

**FACTORS ASSOCIATED WITH THE MEASLES IMMUNISATION
COVERAGE IN THE OPUWO HEALTH DISTRICT, KUNENE REGION,
NAMIBIA**

A THESIS SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
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ABSTRACT

Childhood immunisation is a cost-effective public health strategy. Immunisation is one of the most important preventive health actions in children's lives as it provides protection against most infectious diseases. In Namibia, the Expanded Programme on Immunisation (EPI) has been instituted in 1990 to ensure that the immunisation of children takes place within the prescribed age frame. However, there is still room for improving the EPI, particularly as regards measles immunisation.

The problem was that in 2006, the Opuwo Health District in Kunene Region had a measles immunisation coverage of only 40% as compared to the regional coverage of 60% and the national coverage of 83%.

The purpose of this study was to investigate the factors associated with the low measles immunisation coverage in the Opuwo Health District with the aim of formulating improved intervention strategies in the district.

Accordingly, a cross-sectional study was undertaken in certain rural villages in the Opuwo Health District. The population consisted of parents and caretakers of 120 children aged between 12 and 23 months who were interviewed using a structured, pretested questionnaire regarding the parents/caretakers' socio-demographic and economic status, their beliefs and perceptions regarding immunisation, as well as the measles vaccination status of their children.

The data analysis revealed statistical significant associations between certain socio – economic and demographic variables and the immunisation status of children. It emerged that with higher levels of education, adequate financial support, easy access to health care facilities and client friendly services, the immunisation rates of children increased. It also emerged that children from ethnic groups with a more traditional way of life, tend to be less often immunised.

It was concluded that the factors associated with the lower than national immunisation levels in the Opuwo Health District, could be attributed to socio-economic, demographic and ethnic variables.

TABLE OF CONTENTS

Abstract	i
Acknowledgements	v
Dedication.....	vii
Declaration.....	viii
Abbreviations and acronyms	ix
List of tables.....	x
List of figures.....	xiii
CHAPTER 1: ORIENTATION TO THE STUDY.....	1
1.1 Introduction and background information.....	1
1.2 Statement of the research problem	9
1.3 Purpose of the study	10
1.4 Objectives of the study.....	10
1.5 Hypotheses of the study.....	10
1.6 Significance of the study	12
1.7 Operational definitions.....	13
1.8 Summary	14
CHAPTER 2: LITERATURE REVIEW.....	15
2.1 Introduction	15
2.2 Overview.....	16
2.3 Conceptual frameworks.....	16
2.4 Summary.....	36
CHAPTER 3: RESEARCH METHODOLOGY.....	37
3.1 Introduction.....	37
3.2 Research design	37
3.3 Population	40
3.4 Sampling.....	40
3.5 Data collection	44
3.6 Data analysis.....	49
3.7 Research ethics.....	52
3.8 Summary.....	53
CHAPTER 4: RESEARCH RESULTS AND DISCUSSION	55
4.1 Introduction	55

4.2 SECTION A: Demographic data and socio-economic status of parents and caretakers.....	56
4.3 SECTION B: Measles immunisation status of the children.....	77
4.4 SECTION C: Perceptions of parents and caretakers regarding the importance of immunisation.....	88
4.5 Summary.....	95
CHAPTER 5: CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS OF THE STUDY.....	98
5.1 Introduction.....	98
5.2 Conclusions.....	99
5.3 General recommendations.....	105
5.4 Recommendations for further research	108
5.5 Limitations of the study.....	109
5.6 General conclusion.....	110
REFERENCES.....	112
ANNEXURES.....	119
Annexure A: Approval letter from the Post Graduate Studies Selection Committee – University of Namibia.....	119
Annexure B: Approval letter from the Ministry of Health and Social Services – Office of the Permanent Secretary	120
Annexure C: Letter of permission from the Kunene Regional Health Directorate – Office of the Regional Director	121
Annexure D: Research instrument – Questionnaire	122
Annexure E: Map of Namibia	128
Annexure F: Map of the Kunene Region.....	129

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DEDICATION

This thesis is dedicated to my lovely son, Excellent Ujandja, and my beautiful daughters, Ndapandula Shiwomwenyo and Meriam Kokuuakupi. Let this accomplishment be a source of inspiration for your future studies.

DECLARATION

- I, Katarina Tjiveze, hereby declare that this study is a true reflection of my own research, and that this work, or part thereof, has not been submitted for a degree at any other institution of higher education.

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ABBREVIATIONS AND ACRONYMS

AFR	African region
AIDS	Acquired immunodeficiency syndrome
ANC	Antenatal care
BCG	Bacillus Calmette-Guérin
CDC	US Centers for Disease Control and Prevention
EPI	Expanded Programme on Immunization
HBM	Health Belief Model
MCV	Measles containing vaccine
MDG	Millennium Development Goal
MMR	Measles, mumps, rubella
MoHSS	Ministry of Health and Social Services
NGO	Non-governmental Organisation
PBM	Parental Belief Model
PNC	Postnatal care
RED	Reach Every District
SIA	Supplemental immunisation activity
SPSS	Statistical Package for Social Services
UNAM	University of Namibia
UNICEF	United Nations Children's Fund
WHO	World Health Organization

LIST OF TABLES

Table 1.1	Immunisation coverage in Southern African countries, 1998 and 2010	5
Table 3.1	Comparison table: Health Belief Model versus Parental Belief Model	45
Table 4.1	Age of parents and caretakers	57
Table 4.2	Association between age of parents and caretakers and measles vaccination status of children.....	58
Table 4.3	Relationship to the children	59
Table 4.4	Association between relationship to the children and measles vaccination status of children	59
Table 4.5	Ethnicity of parents and caretakers	60
Table 4.6	Association between ethnicity of parents and caretakers and measles vaccination status of children	61
Table 4.7	Marital status of parents and caretakers.....	62
Table 4.8	Association between marital status of parents and caretakers and measles vaccination status of children.....	62
Table 4.9	Educational level of parents and caretakers.....	64
Table 4.10	Association between educational level of parents and caretakers and measles vaccination status of children.....	64
Table 4.11	Employment status of parents and caretakers.....	66
Table 4.12	Association between employment status of parents and caretakers and measles vaccination status of children.....	67
Table 4.13	Financial support of unemployed parents and caretakers.....	67
Table 4.14	Association between financial support of unemployment parents and caretakers and measles vaccination of children.....	68
Table 4.15	Main source of information about immunisation.....	70
Table 4.16	Association between main source of information about immunisation and measles vaccination status of children.....	70
Table 4.17	Mode of transport of parents and caretakers.....	71
Table 4.18	Association between mode of transport of parents and caretakers and measles vaccination of children.....	72
Table 4.19	Travelling time required by parents and caretakers to reach health facility/outreach point	73
Table 4.20	Association between travelling time required by parents and caretakers to reach health facility/outreach point and measles vaccination status of children.....	74
Table 4.21	Waiting time for immunisation services.....	75
Table 4.22	Association between the waiting time for immunisation service and measles vaccination status of the children.....	75

Table 4.23	Responses regarding the availability of registers at health facilities.....	76
Table 4.24	Association between the availability of registers at the health facility and the measles vaccination status of the children.....	77
Table 4.25	Ages of the children.....	79
Table 4.26	Association between the ages of the children and the measles vaccination status.....	79
Table 4.27	Gender of the children.....	80
Table 4.28	Association between the gender of the children and the measles vaccination status.....	81
Table 4.29	Birth order of the children.....	81
Table 4.30	Association between the birth order of the children and measles vaccination status.....	82
Table 4.31	Measles vaccination status of the children.....	83
Table 4.32	Age at which the children received the measles vaccination.....	84
Table 4.33	Awareness of the provision of immunisation services at health facilities.....	84
Table 4.34	Association between the awareness of the provision of immunisation services at health facilities and the measles vaccination status of the children.....	85
Table 4.35	Availability of outreach points in the areas.....	85
Table 4.36	Association between the availability of outreach points in the areas and the measles vaccination status of children.....	86
Table 4.37	Information provided to respondents during the vaccination of their children.....	87
Table 4.38	Association between the information provided to parents and caretakers during vaccination and the measles vaccination status of the children.....	88
Table 4.39	Immunisation awareness on the part of parents and caretakers.....	89
Table 4.40	Association between immunisation awareness on the part of parents and caretakers and measles vaccination status of the children.....	90
Table 4.41	Perceptions of parents and caretakers regarding immunisation.....	91
Table 4.42	Parents and caretakers' knowledge about the advantages of immunisation.....	91
Table 4.43	Association between the knowledge of parents and caretakers about the advantages of immunisation and the measles vaccination status of the children.....	92

Table 4.44	Beliefs of parents and caretakers about the availability of local substitutes for immunisation.....	93
Table 4.45	Association between the beliefs of parents and caretakers about the availability of local substitutes and the measles vaccination status of the children.....	93
Table 4.46	Awareness on the part of parents and caretakers about measles as a disease.....	94
Table 4.47	Association between awareness of the parents and caretakers about measles as a disease and the measles vaccination status of the children.....	95

LIST OF FIGURES

Figure 2.1: Health Belief Model.....	32
Figure 2.2: Conceptual Model of Parental Decision Making.....	33

CHAPTER ONE

ORIENTATION TO THE STUDY

1.1 Introduction and background information

In view of the ease with which measles spreads it is regarded as one of the most dangerous of all the childhood diseases. Measles spreads from person to person as a result of respiratory contact and via oral or nasal secretions. Initial symptoms, which usually appear 10 to 12 days after the initial infection, include high fever, runny nose, bloodshot eyes and tiny, white spots on the inside of the mouth. As already indicated measles is highly contagious and may lead to serious complications and even death. These complications may include encephalitis, diarrhoea, impaired vision and pneumonia (Weber, 2008, p. 28). Measles is the leading cause of death in children in Africa, ahead of AIDS, tuberculosis and malaria. It is for reason that measles vaccination, also known as immunisation, is implemented in order to reduce child mortality.

