Registration of a research project form

Upon completion of the study, I undertake to provide the Department of Health with a full report of findings including recommendations.

Looking forward to your positive response.

Yours sincerely

Nyarai Nyamupfukudza
Tel: +264 81 4755322
Cell: +264 81 4276404
E mail- nyarainyamupfukudza@yahoo.com

Supervisor's contact details:
Mamahlodi MT
Tel: +27 12 429 6757
Fax: +27 12 429 6688
Email – mamahmt@unisa.ac.za

Chair of the University of South Africa, Department of Health Studies, Research Ethics Committee:
Professor Maritz JE
E mail – maritje@unisa.ac.za

ANNEXURE C: APPLICATION TO LUDERITZ DISTRICT TO CONDUCT STUDY

Keetmanshoop Training Center
Private Bag 2101
Keetmanshoop
Namibia

10/03/2018

Attention: Senior Medical Officer
Luderitz District
Private Bag 2002
Luderitz
Namibia

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT LUDERITZ CLINIC, IN LUDERITZ DISTRICT, KARAS REGION OF NAMIBIA

My name is Nyarai Nyamupfukudza. I am a student at the University of South Africa doing Masters of Arts in Nursing Science. The title of my research project is: Factors associated with the uptake of the measles immunization programme in Luderitz district, Namibia.

The aim of the study is to determine and compare the factors associated with the uptake of measles immunization in the Luderitz District, in the Karas region.

This study will be conducted under the supervision of Mr. MT Mamahlodi, Lecturer at the University of South Africa in the Department of Health Studies.

Please find the following attached documents:

1) Copy of the proposal
2) Clearance letter from UNISA
3) Data collection tool
4) Clearance letter from Biomedical Research Ethics Committee

Upon completion of the study, I undertake to provide the Department of Health with a full report of findings including recommendations.

Looking forward to your positive response.