Immunisation has a long history of success with studies showing that it has an impact on the major causes of infant death and also that it may shape trends in mortality and morbidity in communities. Immunisation remains one of the most cost-effective health interventions while it has been proved to prevent up to 24% of the 10 million annual deaths of children under the age of five years (Sanou, Simboro, Kouyaté, Dugas, Graham, & Bibeau, 2009).

This study indicated that, if children were to receive the most benefit from immunisation, complete immunisation coverage should reach at least 90% of

children at country level and 80% in sub-areas by the year 2010, as per the World Health Organization (WHO). Unfortunately such an ambitious objective is far beyond the actual reach of most developing countries. The study also emphasised that parental factors, such as knowledge, attitude, education and socio-economic status, are crucial in determining vaccination coverage as they play a vital role in whether parents/caretakers either demand or accept the offer of vaccination. The study further emphasised that services delivery points, the knowledge and attitudes of service providers, interaction with parents and the availability of vaccination services all determined the vaccination status of children (Sanou et al., 2009).

In developed countries where is a relatively good vaccination service on offer, parental attitudes tend to determine vaccination uptake. However, the importance of parental factors is less clear in developing countries with relatively poor services or restricted access to vaccination services. In addition, other factors impeding immunisation included inadequate knowledge about immunisation, a lack of suitable venues, long waiting times, transportation difficulties, non-medical facilities and poor motivation (Cockcroft, Anderson, Omer, Ansari, Khan, Chaudhry, & Ansari, 2009). Apart from the social problems, the terrain of the environment has also been reported to affect immunisation coverage; especially where the terrain makes it difficult for parents/caretakers to reach the health facilities or for health workers to reach all the villages (Adeiga, Omilabu, Audu, Sanni, Lakehinde, Balogun, & Olagbaju, 2005). Namibia is one of the developing countries which is characterised by difficult terrain environments and by a low immunisation coverage and uptake, the Kunene region in particular.

This study focused on measles immunisation coverage. Measles is an extremely contagious viral disease that affects almost every child in the world. In 1980, before the widespread global use of measles vaccine, an estimated 2.6 million deaths as a result of measles occurred worldwide. In 2001, in order to accelerate the reduction in measles cases, the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) developed a strategy aimed at delivering two doses of measles-containing vaccine (MCV) to all children through routine services, supplementary immunisation activities (SIAs) and improved surveillance. Subsequent to the implementation of this strategy, the estimated number of annual measles deaths worldwide decreased from 733,000 in 2000 to 164,000 in 2008 (WHO, 2011).

In 2010, the World Health Assembly endorsed the objectives aimed at raising the routine measles coverage by the year 2015. This involved an administration rate for the first dose of MCV (MCV1) to children aged 1 year of $\geq 90\%$ nationally and $\geq 80\%$ in every district. It also aimed to reduce and maintain the annual incidence of measles to less than five cases per million, and to reduce measles mortality by more than 95% from the 2000 estimate. Between 2000 and 2010, the global MCV1 coverage increased from 72 to 85%. However, unfortunately, by the end of 2010, 40% of countries had still not met the incidence target of less than five cases per million (Centers for Disease Control and Prevention (CDC), 2011).

In 2001, the countries in the World Health Organization (WHO), African Region (AFR) became part of a global initiative with the goal of reducing the number of measles deaths (733,000 deaths in 1999) by 50% by 2005, as per the 2000 report.

The recommended strategies to reduce the measles mortality rate included increasing the routine coverage for the first dose of MCV1 to all children; providing a second opportunity for measles vaccination through SIAs; improving measles case management and establishing case-based surveillance with laboratory confirmation of all suspected measles cases. Between 2001 and 2008, the estimated MCV1 coverage increased from 57 to 73%, SIAs vaccinated approximately 398 million children and reported measles cases decreased by 93% – from 492,116 in 2001 to 32,278 in 2008.

In 2006, AFR had achieved the goal of reducing measles deaths by 90% of the original 733,000 deaths. However, inaccuracies in the reported vaccination coverage existed, surveillance was suboptimal, and measles outbreaks continued to occur in AFR countries. Of the 46 AFR countries, 12 (26%) reported measles incidences of less than five cases per one million population during 2010, as compared with 28 (61%) countries in 2008 (CDC, 2011).

The routine measles vaccination coverage has been selected as an indicator of progress towards achieving the fourth Millennium Development Goal (MDG 4 – Reduce child mortality rate) (WHO, 2009). The aim of MDG 4 is to reduce the less than five years mortality rate by two-thirds between 1990 and 2015. Africa reported an improvement in measles vaccination coverage from 54% in 1990 to 84% in 2009 while Namibia reported an increase from 61% in 1998 to 75% in 2010 (WHO, 2011). Other southern African countries also recorded an improvement in measles immunisation coverage in 2010 as compared with the 1998 data (see Table 1.1).

Table 1.1: Immunisation coverage in Southern African countries, 1998 and 2010

Country	1998 measles immunisation coverage (%)	2010 measles immunisation coverage (%)
Botswana	80	94
Swaziland	62	94
Angola	65	93
Malawi	93	93
Tanzania	72	92
Zambia	65	91
Lesotho	43	85
Zimbabwe	65	84
Namibia	61	75
Mozambique	87	70
South Africa	76	65

Source: WHO, WHO Vaccine Preventable Diseases: Monitoring System 2011 Global Summary

The table above indicates that most of the countries in Southern Africa were able to improve measles immunisation coverage by 2010 although two countries, namely, Mozambique and South Africa, had been unable to improve their vaccination coverage. Malawi consistently kept its measles immunisation coverage above 90% while Namibia, Mozambique and South Africa recorded measles immunisation coverage of below 80%. As a result of this low measles immunisation coverage, many countries in Africa are potentially at risk of measles outbreaks.

Measles immunisation is essential because, despite the fact that, during the first nine months of life, the child has some natural protection against measles that is inherited from the mother, this natural protection comes to an end after nine months and the child is, thus, at risk of the disease (Adamson, 1993). According to the World Health Organization (WHO) guidelines, children are considered fully protected against

measles for life when they have received one dose of measles vaccination by twelve months of age (Ministry of Health and Social Services and Macro International Inc., 2008).

The measles, mumps, and rubella (MMR) vaccine is highly effective in preventing measles and its complications. Sustained measles transmission was eliminated in the United States in the late 1990s although the disease remains common in many countries worldwide and cases of measles are imported to the United States regularly. During the first 19 weeks of 2011, 118 cases of measles were reported in the United States (U.S.), the highest number for the same period in any year since 1996 with high hospitalisation rates (40%). Importations accounted for 46 (40%) cases, including 34 (74%) cases among United States residents who had recently travelled abroad. Among the 118 cases, 105 (89%) were import associated, of which 46 (44%) were importations from at least 15 countries, 49 (47%) were import-linked, and 10 (10%) were imported virus cases. Among the 46 imported cases, most were among persons who had contracted the disease in the WHO European Region (20), South-East Asia region (20) and African region (20) with two contracting the disease in the Eastern Mediterranean region, one in the Americas region and 1 in the Western Pacific region (CDC, 2011).

In Namibia strategies are in place to ensure the immunisation of children within the prescribed age frame. These strategies have been further enhanced by the establishment of the Expanded Programme on Immunisation (EPI), which focuses on strengthening routine immunisation and also on eradicating the incidence of measles.

EPI has striven to achieve and maintain an immunisation coverage above 90% in each district (MoHSS, 2008).

However, this commendable goal has yet to be achieved in the Opuwo Health District, specifically with regard to measles. As early as 2002, Taapopi reported on the vaccination coverage and factors associated with vaccination coverage among children aged 12 to 23 months in the Opuwo district, in the Kunene region. He found that 68% only of children had received measles vaccination and those factors such as ethnic group, education level, lack of motivation regarding immunisation, lack of information, and health facility-related problems were associated with child vaccination status.

Data obtained from another study that was conducted in Namibia (Ministry of Health and Social Services and Macro International Inc., 2008) revealed that 83% only of all children between the ages of 12 and 23 months had been immunised against measles, well below the targeted 90%. It is important to note that there is a variation in the vaccination coverage of measles in the 13 regions of Namibia and also among the subgroups comprising the population of Namibia. This coverage ranges from nearly 61% in the Kunene region to 98% in the Oshana region. The latest statistical data available from the Ministry of Health and Social Services indicate that approximately 40% only of all children in Opuwo had been immunised against measles (Ministry of Health and Social Services and Macro International Inc., 2008).

Despite the findings of two studies (Taapopi, 2002; Ministry of Health and Social Services and Macro International Inc., 2008) that reported low measles immunisation

coverage in the Opuwo Health District, measles immunisation coverage was expected to be increased because of the change in the situation brought about by the expansion of health centres, the construction of more clinics and, improved communication in terms of roads and network coverage. Unfortunately, from 22 September 2009 to 9 March 2010, the district experienced extensive measles outbreaks with more than a third of the laboratory-confirmed cases occurring among adults and children with 16 (1.2%) deaths being recorded.

The Kunene region, one of the thirteen regions of Namibia, is home to the Himba, Herero, Zemba, Damara, Nama and Vambo ethnic groups. As compared to the rest of Namibia the region is underdeveloped, mountainous and dry with residential areas that are difficult to access and poor agricultural food production. These conditions, in turn, have become conducive to a nomadic mobile way of life in search for better grazing areas.

The estimated population of the Kunene region is 81,423 (Population Census Report, 2001). The region borders Angola and also five other regions, namely, Omusati, Oshana, Oshikoto, Otjozondjupa, and Erongo. The Kunene region comprises three health districts, namely, Opuwo, Outjo and Khorixas.

This study focused on the Opuwo Health District, the largest district and capital of the Kunene region, and with an estimated population of 45,597 and a population density of two persons per square kilometre (Population Census Report, 2001). Opuwo is inhabited predominantly by the Himba pastoral community/tribe. The tribe lives in mountainous areas with either poor or impassable roads. As a result of the

remoteness and the vastness of the area, poverty and strong cultural beliefs remain the main challenges in the district.