Yours sincerely

Nyarai Nyamupfukudza
Tel: +264 81 4755322
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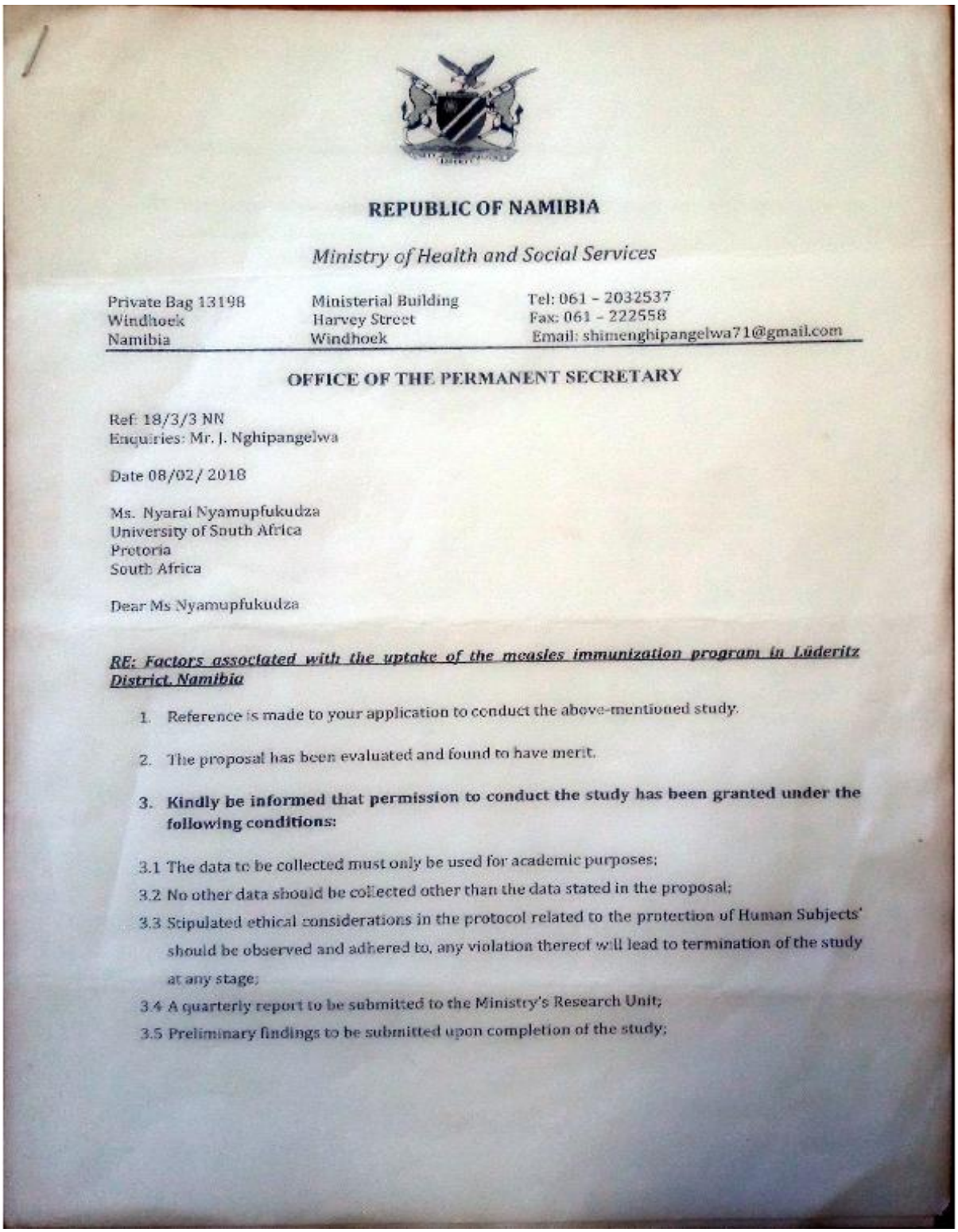
Chair of the University of South Africa, Department of Health Studies, Research Ethics Committee:
Professor Maritz JE
E mail – maritje@unisa.ac.za

ANNEXURE D: CLEARANCE LETTER FROM NAMIBIA RESEARCH ETHICS COMMITTEE



REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198 | Ministerial Building | Tel: 061 – 2032537
Windhoek | Harvey Street | Fax: 061 – 222558
Namibia | Windhoek | Email: shimenghipangelwa71@gmail.com

OFFICE OF THE PERMANENT SECRETARY

Ref: 18/3/3 NN
Enquiries: Mr. J. Nghipangelwa

Date 08/02/ 2018

Ms. Nyarai Nyamupfukudza
University of South Africa
Pretoria
South Africa

Dear Ms Nyamupfukudza

RE: Factors associated with the uptake of the measles immunization program in Lüderitz District, Namibia

1. Reference is made to your application to conduct the above-mentioned study.

2. The proposal has been evaluated and found to have merit.

3. **Kindly be informed that permission to conduct the study has been granted under the following conditions:**

3.1 The data to be collected must only be used for academic purposes;
3.2 No other data should be collected other than the data stated in the proposal;
3.3 Stipulated ethical considerations in the protocol related to the protection of Human Subjects' should be observed and adhered to, any violation thereof will lead to termination of the study at any stage;
3.4 A quarterly report to be submitted to the Ministry's Research Unit;
3.5 Preliminary findings to be submitted upon completion of the study;

3.6 Final report to be submitted upon completion of the study;

3.7 Separate permission should be sought from the Ministry of Health and Social Services for the publication of the findings.

Yours sincerely,

PERMANENT SECRETARY
MINISTRY OF HEALTH & SOCIAL SERVICES

Ms. P Masabane
Acting Permanent Secretary

ANNEXURE E: THE QUESTIONNAIRE- ENGLISH VERSION

SECTION A: DEMOGRAPHIC AND SOCIOECONOMIC STATUS OF THE PARENT /CAREGIVER.