1.2 Statement of the research problem

An earlier study that was conducted in Opuwo Health District (Taapopi, 2002) indicated a measles immunisation coverage of 68% only. The study had recommended the ongoing monitoring of vaccination coverage through routine reporting supported by surveys which should be repeated at least every five years in the Opuwo district in order to identify factors which were hindering vaccination coverage in the district. Another study that was conducted in Namibia in 2006 found that, on average, approximately 83% of all children had been immunised against measles whereas in the Kunene region about 60% only of all children had been immunised against measles. However, in the Opuwo District approximately 40% only of all children had been immunised against measles (Ministry of Health and Social Services and Macro International Inc., 2008). In 2009 to 2010, Namibia experienced extensive measles outbreaks with the Opuwo Health District in the Kunene region being one of the districts most affected. Based on the recommendations of the study conducted by Taapopi (2002) and in view of the recurrent measles outbreaks, which had included fatalities, in the district, the researcher decided to conduct this study in order to seek an answer to the reasons for the low immunisation status in Opuwo.

1.3 Purpose of the study

The purpose of this study was to investigate the factors associated with the low measles immunisation coverage in the Opuwo Health District in the Kunene region.

1.4 Objectives of the study

The objectives of the study include the following:

- To determine the demographic and socio-economic factors pertaining to both the parents/caretakers of immunised children and the parents/caretakers of non-immunised children
- To determine factors, other than socio-demographic factors, that may be associated with the current low immunisation status of children in the Opuwo Health District
- To examine perceptions of parents/caretakers regarding the immunisation of their children in the Opuwo Health District

1.5 Hypotheses of the study

Research objectives	Null hypotheses [H_0]	Alternative hypotheses [H_A]
<ul style="list-style-type: none"> • To determine the demographic and 	<ul style="list-style-type: none"> • There will be no statistically significant 	<ul style="list-style-type: none"> • There will be statistically significant

<p>socio-economic factors pertaining to both the parents/caretakers of immunised children as well as the parents/caretakers of non-immunised children</p>	<p>differences between the parents/caretakers of immunised and non-immunised children with regard to demographic and socio-economic factors</p>	<p>differences between the parents/caretakers of immunised and non-immunised children with regard to demographic and socio-economic factors</p>
<ul style="list-style-type: none"> • To determine factors other than socio-demographic that may be associated with the current low immunisation status of children in the Opuwo Health District 	<ul style="list-style-type: none"> • There will be no statistically significant differences between the parents/caretakers of immunised and non-immunised children with regard to other factors that may possibly either contribute or not contribute to 	<ul style="list-style-type: none"> • There will be statistically significant differences between the parents/caretakers of immunised and non-immunised children with regard to other factors that may possibly either contribute or not contribute to immunisation

	immunisation	
<ul style="list-style-type: none"> To examine the perceptions of parents/caretakers as regards the immunisation of their children in the Opuwo Health District 	<ul style="list-style-type: none"> There will be no statistically significant differences between the perceptions of the parents/caretakers of immunised and non-immunised children with regard to immunisation 	<ul style="list-style-type: none"> There will be statistically significant differences between the perceptions of the parents/caretakers of immunised and non-immunised children with regard to immunisation

1.6 Significance of the study

The study investigated factors associated with the low measles immunisation coverage in the Opuwo Health District in the Kunene Region. It is envisaged that the study results will be used by the Ministry of Health and Social Services (MoHSS) and by various non-government organisations (NGOs). In addition, the study should be of importance in guiding the Kunene Regional Health Directorate and the Opuwo Health District, in particular, in ensuring that their planning and budgeting processes are in line with improving the measles immunisation coverage and in assisting them to mobilise resources from line ministries, stakeholders and NGOs.

The results of this study will further help policy makers, NGOs and other stakeholders to design practical intervention strategies aimed at improving the measles immunisation coverage in the district. Such strategies may include enlarging outreach teams, conducting awareness campaigns on the importance of immunising children and providing health education to parents on immunisation from the antenatal period up to the postnatal period. The study will also help the Opuwo Health District, in particular, and the Kunene Region, in general, as well as the country at large to plan and execute control strategies aimed at the prevention of measles outbreaks in the future.

The study will also contribute to the existing body of knowledge on the demographic and socio-economic characteristics, perceptions, and beliefs of parents as regards the immunisation of children in the Kunene region and, in particular, in the Himba community in the Opuwo Health District. Other researchers may also benefit from this study and the study will also add on the existing knowledge of measles, measles outbreaks and possible controls.

1.7 Operational definitions

Immunisation:	Refers to the production of an immune response in the host after the introduction of a foreign antigen. The terms immunisation and vaccination tend, however, to be used interchangeably.
Low immunisation coverage:	An immunisation coverage that is below 80% in a district and, thus, less than the WHO target ($\geq 80\%$).

Vaccine: Refers to a substance made from the germs that causes a particular disease and which is given to an individual to prevent his/her contracting the disease.

1.8 Summary

This chapter introduced the concept of an expanded programme on immunisation, measles immunisation in particular. It provided background information concerning low measles immunisation coverage in the health district under study. A statement of the research problem, purpose, objectives, hypothesis and significance of the study as well as operational definitions were presented. The next chapter will focus on literature review with regard to low measles immunisation coverage in both developed and developing countries as well as conceptual frameworks that assisted with literature research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

A literature review is an organised written presentation of information on a topic that has already been published by scholars. The purpose of the literature review was to convey to the reader what is currently known regarding the topic of interest (Burns & Grove, 2005). In view of the fact that immunisation coverage data serves as an indicator of a health system's capacity to deliver essential services to the most vulnerable members of a population, various research studies have been conducted using completed immunisation surveys.

The conceptual frameworks that assisted with the literature search in this study included the health belief model (HBM) and the parental belief model (PBM). The literature review will focus on the four main constructs which emerged repeatedly throughout the literature review. These main constructs include perceived seriousness, perceived susceptibility, perceived benefits and perceived barriers. Each of these perceptions, either individually or in combination, may be used to explain health behaviour. Other constructs that were added include cues to action, motivating factors and self-efficacy (Chin, Monroe, & Fiscella, 2000). Despite the fact that the literature presents these constructs in a variety of contexts, this study will focus primarily on the application of these constructs to parents' decision making regarding their children's measles vaccination.

2.2 Overview

According to a WHO report (2011), it was estimated that, in 2008, measles caused between 117,000 and 164,000 child deaths throughout the world. According to the Namibia Demographic and Health Survey report of 2006 – 2007, immunisation coverage in Namibia has remained below 90%. Data that were obtained from a study that was conducted in Namibia during 2006 (Ministry of Health and Social Services and Macro International Inc., 2008) revealed that 83% only of all children between the ages of 12 and 23 months had been immunised against measles. The study also indicated that, in the Kunene region, the measles immunisation coverage was 60% and in the Opuwo Health District 40% – less than Taapopi's (2002) finding of 68%.

It is possible to ascertain the measles immunisation coverage by using various demographic and socio-economic characteristics of the parents and caretakers of children, their perceptions and beliefs as well as their lack of motivation, lack of information and negative experiences regarding immunisation.

2.3 Conceptual frameworks

The literature review is drawn in part from both the Health Belief Model and the Conceptual Model of Parental Decision Making regarding their health and that of their children.

The Health Belief Model predicts health related behaviour by assessing the beliefs of individuals about the likelihood that behaviour may prevent illness as well as

perceived barriers to diseases. This model includes concepts such as perceptions, modifying factors and the likelihood that the parents and caretakers of the children concerned will take action. The Health Belief Model proposes that people make their health decisions based on their perceived susceptibility to disease, their perceived severity of the disease, their perception of benefits versus costs and cues to action (Glanz, Lewis, & Rimer, 2002).

Perceived susceptibility to disease may be described as the subjective perceived risk of contracting a disease (Glanz et al, 2002). In other words, the perceived severity of disease refers to the subjective feeling concerning the seriousness of disease including the medical and social consequences of the disease concerned. Personal susceptibility is an essential perception in prompting people to adopt healthier behaviours (Glanz et al, 2002). Perceived susceptibility may motivate parents to take their children to be vaccinated against diseases (Chen, Fox, Cantrell, Stockdale, & Kagawa-Singer, 2007). Logically, when people believe that they are at risk of contracting a disease, they will be more likely to take action to prevent this from happening. On the other hand, people who believe that they are not at any risk or that they have a low risk of susceptibility will not experience any compelling need to take any action that may prevent them from contracting the disease in question.

The **perception of benefits** versus costs refers to the evaluation of the effectiveness of the various actions that may be taken in order to reduce either the threat of disease or the burden of the disease (Glanz et al, 2002). Accordingly, a perceived benefit is a person's opinion of the value or usefulness of a new behaviour as regards decreasing the risk of contracting a disease.

The “**perceived barriers to care**” aspect of the model includes, inter alia, emotional, economic, social or physical factors that may prevent an individual from seeking care. In addition, this aspect of the model encompasses the tangible costs that may influence the decision to seek care (Glanz et al, 2002). It is essential that a person believe in the benefits of a new pattern of behaviour if the person is to adopt the new behaviour (Centers for Disease Control and Prevention, 2004). It is, thus, vital that parents receive education as regards the eight communicable diseases, namely, polio, tuberculosis, diphtheria, pertussis, tetanus, hepatitis, influenza, and measles, their causes and also preventive measures, including immunisation. In addition, it is recommended that information about complications which may arise from these diseases, for example, disabilities and deaths, also be included. This, in turn, should result in the parents realising the benefits of immunisation and deciding to make use of the vaccination services available.

Modifying variables refer to those variables that may modify the above mentioned constructs of perception. These variables include, inter alia, level of education, age of parents, ethnicity, gender, culture, accessibility to immunisation services, transport, information, motivation of parents/caretakers regarding immunisation, past experiences of parents on immunisation and health facility related problems. These variables that influence personal perceptions are all individual characteristics and are discussed below:

Level of education of parents/caretakers and immunisation

Several researchers have found that education plays a vital role in the decision to access health services as well as the decision to immunise children with low levels of education being associated with lower immunisation coverage. This was also the finding in a study which was conducted in the Democratic Republic of Congo. The study indicated that the educational level of the father and the mother's knowledge of the Expanded Programme of Immunisation (EPI) were significant factors as regards the immunisation of their children (Mapatano, Kayembe, Piripiri, & Nyandwe, 2008). The educational status of the parents was found to be the most significant factor as regards the immunisation status of children in rural Nigeria (Odusanya, Alufohai, Meurice, & Ahonkai, 2008) while a study conducted in the Opuwo district in Namibia found that low educational levels of the parents were associated with low vaccination coverage of children (Taapopi, 2002).

Another study reported that, in general, a similar pattern existed throughout Namibia. Thus, the specific implication of these findings is that the better educated the parents the better the immunisation status of their children (Ministry of Health and Social Services and Macro International Inc., 2008). A study conducted in the Outapi district in the Omusati region in Namibia revealed that, despite the fact that many parents had attained primary through to tertiary education, immunisation coverage was less than 80% (Shikongo, 2010). A study conducted in peri-urban Karachi in Pakistan found that the educational status of parents was significantly associated with the immunisation status of their children with 50% of nonimmunised children being more likely to have an illiterate father only, 71% of partially immunised children being more likely to have an illiterate mother only and more than four times as likely

to both an illiterate father and an illiterate mother (Siddiqi, Khan, Nisar, & Siddiqi, 2007).

A similar study conducted in Malawi revealed that the educational level of the mother is an important determinant of immunisation status of the child. In 2004, 84% of the children whose mothers had a secondary and higher level of education were fully vaccinated compared to 55% of the children whose mothers had had no education (Munthali, 2007).

A study conducted in Mozambique found that a low educational level on the part of mothers was strongly associated with low vaccine uptake (Jani, De Schacht, Jani, & Bjune, 2008). Another study conducted in Nairobi, Kenya found that the mothers' level of education was associated with vaccination of their children with mothers with primary or higher level education being more likely to have children who were fully vaccinated (Mutua, Kimani-Murage, & Ettarh, 2011).

Educational background has also been found to be a factor in non-African countries and, in India, it was reported that most of the non-immunised children were the sons and daughters of illiterate mothers (Sharma, Kumar, Goel, & Mangar, 2008). However, it emerged from the literature that, even in "developed countries", the level of education of parents was a factor as regards the immunisation of children. In Japan, Matsumura, Nakayama, Okamoto, & Ito (2005) found that the mothers of non-immunised children possessed insufficient knowledge about immunisation of children while a study conducted in Austria indicated that low measles vaccination

coverage is directly associated with the educational level of the fathers (Stronegger & Freidl, 2009).

Age of parents and immunisation

A study conducted in the Opuwo Health District found that the age of mothers, guardians or caretakers did not significantly influence the vaccination status of the children as there was no apparent difference between those children who were fully vaccinated and those who were either partially vaccinated or not vaccinated (Taapopi, 2002).

In Japan it was found that the main characteristics of mothers of unvaccinated children included the mothers being aged younger than 30 years, working and concerned about the adverse events of the vaccine (Matsumura et al., 2005). A study conducted in Kinshasa, Democratic Republic of Congo, found that the age of the mother, whether young or old, did not influence the immunisation status of the child (Mapatano et al., 2008). Mutua et al. (2011) found that in Nairobi, Kenya, maternal age was a strong predictor of the vaccination status of children with older mothers being more likely to have children who were vaccinated as compared to mothers who were aged less than 20 years and whose children were not vaccinated.

Following the study that was conducted by Taapopi (2002) and which indicated no relationship between the age of the mother and the immunisation status of children in the Opuwo Health District, this study intends to establish whether this finding is still valid in view of both the many interventions that have occurred in line with health

education and improved service delivery. Thus, the researcher is of the belief that these developments, which have taken place since the study of Taapopi was conducted, may have resulted in a change as regards the effect of age of parents on immunisation.

Ethnicity and immunisation

The ethnic group of mothers may also be a factor associated with the immunisation status of children. A study conducted in the Opuwo Health District in the Kunene region by Taapopi (2002) found that more children in the Himba tribe were either partially vaccinated or not vaccinated, as compared to the children in other tribes such as the Hereros, Vambos and Zembas. The Himba community is a traditionally nomadic tribe in Namibia and similar to the nomadic population in the Henan province of China (Taapopi, 2002). A study conducted in China found that immunisation coverage of children of a nomadic population was less than 60% while the overall coverage with four kinds of vaccines was 32% only (Guo & Feng, 2000).

In the urban slums of the Lucknow district in India, it was found that the Muslim religion, scheduled caste or tribes and high birth order were significantly associated with the partial immunised status of children (Nath, Singh, Awasthi, Bhushan, Kumar, & Singh, 2007). Another study conducted in Nairobi, Kenya found that ethnicity was significantly associated with the vaccination status of children with the

children from the Luhya, Luo and other ethnic groups having a lower likelihood of vaccination as compared to Kikuyu children (Mutua et al., 2011).

The study conducted by Taapopi in 2002 indicated that the tribe of parents was significantly associated with the immunisation status of children in the Opuwo Health District as the children from the Himba tribe were found to be either partially vaccinated or not vaccinated at all as compared to the children from the other tribes in the district. This study intends to establish whether this finding is still valid in view of the many interventions involving health education, outreach services and improved service delivery since 2002. These developments may imply that, since the study was carried out in 2002, there is a possibility that the effect of ethnicity on the immunisation status of children may have changed.

Birth order and immunisation

Researchers have also found that birth order may be one of the factors affecting the immunisation status of children. In other countries it has been shown that there is a strong association between immunisation status and birth order with children born into larger families having a low vaccination uptake and first-born children being more likely to be immunised on time than second-born children. A study conducted in Malawi found that the vaccination coverage among the first-born children was higher than those who were born later – 79% of the first-born children aged 12 to 23 months had been fully vaccinated as compared to 58% of the children who were sixth or above in the birth order (Munthali, 2007). Matsumura et al. (2005) reported

the same findings in Japan, namely, that children who had not been vaccinated were often not the first born.

These findings have been recorded from outside Namibia and, most especially, in settings very different to Opuwo, in particular, and the Kunene region in general. Accordingly, this study seeks to establish whether the effect of birth order, as proved elsewhere, is valid in Opuwo and in the Kunene region.

Gender of the child and immunisation

The literature also discussed the effect of cultural factors on immunisation. Research conducted in Chandigarh in India indicated that measles coverage is lower in female children than in male children – 56% versus 63.5%. The study indicated that, as a result of cultural beliefs that males are more important than females; female children were not taken care of in the way that male children were (Sharma et al., 2008). However, a study conducted in Malawi revealed that there was no difference between the vaccination coverage of male children and the vaccination coverage of female children (Munthali, 2007). In addition, a study conducted in a rural setting in Mozambique by Jani et al. (2008) did not find any significant difference in the gender of children with respect to children with either complete or incomplete vaccination status.

A study conducted in Surat, India, found that the sex of the child was associated with child immunisation because, when the two genders were compared, the proportion of fully immunised children was higher in females (27%) than in males (23%). These

results indicated a welcome change as regards the caring for female children in India and may be contrasted with the findings of the study conducted in 2008 by Sharma et al. (Trivedi, Mundada, & Chudasama, 2009).

In view of the fact that studies conducted in both African and non-African countries have shown that the gender of the child is not associated with the immunisation of a child except in India, this study intends to establish whether this finding is also valid in the region in question.

Financial support and immunisation

The issue of financial support to the mothers by partners and other family members to enable the mothers to access vaccination sites is also discussed in the literature as most of the mothers of children are either housewives or unemployed. A study conducted in Kinshasa, Democratic Republic of Congo, found that the father's involvement was associated with the child's vaccination status in the high coverage zone with fathers either providing transport fare or accompanying the mothers to the vaccination sites (Mapatano et al., 2008).

In Mozambique, Jani et al. (2008) found that mothers were often motivated in children's immunisation, they understood the benefits of immunisation and they were willing to walk long distances to access health care. In view of the fact that the majority of the mothers in the study were peasant mothers with no formal income, the money for the travelling costs must have come from other family members or alternative sources. The study also found that the level of incomplete vaccination

status was high as a result of the difficulties experienced in accessing the health facility as the population settlements were more dispersed (Jani et al., 2008).

A study conducted in Pakistan found that, in many cases, poverty constituted a barrier to vaccination as the parents were often not able to afford the costs of the supposedly “free” immunisations with the travel costs, opportunity costs, and demands for unofficial payments (Cockcroft et al., 2009). A study conducted in Nairobi in Kenya revealed that financial barriers among the socio-economically disadvantaged groups were significantly associated with the vaccination status of children (Mutua et al., 2011).

Transport and immunisation

The transport to health facilities is one of the factors associated with low immunisation coverage. A study conducted in the Opuwo Health District by Taapopi (2002) found that accessibility to health facilities was associated with immunisation status. The study found that 21% of the mothers whose children were partially vaccinated and 17% of the mothers whose children were not vaccinated lived far from health facilities and had no access to transport. Another study conducted in difficult to reach areas in the Lagos metropolis found that obstacles such as the nature of the mothers’ busy work schedules, the long distances to outreach clinics and the unavailability of transport to access vaccination centres were associated with low immunisation coverage with these accounting for 48% of non-immunised children of the cases studied (Adeiga et al., 2005). Another study conducted in rural

Mozambique showed that distance to health facility and spending more than hour to reach the nearest health facility had a negative influence on the immunisation uptake with 52% mothers interviewed during the survey living far away from the nearest health facility (Jani et al., 2008).

Lack of information about immunisation

Lack of information about immunisation may also be a factor affecting the immunisation coverage. Mothers and caretakers may be unaware of the need for follow up visits and also unaware of the need for their children to be vaccinated. A study conducted in the Opuwo Health District identified the lack of information as one of the factors associated with child vaccination (Taapopi, 2002) while a study conducted in the difficult to reach areas of the metropolis of Lagos revealed that a lack of information about the details of vaccination programmes contributed to approximately 41% of the failures either to receive or complete the required vaccinations (Adeiga et al., 2005).