<u>Instruction</u>: - please provide short answer to the socio-demographic questions

Unique code: ☐☐☐

1. Age: ☐☐
2. Sex: 1. Male ☐
   2. Female ☐

3. How are you related to the child?
   1. Parent ☐
   2. Caregiver ☐

4. What is you marital status?
   1. Single ☐
   2. Married ☐
   3. Divorced ☐
   4. Widowed ☐
   5. Co-habitating ☐

5. What is your highest level of education?
   1. None ☐
   2. Primary education. ☐
   3. Secondary education ☐
   4. Tertiary education ☐

6. What is your current employment status?
   1.Employed full time. ☐
   2.Employed part time ☐
   3.Self employed ☐
   4.Unemployed ☐

7. If unemployed, what is your main source of financial support?
   1. Family supports ☐
   2. Grants ☐
   3. None ☐
   4. Not applicable ☐

8. Religion of the respondents
    1. Christian ☐
    2. Muslim ☐
    3. None ☐
    4. Other e.g. traditional ☐

9. What mode of transport do you usually use to go the health facility?
    1. By foot ☐
    2. Bicycle ☐
    3. Car ☐
    4. Motorbike ☐

10. Do you drink alcohol?
    1. Yes ☐
    2. No ☐

SECTION B: PATIENT RELATED FACTORS

Instruction: - please provide short answers to questions on the patient related factors .

11. Age of the child in months
    1. 9-12 months ☐
    2. 13- 24 months ☐
    3. 25- 36 months ☐
    4. 37-48 months ☐
    5. 49-59 months ☐

12. Sex of the child
    1. Male ☐
    2. Female ☐

13. Birth order
    1. First ☐
    2. Second ☐
    3. Third ☐
    4. Fourth ☐
    5. 5^{th} and above ☐

SECTION C: HEALTH SERVICES FACTORS

Instruction: For the following statements related to Immunization services in this health district, please express your opinion

14. How often are your immunization services provided at your nearest health facility?

1. Once a week ☐
2. Twice a week ☐
3. Thrice a week ☐
4. Four times a week ☐
5. Daily, the whole day ☐
6. Daily, in the morning ☐
7. Daily, in the afternoon ☐

15. How much time do you spend travelling to the nearest health facility or outreach point?

1. Less than 30 minutes ☐
2. 30 minutes to one hour ☐
3. More than one hour ☐
4. Do not know ☐

16. Who is your main source of information about immunization?

1. Nurse / health worker ☐
2. Parents ☐
3. Church ☐
4. Traditional healers ☐
5. Media e.g. radio, television, newspaper ☐

17. What information are you normally given before your child is immunized?

1. About the antigen is to be given, possible side effects and follow up date ☐
2. I don't remember ☐
3. Nothing at all ☐

18. How much time do you usually spend in the health facility waiting for the child to be immunized?

1. Less than one hour ☐
2. 1- 6 hours ☐
3. The whole day ☐
4. Do not know ☐

19. Is there a time your child was not vaccinated due to unavailability of vaccines?

1. Yes ☐
2. No ☐

20. How satisfied are you with healthcare workers at this district?
    1. Satisfied ☐
    2. Undetermined ☐
    3. Dissatisfied ☐

SECTION D: PERCEPTIONS OF PARENTS / CAREGIVERS REGARDNG THE IMPORTANCE OF IMMUNISATON

21. Are you aware that your child should be immunized?
    1. Yes ☐
    2. No ☐

22. Do you believe that immunization is for a healthy child or a sick child?
    1. Healthy child ☐
    2. Sick child ☐
    3. Both ☐
    4. Don't know ☐

23. Do you believe that immunization is for male children only or female children only?
    1. Male children ☐
    2. Female children ☐
    3. Both ☐
    4. Do not know. ☐

24. What positive things do you believe about immunization?
    1. Protects the child against diseases and keep the child healthy ☐
    2. Do not know ☐

25. Do you believe that there are local substitutes for immunization?
    1. Yes ☐
    2. No ☐
    3. Do not know ☐

26. Which of these are you aware of / do you think are complications of measles?
    1. Blindness ☐
    2. Body rashes ☐
    3. Physical handicap ☐
    4. Death ☐
    5. I don't know ☐

27. What do you think are reasons for not bringing children to receive measles vaccine?
    1. Forgot ☐
    2. Inconvenient vaccination time ☐
    3. Vaccine out of stock ☐
    4. Religious and cultural beliefs ☐

5. Child was sick. ☐
6. Child became sick after the previous vaccination ☐
7. Vaccine is painful for the child ☐
8. Child had travelled for holiday ☐

28. What suggestions would you make to increase the number of parents/ caregivers who bring children for immunization in this district?

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

ANNEXURE F: THE QUESTIONNAIRE- OSHIWAMBO VERSION

SECTION A: OMAUYELE WOMUDINGONOKO WOMUNHU NOMOUXUPILO OMUDALI /OMUTEKULI.

Unique code: ☐☐☐

1. Eedula: ☐

2. Oukakwashike koo okanhu:
   1. Omulumenhu ☐
   2. Omukainhu ☐

3. Okanona oke kupamba ngahelipi?
   1. Omudali wokanona ☐
   2. Omufilishisho wokanona ☐

4. Ohombo?
   1. Omulikaleli ☐
   2. Owahombolwa ☐
   3. Owa hengena ☐
   4. Omufiyekadi ☐
   5. Kaume wopaihole ☐

5. Ouhongelwe
1. Inofikola nande ☐
2. Ehongo lopedu ☐
3. Osekundo fikola ☐
4. Elongo lopombala ☐

6. Oholongo paife?
Efiku liiyadi ☐
Oho longo omalufe ☐
Oho lilongele mwene ☐
Iholongo ☐

7. Ngeenge iho longo oho xupu ngahelipi?
1. Oho kwafwa kovakwanedimo voye ☐
2. Oho pewa oshimaliwa kepangelo ☐
3. Kapenasha ☐
4. Kepena sha shomwaayo watumbula tete ☐

8. Eitavelo loye lopamepo
1. Omukriste ☐
   2. Oumumoslema ☐
   3. Kapenasha ☐
   4. Ikwao yawedwapo, ngashi omufyuulukwakalo ☐

9. Oho fiki ngahelipi koshipangelo?

1. Okeemhadi ☐
2. Onokambashikela ☐
3. Onoshihauto ☐
4. Okapakapaka ☐

10. Ohonhu oikolwifa?

1. Heeno ☐
2. Ahawe ☐

SECTION B: OMAUKWATYA WOMUNAUDU

11. Okanona okena eemwedi ngapi?

1. Eemwedi 9-12 ☐
2. Eemwedi 13-24 ☐
4. Eemwedi 25-36 ☐
5. Eemwedi 37-49 ☐
6. Eemwedi 50-59 ☐

12. Okanona okakolwashike?

1. Okamati ☐
2. Okakadona ☐

13. Okanona okatingapi kedalo?

1. Okatete ☐
2. Okativali ☐
3. Okatitatu ☐
4. Okatine ☐
5. Okatitano nokuyapomboda ☐

SECTION C: **OMAUKWATYA OUHAKU**

14. Oshipangelo shopopepi naave ohashitunile lungapi?

1. lumwe moshivike ☐
2. luvali moshivike ☐
3. lutatu moshivike ☐
4. lunhe moshivike ☐
5. Keshe efiku, efiku alishe ☐
6. Keshe efiku, ongula ☐
7. Keshe efiku, omutenya ☐