A lack of knowledge regarding the subsequent vaccinations was also found to be one of the reasons for the partial immunisation of 10% of children in the Lucknow district in India (Nath et al., 2007). In Karachi, Pakistan it was found that approximately 14% of the mothers had children who had not been vaccinated appropriately as a result of the fact that the mothers possessed inadequate knowledge of the immunisation schedules (Siddiqi et al., 2007).

A study conducted in rural Nigeria showed that there was a significant correlation between the mothers' knowledge of immunisation and the rate of full immunisation (Odusanya et al., 2008). Trivedi et al. (2009) reported that a lack of information (place, time, date, etc) among the parents in Surat, India was one of the major causes of dropouts from the vaccination programme. The study further reported that an unawareness regarding the need for routine immunisation was the main reason for children not being vaccinated.

In both the Democratic Republic of Congo and Mozambique most mothers recognise the health workers as the major source of information about immunisation and mothers trust these health workers (Mapatano et al., 2008; Jani et al., 2008).

Lack of motivation regarding immunisation

The literature also discussed a lack of motivation as regards immunisation as one of the factors associated with the immunisation status of children. A study conducted in the Opuwo district found that 54% children were partially vaccinated and 30% were not vaccinated as a result of a lack of motivation. Mothers and caretakers were willing to have their children vaccinated but, in view of the fact that they did not understand the benefits of vaccination, they tended to postpone taking their children for vaccinations and, thus, the children's opportunity to be vaccinated was lost (Taapopi, 2002). Adeiga et al. (2005) reported that lack of motivation was one of the reasons advanced by mothers in Lagos, Nigeria for their failure either to vaccinate or

complete the immunisation of their children with a lack of motivation accounting for 12% of the reasons for failing to immunise.

Children missed being vaccinated because mothers had not being educated about the importance of immunisation during the antenatal period. In the Lucknow district in India it was found that 16% of mothers had no faith in the effectiveness of vaccination and were often apprehensive as a result of sickness on the part of the elder sibling (Nath et al., 2007). Siddiqi et al. (2007) found that mothers in peri-urban Karachi in Pakistan had refused to allow their children to be vaccinated as a result of a lack of motivation with 33% of mothers perceiving vaccination as unnecessary, 26% reporting child sickness on the due date, 26% maintaining that the vaccine made their children sick and 10% considering that their children were too weak to be vaccinated.

Negative experiences as regards immunisation

Negative experiences as regards immunisation may be one of the factors associated with low immunisation coverage. Yawn et al identified fear of side effects as an important factor for under immunisation when they conducted a study in an affluent community in the United States of America. In other countries such as Malawi, Ethiopia, Bangladesh, the Philippines, India and the Democratic Republic of Congo it emerged that mothers understood the side effects of immunisation with some mothers viewing them as a normal occurrence, some expecting them to disappear

anyway and others seeing in them a sign that the vaccine was working (Mapatano et al., 2008).

Taapopi (2002) found that another contributing factor to low immunisation coverage was the possible reaction of children to vaccinations, including fever, pain on the injection site and irritability. However, adverse reactions may discourage mothers from immunising their children simply as a result of a lack of understanding. Both qualitative and quantitative studies conducted in Pakistan cited fear of the adverse effects of vaccination as a reason for children not being vaccinated. Among those mothers (43%) who had heard of possible bad effects, many mentioned the actual side effects of vaccination, including fever and also pain and swelling at the vaccination site, while others mentioned fears and misconceptions about the side effects including the fact that the child may either die or become sterile as a result of having been vaccinated (Cockcroft et al., 2009).

Accordingly, this study is intended to establish whether the findings regarding the fear of adverse effects which proved significant in Namibia, the USA and Pakistan are valid in the Opuwo Health District.

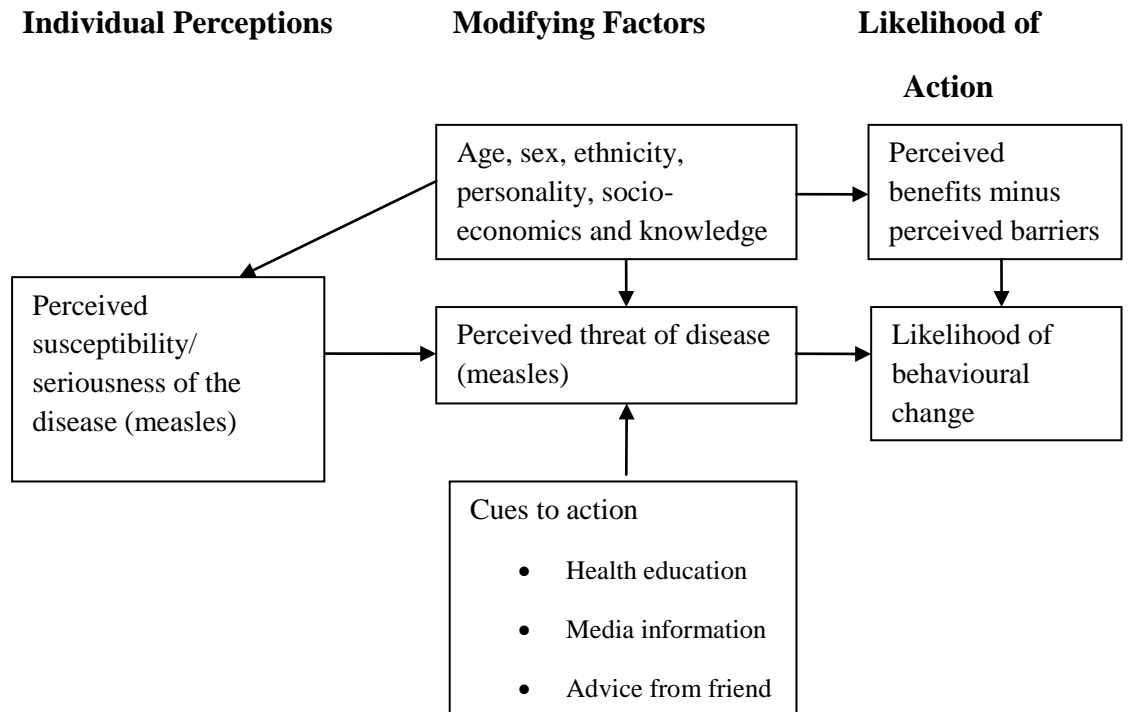
Health facility related problems and immunisation

The factors affecting immunisation status that emerged from some of the older studies tended to be more logistic and administrative in nature. More recent studies, however, have also continued to support the findings that logistic and administrative problems may prevent an optimum immunisation status in children. In this regard a

study conducted in the Democratic Republic of Congo indicated that health system factors such as health services barriers have a detrimental effect on immunisation programmes (Mapatano et al., 2008).

A study conducted in the Opuwo district found that health facility related problems influenced immunisation. Some children were brought to the clinics but were not vaccinated either because the clinics were closed or because there was no vaccine available at the clinic. On the other hand, other children were brought to the clinics for treatment but their health passports were not inspected by the health workers and, thus, they missed the opportunity to be vaccinated (Taapopi, 2002). A study conducted in rural Mozambique identified reasons for incomplete vaccination that were associated with health services delivery as the following: long waiting times for vaccination, no personnel on duty at the health facilities, no vaccines available on the days required, no information about the correct days for vaccination, and vaccinations not given as a result of the children being ill (Jani et al., 2008).

Cues to action refer to those events, people or things that move people to take action as regards soliciting care, for example, the advice from a friend, an advertisement in the media or the advice from a healthcare professional (Glanz et al, 2002). In terms of the Health Belief Model, the decision to vaccinate may be seen as a “function of perceived susceptibility and severity of disease as well as concern about vaccine benefits and risk”. The Health Belief Model may also be used to predict health behaviours. In other words, if people are seen as possessing certain characteristics, then it is believed that it may be possible to predict their behaviour. See figure 2.1 on the next page.

Figure 2.1: Health Belief Model

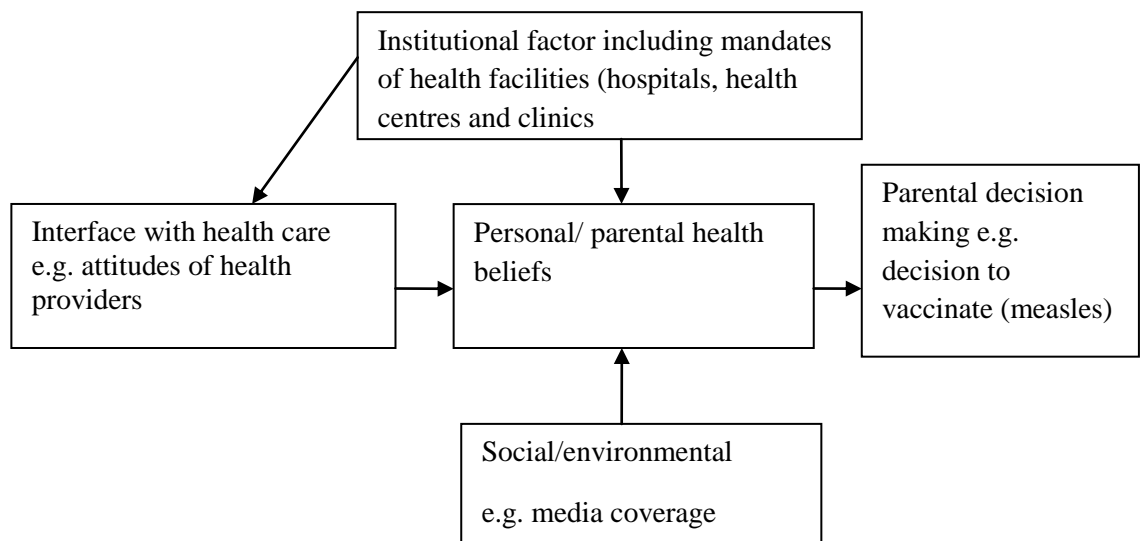
Source: Glanz, Lewis, and Rimer (2002)

In the literature on the parental measles vaccination decision making process, one set of writers articulated a model based on the Health Belief Model that summarises many of the factors that contribute to the decision to vaccinate. In this model, the Conceptual Model of Parental Decision Making, they include institutional, personal, socio-environmental and interface with health care as factors which may influence a parent's decision either to have his/her child vaccinated or not vaccinated (Sturm, Mays, & Zimet, 2005).