15. Ohashi kupula efimbo lifike peni opo ufike koshipangelo shili popeni naave?

1. Etata vili ☐
2. Ovili imwe ☐
3.Oshidule povili yimwe ☐
4. Kandi shi shi ☐

16. Olyelye hekupe ouyelele kombinga yetunilo?
1. Omupangi ☐
2. Ovadali ☐
3. Ongeleka ☐
4. Eendudu ☐
5. Oikundaneki ☐

17. Ouyele washike hopewa manga okakona inaka tunilwa?
1. Etunilo lilipi taliyandjwa? ☐
2. Oshike una okuninga ngeenge okanona kapupyala ile kaninga efina? ☐
3. Omafiku etunilo lashikula ko. ☐
4. Itandi dimbuluka ☐
5. Ihandi lombwelwa sha ☐

18. Koshipngelo ohokwata efimbo lifike peni wateelela okanona katunilwe?
1. Meni ine ☐
2. Oule weevili 1-6 ☐
3. Efiku alishe ☐
4. Kandi shishi ☐

19. Opena efiku mwashunifwako pehena oitunilifo?
1. Heeno ☐
2. Ahawe ☐

20. Omeme ota ka kuta pokirinika?
1. Ee-ee ☐
2. Ngiika ☐
3.Aaye ☐

SECTION D: OMALIUDO OVADALI/ OVAFILISHISHO KOMBINGA YEFIMAMANO LOMATUNILO

21. Oushishi kutya okanona okapumbwa okutunilwa?
1. Heeno ☐
2. Ahawe ☐

22. Ouna eitavelo kutya omatunilo ovo ounona ava vena oukolele ile ounona ava tava vele?
1. Ounona vena oukolele ☐
2. Ounona tava vele ☐
3. Ounona aveshe ☐
4. Kandi shishi ☐

23. Ounona eitavelo kutya etunilo olounona ashike ava voumati ite ounona ashike voukadona?

1. Oumati ashike ☐
2. Oukadona ashike ☐
3. Aveshe ☐
4. Kandi shishi ☐

24. Omatunilo okuna ouwa washike?

1. Oku kaleka okanona moukolele ☐
2. Oku amena okanona komukifi ☐
3. Oku koleka ovakwaita volute ☐
4. Kandina eshivo lasha ☐

25. Ouna eitavelo nokutya opena vali omikalo dimwe doku amena okanona komikiti kakele komatunilo?

1. Heeno ☐
2. Ahawe ☐
3. Kandi shishi ☐

26. Oushishi kutya omukifi wokakwenyene ouna oupyakadi wanika oshiponga kokanona?

1. Heeno ☐
2. Ahawe ☐
3 Kandi shishi ☐

27. Omatomeno ashike iho twala okanona ketunilo lokakwenyene?

1. Onda dimbwa ☐
2. Oinakuwanitwa oihapu ☐
3. Oitunilifo okwali yapwapo ☐
4. Okanona okwali taka vele ☐
5. Omaitavelo opamepo nomifyuululwakalo ☐
6. Okanona oka velele eshi katuniliwe oshikando shadjako ☐
7. Omatunilo ohalulumike ounona ☐
8.Oinda kohorinde ☐

28. Omaliudo oshike una taadulu oku hapupaleka omuvalu wovadali/ ovatekuli opo vadule okutwala ounona komatunilo?

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. . . .

ANNEXURE G: THE QUESTIONNAIRE- AFRIKAANS VERSION

AFDELING A: DEMOGRAFIES EN SOSIO-EKONOMIES STATUS VAN DIE OUER / VERSORGER.

Instruksie: - Gee'n kort antwood op die sosio-demografiese vrae asseblief

Unieke kode: ☐☐☐

1. Ouderdom: ☐☐
2. Geslag: 1.manlike ☐
   2. vroulike ☐

3. Wat is jou verhouding met die kind?
   1. Ouer ☐
   2. Versorger ☐

4. Wat is jou huwelikstatus?
   1. Enkele ☐
   2. Getroud ☐
   3. Geskei ☐
   4. weduwee ☐
   5. Co-habitating ☐

5. Wat is jou hoogste onderwysvlak?
   1. Niemand ☐
   2. Primere onderwys. ☐
   3. Sekondere onderwys ☐
   4. Tersiere onderwys ☐

6. Wat is jou huidige diensstatus?
   1.voltyds aangestel. ☐
   2.deeltyds aangestel ☐
   3.Selfstandig ☐
   4.werkloos ☐

7. Indien werkloos,wat is jou belangrikste bron van finansiele ondersteuning?
   1. Familielede ☐
   2. Toelaes ☐
   3. Niemand ☐
   4. Nie van toepassing nie ☐

8. Respondents' se godsdiens
   1. Christen ☐
   2. Moslem ☐
   3. Niemand ☐
   4. Ander e.g. tradisionele ☐

9. Wat is jou gewone manier van vervoer na die kliniek?
   1.Loop ☐
   2. Fiets gebruik ☐
   3. Kar ☐
   4. Motorfiets ☐

10. Drink jy alkohol?
   1. Ja ☐
   2. Neen ☐

AFDELING B: PASIENTVERWANTE FAKTORE

<u>Instruksie</u>: - Gee'n kort antwood op die pasienteverwante faktore

11. Ouderdom van die kind in maande
   1. 9-12 maande ☐
   2. 13- 24 maande ☐
   3. 25- 36 maande ☐
   4. 37-48 maande ☐
   5. 49-59 maande ☐

12. Geslag van die kind
   1.
   Watter voorstelle sal jy maak om die getal ouers/versorgers te verhoog wat kinders vir immunisasie in hierdie distrik bring?
   ☐

13. Geboorte orde
   1. Eerste ☐
   2. Tweede ☐
   3. Derde ☐
   4. Vierde ☐
   5. vyfde en hoër ☐

AFDELING C:: GESONDHEIDSDIENSTE FAKTORE

Instruksie: Vir die volgende stellings wat verband hou met immunisasie dienste in hierdie gesondheidsdistrik, druk asseblief u mening

14. Hoe dikwels is jou immunisasie dienste wat op jou naaste gesondheid fasiliteit?

1. Een keer 'n week ☐
2. Twee keer 'n week ☐
3. Drie maal per week ☐
4. Vier keer per week ☐
5. Daaglikse, die hele dag ☐
6. Daagliks, in die oggend ☐
7. Daagliks, in die namiddag ☐

15. Hoeveel tyd spandeer jy om na die naaste gesondheidfasiliteit of uitreikpunt te reis?

1.Minder as 30 minute ☐
2.30 minute tot een uur ☐
3. Meer as een uur ☐
4.Weet nie ☐

16. Wie is jou belangrikste bron van inligting oor immunisasie?

1. verpleegster/gesondheidswerker ☐
2. ouers ☐
3. die kerk ☐
4. tradisionele genesers ☐
5. media bv. radio, televisie, Koerant ☐

17. Watter inligting word jy gewoonlik gegee voordat jou kind immunizeerd is?

1. oor die antigeen is om gegee te word, moontlike newe-effekte en opvolg datum ☐
2. Ek onthou nie ☐
3. niks ☐

18. Hoeveel tyd spandeer jy gewoonlik in die gesondheidfasiliteit en wag vir die kind om immunizeerd te wees?

1. minder as een uur ☐
2.1-6 ure ☐
3. die hele dag ☐
4. weet nie ☐

19. Is daar 'n tyd dat jou kind nie ingeënt is as gevolg van onbeskikbaarheid van entstowwe nie?

1. Ja ☐

2. Geen ☐

20. Hoe tevrede is u met gesondheidsorgwerkers by hierdie distrik?
1. Tevrede ☐
2. Onbepaald ☐
3. Ontevrede ☐

AFDELING D: PERSEPSIES VAN OUERS/VERSORGERS REGARDNG DIE BELANGRIKHEID VAN IMMUNISATON

21. Is jy bewus daarvan dat jou kind immunizeerd moet wees?

1. Ja ☐
2. Geen ☐

22. Glo jy dat immunisasie vir 'n gesonde kind of 'n siek kind is?
1. gesonde kind ☐
2. siek kind ☐
3. beide ☐
4. weet nie ☐