In other words, this approach articulates those factors which contribute to one's perception of susceptibility to disease, disease severity, the benefits and risks of

treatment and cues to action. The institutional component of the model encompasses the government, its agencies and its policies while the socio-environmental factor includes cultural attitudes to and beliefs about vaccination and immunisation, including lay and expert knowledge. The personal and/or parental component of the model includes the beliefs of the parent as regards vaccination and vaccine preventable diseases (Sturm et al., 2005). See figure 2.2 below.

Figure 2.2: Conceptual Model of Parental Decision Making



Source: Sturm, Mays, and Zimet (2005)

Interface with health care

The interaction which a parent or head of a family has with the health care provider is an important determinant of health decision making. Studies investigating the acceptability of vaccines have noted that advice from a physician/health worker

about a vaccine may play a significant role in the parents' final vaccination decision (Dinh, Rosenthal, Doan, Trang, & Pham, 2007). For example, Gust, Darling, Kennedy, & Schwartz (2008) found that, for those parents who were resistant to vaccinating their children or who delayed vaccination, the advice of a physician was the main factor that would change their minds.

Personal/parental beliefs related to vaccination

The personal beliefs of parents hold vaccines, the process of vaccination and adverse reactions and immunity may affect the way in which they view the risks pertaining to their vaccination choice, how they view their children's susceptibility to disease and the effect that vaccination may have on their children.

Anthropologist Emily Martin conducted a study that investigated the way in which the American public viewed the immune system. Among her conclusions she found that the way in which the public conceptualises the immune system and how it works differs dramatically from the scientific understanding of immunity. In addition, she found that the public is somewhat conflicted about vaccination as a result of the way they perceived the impact of vaccination on the immune system. Vaccines were generally believed to have the effect of training or educating the immune system while, at the same time, they may compromise to an immune system that should be able to fend off disease if a person concerned were healthy (Sturm et al., 2005).

Advice for parents

Parents make the decision about whether or not to vaccinate their children after weighing up for themselves the risks and benefits of vaccination. The Centers for Disease Control (CDC) provides guidelines to parents for considering vaccinations of children by offering the following recommendations:

Before making a decision, parents/caretakers should review the information on vaccination while taking into account the components of the vaccine, the side-effects of vaccination, the duration of the immunity provided and number of shots needed to ensure immunity. When seeking information about vaccination online, they should verify that the information comes from a valid source. It is also important to talk to the health worker (doctor or nurse) about the benefits and risks of vaccines and about adverse reactions to vaccines. In addition, parents/caretakers should alert the health worker should the child have any allergies or sensitivities to the vaccine components; and also should the child be either moderately or severely ill. Parents/caretakers should also report any adverse reactions experienced after vaccination.

Although these models provided a significant direction and focus to perceptions, the researcher was, nevertheless, aware of the inherent limitations in these models, including a failure to take into account factors such as the environment, economics and also social norms in the form of peer pressure (Chin et al., 2000). These limitations were taken into account when the literature search, as discussed above, was conducted.

2.4 Summary

In this chapter the researcher discussed current information about those factors that were associated with low measles immunisation coverage in both the developed and developing countries during the period 2002 to 2011. The Health Belief Model and the Parental Belief Model were used as conceptual frameworks to assist with literature search. The literature review focused on four main constructs, namely, perceived seriousness, perceived susceptibility, perceived benefits and perceived barriers. Variables, such as education, age and ethnicity, which may modify the perception constructs, were also discussed. It should be noted that all the literature discussed above provided evidence that immunisation is one of the best practices that may improve the living standards of the world population and, most especially, of children. However, immunisation requires a concerted effort on the part of both the service providers and the beneficiaries of immunisation. There remain wider gaps to fill, particularly in the developing countries where resources are minimal and where factors such as culture and other social beliefs are hold sway over modern science, as is the case in Opuwo and in Namibia in general.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The background and rationale to the study were presented in the previous chapter. This chapter will discuss the research design and research method in order to clarify the way in which the researcher carried out the investigation aimed at answering the principal research question, namely, “Why is the measles immunisation coverage in Opuwo lower than the national and regional coverage?” (Brink, 2009).

This section presents an overview of the methods used in the study, namely, the research design, population, sampling, research instrument, data collection method, data processing and data analysis while also discussing the relevant research ethics.

3.2 Research design

The research design flows directly from the specific research question or research hypothesis and is also based on the actual purpose of the study. The research design refers to the set of logical steps taken by the researcher to answer the research question (Brink, 2009).

This study employed a quantitative, descriptive, cross-sectional, analytical research design in order to investigate those factors that are associated with the low measles

immunisation coverage in the Opuwo Health District. The motivation for this choice of research design was based on the following:

- A quantitative approach allows for the quantification of the factors on which the researcher focused (Mouton, 2007).
- Quantitative research explains phenomena by collecting numerical data that were then analysed using mathematically based methods and, in particular, statistical models (Creswell, 1994).
- Quantitative methodology is applicable where the aim of the research is to ascertain “how many, what and where?” In seeking these answers, a quantitative approach relies on the use predetermined response categories by utilising standardised data collection instruments such as the structured questionnaire (Demirbag, 1994). It is, thus, clear that the quantitative approach was appropriate for the purposes of this study.
- A cross-sectional analytical approach allows for the measurement of exposure and effects simultaneously (Bonita, Beaglehole, & Kjellstrom, 2006).
- Cross-sectional studies are observational in nature and are known as descriptive research. A researcher records the information that emerges from a specific population without manipulating the variables. Accordingly, this type of research may be used to describe the characteristics that exist in a population (Trochim, 2006).

- A cross-sectional approach may be used to estimate the population parameters, for example, proportions, odds ratios and totals, that represent the magnitude of a risk factor as well as to determine the extent of a health problem within a population and/or to test a hypothesis related to the degree of association between a causative factor and a health outcome within a defined population. The source of the data used in cross-sectional studies is generally some form of survey, namely, telephonic or personal interviews, self-administered questionnaires or record reviews (Oleske, 2001). For example, in this study, personal interviews were conducted with parents and caretakers using a structured questionnaire.
- The cross-sectional study design was employed in this study as it also provides a quick assessment of the strength of the relationship between a factor and a health outcome associated with the specific factor as the relationship exists within a specified population at a particular time. A cross-sectional approach represents the simplest variety of descriptive epidemiology that may be conducted on representative samples of a population.
- The cross-sectional study design was also deemed suitable for this study because the study utilised different groups of people who differed as regards the variable of interest although they shared other characteristics such as socio-economic status, educational background and ethnicity.

3.3 Population

A population is the entire group of persons or objects that is of interest to the researcher and which meet the criteria which the researcher wishes to investigate (Brink, 2009).

The population considered in this study comprised the parents and caretakers of children aged between 12 and 23 months in the Opuwo Health District. It is during this specific time period that children should be immunised against measles. During the period of the data collection – January 2012 – the Opuwo Health District had a projected population of 45,597 of which 6,840 [15%] were children younger than five years old.

3.4 Sampling

Sampling is a technical accounting device which is used to rationalise the collection of information and to choose, in an appropriate way, the restricted set of objects, persons or events, known as the sample, from which the actual information will be drawn. Sampling is a practical way in which to collect data when the population is either infinite or else extremely large, thus rendering a study of all the elements of the population impossible (Bless & Higson-Smith, 1995). The purpose of sampling is to enable a researcher to determine the characteristics of a population by directly observing a portion (or sample) of the population only.

3.4.1 Sampling frame

The sampling frame comprises the list of population elements from which the sample is drawn (Brink, 2009; Dawn & Gilbert, 2009). In this study the sample was drawn from the population of parents and caretakers of children aged between 12 and 23 months in the rural villages in the Opuwo Health District.

3.4.2 Sampling approaches

In research there are two basic sampling approaches, namely, probability sampling and non-probability sampling. In this study probability sampling was employed. Probability sampling involves using a random sampling procedure in order to select a sample from the elements or members of a population (Brink, 2009).

Probability sampling was employed in this study because the sample selected was much more likely to represent the population and also to reflect the variations in the population. Each individual from the population had an equal probability of being selected, thus ensuring that the sample would be representative of the population. Probability sampling includes simple random sampling, interval or systematic random sampling, stratified random sampling and cluster random sampling (Brink, 2009).

It was impossible to use either simple, systematic or stratified random sampling methods in this study because there was no list available of all the households comprising the population, it was impossible to draw up such a list and the

households were not arranged in order. Accordingly, cluster random sampling was employed in order to select households with children aged between 12 and 23 months from seven villages in the Opuwo Health District to make up the sample. Cluster random sampling was also employed because the population was widely dispersed geographically; while it was also difficult, if not impossible, for the researcher to obtain a total listing of some of the population making up the district (Brink, 2009).

Cluster random sampling was also employed because it is a cost-effective approach and the researcher had limited sources. She was responsible for her own transport and travel costs and there was no extra budget available.

The cluster random sampling was approached as follows:

The Kunene Region comprises three health districts, namely, the Khorixas, Outjo and Opuwo Health Districts.

- The Opuwo Health District was selected for the study because it was characterised by lower measles immunisation coverage than the other health districts while it had also experienced outbreaks of measles in 2009 to 2010.
- The Opuwo Health District consists of three constituencies, namely, the Opuwo, Sesfontein, and Epupa constituencies and it includes of seventeen (17) health facilities.
- Seven villages were randomly selected by using simple random sampling.
- From the seven villages, seventeen households were selected from each village. These seventeen households included the parents and caretakers of

120 children aged between 12 and 23 months. In order to evaluate the vaccination status of the children each selected household had to include a child who met the criteria for inclusion in the study. One household had more than one child who met the criteria for inclusion in the study and, thus, both children were included and assessed. The researcher moved from house to house.

- In the case of no child in the selected household meeting the criteria the researcher moved to the next household until a sample comprising 120 children aged between 12 and 23 months had been reached.

3.4.3 Sample size

A sample may be defined as either a part or fraction of a whole or as a subset of a larger set and selected by the researcher to participate in a research study. Thus, a sample comprises a selected group of elements or units of analysis from a defined population (Brink, 2009). The sample size refers to the number of targeted research study participants about which the researcher wishes to acquire further knowledge. The decision regarding sample size involves determining the number of people that must be studied so as to enable the researcher to obtain sufficient accurate answers to permit a decision about recommendations to be made (Macnee & McCabe, 2008). In this study, the final minimum sample size calculated was based on the following formula proposed by Levy and Lemeshow (2008):

$$n = \frac{N \cdot z^2 \cdot pq}{(N-1) \cdot d^2 + Z^2 \cdot pq} \approx \frac{z^2 \cdot pq}{d^2}$$

As $N \Rightarrow \infty$

where:

n = estimated sample size

z = value for an expected confidence level, usually 1.96

pq = expected variance where p = expected proportion of households with a mother with a child between the ages of 12 and 23 months and q = is $1-p$

N = population size

d = selected accepted error (precision)

(Levy & Lemeshow, 2008)

The total population of people (N) in the Opuwo district is over 45,597 (Population Census Report, 2001). When these data, together with an estimated variance (pq) of 0.25 (0.5 x 0.5) and an absolute error (d) of 0.075, were substituted in the formula above a sample size of 120 was obtained.

3.5 Data collection

This section focuses on the data collection procedures and techniques which formed part of the research design. Data collection is an important process which is critical to the success of a study (Brink, 2009, p. 141). The data collection instrument, data collection process and data collection techniques utilised in the study are discussed below.

3.5.1 Data collection instrument

In order to collect the data required, the researcher administered a structured questionnaire. In other words, the researcher obtained the required information directly from the respondents. The questionnaire included three sections that elicited information about the demographic and socio-economic characteristics of the parents and caretakers of the children, the measles vaccination status of the children and the perceptions of the parents and caretakers as regards immunisation (see Annexure D).

Table 3.1: Comparison table: Health Belief Model versus Parental Belief Model

Section in the questionnaire	Health Belief Model	Model of Parental Belief
SECTION A Demographic and socio-economic status of parents and caretakers	Modifying factors, e.g. age, ethnicity, education, health education, media information, etc.	Social environment, e.g. media, friends, etc.
SECTION B Measles vaccination status	Likelihood of action, e.g. perceived benefits and barriers, behavioural change	Personal and parental health beliefs
SECTION C Perceptions and beliefs of parents	Individual perceptions, e.g. perceived susceptibility, etc.	Decision to immunise, e.g. child receive measles vaccination

3.5.2 Data quality

It is the aim of every researcher to produce quality research and to obtain research results that are meaningful, that reflect reality as accurately as possible and which are replicable (Brink, 2009). Thus, in this study, the researcher employed specific measures to ensure the validity and reliability of the data collection instrument. Validity and reliability are closely related and refer to the accuracy and consistency of the measures used (Macnee & McCabe, 2008).

3.5.2.1 Validity of the data collection instrument

Validity refers to the ability of an instrument to measure the variable that it is intended to measure (Brink, 2009). In this study, both the content validity and the face validity were assessed. Content validity refers to the degree to which an instrument covers the scope and range of information that is sought, while face validity is a subjective determination that an instrument is sufficiently adequate to obtain the desired information.

The researcher established face validity by submitting the questionnaire to three of her colleagues and to her two supervisors. They were asked to evaluate the questions and the thesis outline in relation to the objectives of the study. Their confirmation ensured that the questions did actually assess the test characteristics which the researcher had identified. In order to establish content validity, existing literature on those factors that associated with the low vaccination coverage of children was investigated.

3.5.2.2 Reliability of the data collection instrument

Reliability refers to the consistency and dependability of a research instrument as regards measuring a variable. There are three types of reliability, namely, stability, equivalence and internal consistency (Brink, 2009).

In this study, the researcher employed specific measure to the ensure reliability of the data collection instrument by utilising a control individual who conducted repeat interviews with ten parents during the pretest of the instrument. The findings revealed that the questionnaire provided the same results when the interviews were repeated and, thus, it was consistent (Stommel & Wills, 2004; Rosnow & Rosenthal, 2005; Terre Blanche, Durrheim, & Painter, 2006). As discussed below in the section on the pilot study a few changes were made to the questionnaire.

3.5.2.3 Pilot study

A pilot study may also be referred to as a preliminary study. A pilot study is a small scale study which is conducted by a researcher prior to the main study. The pilot study is conducted using a limited number of subjects from the population at hand. The purpose of a pilot study is to investigate the feasibility of the proposed study and also to detect possible flaws in the data collection instrument, for example, ambiguous instructions or wording and inadequate time limits and also to ensure that the variables defined by operational definitions are actually observable and measurable (Brink, 2009).

Accordingly, the researcher in this study conducted a pilot test of both the data collection instrument and the data collection procedure. The data collection instrument was pretested in the Okondaunue village in the Opuwo Health District in December 2011 on ten parents who were then excluded from the main study. It emerged that there were some ambiguous questions and also some variables had not been included. Accordingly, after the pilot study, minimal changes were implemented. These changes were mainly grammatical and sequential in nature.

3.5.3 Data collection process

The data collection process refers to the process of gathering and measuring information on the variables of interest in an established systematic fashion that enables the researcher to answer the stated research questions, test the research hypotheses and evaluate the outcomes. During this process, the researcher considers exactly what type of information is needed, how the data will be collected, who will collect the data, where the data will be collected and when the data will be collected (Brink, 2009).

In this study, quantitative data were collected while a nominal level of measurement was used to categorise the variables such as ethnicity, marital status, etc. The researcher used a structured questionnaire to gather the data. The data were collected from households of respondents in villages in the Opuwo Health District in the Kunene region in January 2012.

3.5.4 Data collection techniques

In research there are three frequently used data collection techniques, namely, the questionnaire, the interview and observation. In this study, structured interviews were conducted in order to obtain information from the respondents by means of a questionnaire comprising either closed-ended questions or fixed alternative questions (Connaway & Powel, 2010).

In January 2012 the researcher went to the villages to introduce herself to the community members and to collect the data. Upon entering the villages, the researcher sought consent to conduct the study from the headmen of the villages. The researcher moved from house to house in order to collect information. Upon entering the specific household, the researcher sought permission to conduct the interview from household head, as well as the informed consent of the individual respondents before conducting the interviews. The researcher personally interviewed 120 parents and caretakers of both immunised and non-immunised children aged between 12 and 23 months.

3.6 Data analysis

Coding is the major data analysis activity that takes place after completion of the data collection process. Coding represents the operations in terms of which data are broken down, conceptualised and put back together in new ways (Brink, 2009). Data management activities also include data entry, data cleaning and data analysis. In this

study the data analysis was carried out using the Statistical Package for Social Sciences (SPSS) software package v. 10.

Tables were generated showing the percentage distribution of the background variables of all the respondents. In addition, the results from cross tabulations of the Pearson chi-square were extrapolated and simple result tables generated.

In order to evaluate the data, the researcher enlisted the assistance of a professional statistician. The data analysis was carried out on two levels, namely, univariate and bivariate analysis.

3.6.1 Univariate analysis

At the level of the univariate analysis, frequency distributions were generated to describe the background characteristics of the parents and caretakers with children aged between 12 and 23 months, their perceptions and beliefs regarding immunisation and the measles vaccination status of the children. This was to ensure both simplicity and suitability as regards the data analysis by comparing the different types of data and ascertaining whether the data were sufficient to carry out the data analysis.

3.6.2 Bivariate analysis

In order to meet the research objectives, cross tabulations and a chi-square statistical analysis were conducted to establish the association between the independent variables and the measles vaccination status of the children. The chi-square statistical analysis is one of the simplest and most widely used non-parametric tests in statistical analysis. The test shows the level of association using the p-value, the level of significance and the probability of either rejecting or accepting the hypothesis being tested. The p-value was fixed at 0.05. If the p-value is greater than 0.05, then the statistical relationship between the dependent and independent variables under study is not significant. On the other hand, if the p-value is found to be less than 0.05 then there is a significant relationship between the two variables such that, if one of the variables changed, the other will also change.

The chi-square test statistic used Pearson's formula below;

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^k \frac{(O_{i,j} - E_{i,j})^2}{E_{i,j}}$$

Where $j=1, 2, \dots, k$

$i=1, 2, \dots, r$

O_{ij} = Observed frequencies for the i th and j th groups

E_{ij} = Expected frequencies for the i th and j th groups

k = Number of categories of the dependent variable

r = Number of categories of the independent variable

3.7 Research ethics

A research project is a process which has ethical implications. However, the researcher conducted this research in an ethical manner (Brink, 2006).

The following three fundamental ethical principles should guide the researcher, namely, respect for persons, respect for beneficence and respect for justice. These principles are based on the human rights that must be protected during any research project, including the right to self-determination, privacy, anonymity, confidentiality, fair treatment and protection from discomfort and harm. In this study the research participants were all informed that they had right to withdraw from the study at any time, the right to refuse to provide information and the right to ask for clarification regarding the study (Brink, 2009).

Permission to conduct the study was sought from and granted by the University of Namibia Post Graduate Studies Committee. The researcher also obtained consent to conduct the study from the MoHSS through the Permanent Secretary as well as from Kunene Regional Health Director. A copy of the research proposal and the letter from the chairperson of the Post Graduate Studies Committee of University of Namibia (UNAM) was attached to the application letters to the Permanent Secretary and the Regional Health Director.

Upon entering each village, the researcher went to the village headman's house or to his deputy to seek permission to carry out the study in the village. Upon entering the specific household the researcher obtained permission to conduct the interview from the household head and also the informed consent of the research participants. The

researcher explained the purpose and objectives of the study before interviewing the respondents. No false promises were made to any individual in the population selected (Brink, 2009).