23. Glo jy dat immunisasie slegs vir manlike kinders of vroulike kinders is?

1. manlike kinders ☐
2. vroulike kinders ☐
3. beide ☐
4. weet nie. ☐

24. Watter positiewe dinge glo jy oor immunisasie?
1. beskerm die kind teen siektes en hou die kind gesond ☐
2. weet nie ☐

25. Glo jy dat daar plaaslike plaasvervangers vir immunisasie is?

1. Ja ☐
2. Geen ☐
3. Niks ☐

26. Wie van hierdie is jy bewus van/dink jy is komplikasies van masels?
1. blindheid ☐
2. liggaamsuitslag ☐
3. fisiese voorgee ☐
4. dood ☐
5. Ek weet nie ☐

27. Wat dink jy is redes om nie kinders te bring om masels-entstof te ontvang nie?

1. vergeet ☐
2. ongerieflik inentingstyd ☐
3. entstof uit voorraad ☐
4. godsdienstige en kulturele oortuigings ☐
5. kind was siek. ☐
6. kind het siek geword na die vorige inenting ☐
7. entstof is pynlik vir die kind ☐
8. kind het vir vakansie gereis ☐

28. Watter voorstelle sal jy maak om die getal ouers/versorgers te verhoog wat kinders vir immunisasie in hierdie distrik bring?

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ANNEXURE H: PARTICIPANT INFORMATION SHEET

UNIVERSITY OF SOUTH AFRICA
Preller Street, Muckleneuk Ridge, Pretoria
PO Box 392, UNISA, 0003, South Africa
Tel: +27 12 429 6757, Fax: +27 21 429 6688
E-mail: 48948551@mylife.unisa.ac.za / nyarainyamupfukudza@yahoo.com

Project Title: Factors associated with the uptake of the measles immunization program in Luderitz district, Karas region, Namibia.

What is this study about?

This is a research project being conducted by Nyarai Nyamupfukudza at the University of South Africa. I am inviting you to participate in this research project because your experience and the information about your child's immunization status is relevant to the study. The aim of the study is to explore and compare the factors associated with the uptake of measles immunization in the Luderitz district in the Karas region.

What will I be asked to do if I agree to participate?

You will be asked to give information on what you know about measles, on how a child can get measles, the age of the child to receive measles vaccination, your opinion on the reasons as to why some caregivers do not bring their children for measles immunization as indicated on health care facility register, on what you know about the child who gets measles and your thinking on what would help to get a better response to measles immunization.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality, all the collected data will be kept in a safe and locked up filling cabinet and further information will be kept in a password – protected computer files.

Your name will not be included on the study and other collected information, instead a unique identification will be allocated to your name during the research study. Only the researcher will have access to the identification code We will only disclose to the programme manager's information that comes to our attention for the children who are at the disadvantage of receiving measles immunization and who if not immunized may have the potential of acquiring the measles disease complications.

What are the risks of this research?

There are minimal risks associated with participating in this research project related to emotional harm. Given the confidentiality explained above, you need to be assured that there will be minimal risks associated with participating in this research project. If you are stressed a referral letter will be given to you to see a social worker.

What are the benefits of this research?

The benefits, include informing programme managers on the need to address inhibiting factors that are to be addressed by Department of Health Manager in order to promote the health of all children the results will help the investigator learn more about promoting or inhibiting factors related to the uptake of measles immunization. We hope that, in the future, other people might benefit from this study through improved understanding of inhibiting factors associated with measles immunization uptake

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. There are no undesirable effects in participating in this study, but in unlikely events, the assistance that can be offered can be in a form of either counselling or referral for secondary care at the clinic.

What if I have questions?

This research is being conducted by Nyarai Nyamupfukudza a student at the University of South Africa. If you have any questions about the research study itself,

please contact Nyarai Nyamupfukudza at: PO Box 2101, Keetmanshoop, Namibia, Telephone number: 063 – 220 9016, Cell phone number: 081 4276404
E-mail address: 48948551@ mylife.unisa.com

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Supervisor:
MT Mamahlodi (Mr)
Lecturer (Public Health)
Department of Health Studies
Muckleneuk Campus
Theo van Wijk Building 6th floor, Room 166
PO Box 392
UNISA
0003
Tel: +27 12 429 6757
Fax: + 27 12 429 6688

This research has been approved by the University of South Africa Research Committee and Ethics Committee.

ANNEXURE I: CONSENT FORM

UNIVERSITY OF SOUTH AFRICA
Preller Street, Muckleneuk Ridge, Pretoria
PO Box 392, UNISA, 0003, South Africa
Tel: +27 12 429 6757, Fax: +27 21 429 6688
E-mail: 48948551@mylife.unisa.ac.za / nyarainyamupfukudza@yahoo.com

Participant (Under five) Unique ID………………..
Statement concerning participation in a Research Project:

FACTORS ASSOCIATED WITH THE UPTAKE OF THE MEASLES IMMUNIZATION PROGRAM IN LUDERITZ DISTRICT, NAMIBIA

I have read the information and heard aims and objectives of the proposed study. I was provided with the opportunity to ask questions as well as adequate time to rethink this issue. The aim and objectives of the study are sufficiently clear to me. I have not been pressured to participate in any way.

I understand that participation in this study is voluntary and that I may withdraw from it at any time and without supplying reasons. It was also stated that this will have no negative influence on my family or me. I know that the Namibian Research Committee and the University of South Africa have approved this study. I am fully aware that the results of the study will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

I hereby give consent to participate in the study.

. . . .

Name of patient/volunteer   Signature of patient/guardian

. . . .

Place   Date   Witness Statement by

Researcher:

I provided verbal and written information regarding this study.

I agree to answer any future questions concerning the study to my best capacity.

I will adhere to the approved protocol.

. . . . .	. . . . .	. . . . .	. . . . .
Name of researcher	Signature	Date	Place

ANNEXURE J: LETTER OF APPROVAL FROM HEALTH FACILITY

REPUBLIC OF NAMIBIA

Ministry of Health and Social Services
LÜDERITZ HOSPITAL

Private Bag 2002	**Main Road**	**Tel.: 063-202446 ext: 206**
LÜDERITZ	**NAUTILUS**	**Fax: 063-203602**
NAMIBIA	**LÜDERITZ**	**Email: pmo.adminludho@iway.na**
Enquiries: Dr D. M. Nkalamo	**Ref. No:**	**Date: 25 March 2018**

Keetmanshoop Regional Health Training Centre
Private Bag 2101
Keetmanshoop

Dear Mrs. Nyarai Nyamupfukudza

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT LUDERITZ CLINIC, IN LUDERITZ DISTRICT, KARAS REGION OF NAMIBIA

Your letter, dated 10th of March 2018, on the above-mentioned subject refers.

Your study entitled "**Factors associated with the uptake of measles immunisation in the Luderitz District, Namibia**" is a welcome idea and will go a long way in assisting not only yourself but the district as well.

Permission for your research in the district is therefore granted on conditions that you share your findings with the district.

Wishing you all the best with the collection of data.

Kind Regards

Dr D. M. Nkalamo
Senior Medical Officer

ANNEXURE K: TURNITIN REPORT

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