In order to ensure confidentiality, the researcher made sure that no information provided by a participant during the course of the study was either divulged or made available to any person other than the supervisors of the study. In addition, the completed dissertation did not mention any of the participant's names (Brink, 2009).

3.8 Summary

In this chapter the researcher discussed the research methodology that was used in the study. This discussion focused on the research design, population, sampling, data collection method, validity and reliability of the data collection instrument, data processing and data analysis and the issue of research ethics.

This study employed a quantitative, descriptive, cross-sectional, analytical design. The population for the study comprised the parents and caretakers and their children aged between 12 and 23 months in the Opuwo Health District in the Kunene Region. The parents and caretakers of 120 children aged between 12 and 23 months were drawn as a sample. Probability sampling was used by utilising cluster random sampling.

The validity and reliability of the data collection instrument and the data collection procedure were ensured through a pilot study as a result of which certain questions

were changed and others added to the list. The quantitative data were collected by using a structured questionnaire during interviews which the researcher conducted with the parents and caretakers of children aged between 12 and 23 months. The researcher went into the villages selected and moved from house to house in order to gather the required information. Three local languages were used during the interviews with the parents and caretakers.

The data analysis was conducted using the Statistical Package for Social Sciences (SPSS) software package.

Cross tabulations and the Chi-square statistical analysis were used to establish the association between the various independent variables and the measles vaccination status of children in the Opuwo Health District. The p-value was fixed at 0.05. If the p-value is greater than 0.05, this shows that no significant relationship exists between the two variables in question while a p-value of less than 0.05 shows a significant relationship between two variables. The chapter concluded with a discussion on research ethics. The study was conducted in an ethical manner with the researcher being guided by respect for person, respect for beneficence, and respect for justice. The next chapter discusses the research results.

CHAPTER FOUR

RESEARCH RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the research findings and discusses the data analysis at both the univariate and bivariate levels. The information required was collected by means of structured interviews which were conducted with the parents and caretakers of 120 children aged between 12 and 23 months from villages in the Opuwo Health District. It describes the demographic data pertaining to the parents and caretakers, their socio-economic status, their perceptions and beliefs about immunisation and the measles vaccination status of children.

The influence of the demographic and socio-economic characteristics of parents/caretakers as well as their beliefs and perceptions about immunisation were assessed through cross tabulations. Proportions, chi-square statistic and p-values were computed for each variable in order to discover the existence of any possible statistical significance between variables. The results are presented in the same order as the three sections in the questionnaire.

These three sections were:

- Section A: The demographic data and socio-economic status of the parents and caretakers
- Section B: The immunisation status of the children

- Section C: Perceptions of parents/caretakers regarding the importance of immunisation

The first discussion is on the demographic data and the socio-economic status of the parents/caretakers.

4.2 SECTION A: Demographic data and socio-economic status of the parents and caretakers

Demographic and socio-economic variables are variables which the researcher is not able either to manipulate or to influence. In addition, they may vary in the population under investigation. These variables include, inter alia, age, marital status, gender, ethnicity, education levels and income, and are inherent to the subjects before the study even begins (Brink, 2009). In this study, the researcher collected the demographic and socio-economic data on the parents/caretakers of 120 immunised and non-immunised children between the ages of 12 and 23 months from seven rural villages in the Opuwo Health District in the Kunene region.

4.2.1 Gender of parents and caretakers

Gender is an important variable as it may influence both behaviour and decision making and, thus, this variable was investigated in this study. The data indicated that 100% of parents/caretakers investigated in this study were female.

4.2.2 Age of parents and caretakers

The age of the parent/caretaker may be one of the demographic factors associated with the measles vaccination status of children. Age is one of the most important characteristics in understanding particular situations. It may indicate the level of maturity of individuals. In this study the age variable become more important when responses across the age categories were compared.

It is evident from Table 4.1 below that the mean age of the parents and caretakers was 30.14 years. Among the parents/caretakers who were interviewed, the majority, namely, 45% (n = 54), were in the 25 to 34 years age group while the minority, namely, 10.8% (n = 13), were in the 45+ years age group.

Table 4.1: Age of parents and caretakers

Age of parent/caretaker	Frequency	Percent
15–24	34	28.3
25–34	54	45.0
35–44	19	15.8
45+	13	10.8
Total	120	100

The study further revealed that 80% [n = 43] of the children whose parents/caretakers were aged between 25 and 34 years had received measles vaccinations as compared to the 76% [n = 26] of children whose parents were aged between 15 and 24 years. Nevertheless, as indicated in Table 4.2 below, the age of the parents/caretakers did

not show a statistically significant relationship with the measles vaccination status of the children in the Opuwo Health District ($p = 0.859$).

Table 4.2: Association between age of parents and caretakers and measles vaccination status of children

Age of parent/caretaker	Measles vaccination status		Total
	Vaccinated	Not Vaccinated	
15–24	76% (26)	24% (8)	34
25–34	80% (43)	20% (11)	54
35–44	74% (14)	26% (5)	19
45+	69% (9)	31% (4)	13
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 0.762, p = 0.859$			

These findings are in agreement with the findings of earlier studies which were conducted in the Opuwo District, Namibia (Taapopi, 2002) and also in Kinshasa, Democratic Republic of Congo (Mapatano et al., 2008), where it was found that the age of the parents did not significantly influence the vaccination status of the children. However, these findings are contrary to the findings of studies which were conducted in Japan (Matsumura et al., 2005) and in Nairobi, Kenya (Mutua et al., 2011). These studies found that age of the parent was a strong predictor of the vaccination status of the children and they concluded that, with increased parental age, the immunisation level status of the respective children also increases.

4.2.3 Relationship to the child

The relationship of the parents/caretakers to the children was also assessed as it was felt that this relationship may have influenced the vaccination status of the children. The findings indicated that the majority of the respondents, namely, 89% (n = 107), were the biological mothers of the children as compared to the 11% (n = 13) who were caretakers.

Table 4.3: Relationship to the child

Relationship to the child	Frequency	Percent
Parent	107	89.2
Caretaker	13	10.8
Total	120	100

The study revealed that there was no difference in the measles vaccination status of the children whether they were with either parents or caretakers – both were at 77%. In other words, there was no statistically significant association between the relationship to the child and the measles vaccination status of the children in the Opuwo district (p = 0.982) (see Table 4.4).

Table 4.4: Association between the relationship to the child and the measles vaccination status of the children

Relationship to the child	Measles vaccination status		Total
	Vaccinated	Not Vaccinated	
Parent	77% (82)	23% (25)	107
Caretaker	77% (10)	23% (3)	13
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 0.001, p = 0.982$			

4.2.4 Ethnicity of parents and caretakers

Ethnicity was one of the variables that were assessed in this study because ethnicity reveals the way in which multicultural individuals view specific interventions and this, in turn, affect their rates of compliance with healthy behaviour. The findings showed that the majority of the respondents in this study were Oshiwambo speaking, 38% (n = 45), followed by Hereros and Himbas at 29% (n = 35) and 20% (n = 24) respectively.

Table 4.5: Ethnicity of parents and caretakers

Ethnicity parents/caretakers	Frequency	Percent
Himbab	24	20.0
Hereros	35	29.2
Vambos	45	37.5
Others (Damaras, Zembas, Ngumbis)	16	13.3
Total	120	100

The study indicates that ethnicity was, indeed, associated with the measles immunisation status of the children ($\chi^2 = 17.253$, $p = 0.001$) as it was found that it was mainly the children of the Himba and Herero heritage who were not immunised. The findings revealed that 50% [n = 12] of the Himba children had not been vaccinated against measles as compared to 29% [n = 10] of the Herero children, 19% [n = 3] from other tribes and 7% [n = 3] Vambos.

The Himba and Herero ethnic groups have a common identity in their love for their animals. In addition, as dictated by their nomadic lifestyles they are mobile in nature

and, thus, because they are always on the move they attach little importance to the immunisation of their children. The analytical findings as regards the ethnic groups are presented in Table 4.6.

Table 4.6: Association between the ethnicity of the parents and caretakers and the measles vaccination status of the children

Ethnicity parent/ caretaker	Measles vaccination status		Total
	Vaccinated	Not Vaccinated	
Himbos	50% (12)	50% (12)	24
Hereros	71% (25)	29% (10)	35
Vambos	93% (42)	7% (3)	45
Others (Damaras, Zembas, Ngumbis)	81% (13)	19% (3)	16
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 17.253, p = 0.001$			

These findings concur with the findings of earlier studies which were conducted in the Opuwo district in Namibia (Taapopi, 2002), in China (Guo & Feng, 2000), in the Lucknow district in India, (Nath et al., 2007) and in Nairobi in Kenya (Mutua et al., 2011) and that concluded that ethnicity was significantly associated with the vaccination status of children.

4.2.5 Marital status of parents and caretakers

The marital status of a parent/caretaker was regarded as an important variable in the study because of the influence of marriage on people's attitudes and behaviours. In a

marriage the knowledge and perceptions about aspects of the care of the children do not reside with one person only, but with a couple. In addition, the perceptions and attitudes of a person may also differ as a result of the marital status of the person because marriage is often associated with more responsibility and maturity in understanding the importance of immunisation (Shikongo, 2010).

The research findings indicate that 63% [n = 76] of the parents/caregivers were unmarried as compared to the 24% [n = 29] who were married.

Table 4.7: Marital status of parents and caretakers

Marital status of parent/caretaker	Frequency	Percent
Single	76	63.3
Married	29	24.2
Others (divorced, widowed, cohabiting)	15	12.5
Total	120	100

The study also revealed that 80% [n = 61] of the children of single parents/caretakers had been vaccinated against measles as compared to 69% [n = 20] of the children of married parents/caretakers. Nevertheless, there did not appear to be a statistically significant relationship between marital status and measles immunisation in the Opuwo Health District ($p = 0.448$).

Table 4.8: Association between the marital status of parents and caretakers and the measles vaccination status of the children

Marital status of parent/caretaker	Measles vaccination status		Total
	Vaccinated	Not Vaccinated	
Single	80% (61)	20% (15)	76

Married	69% (20)	31% (9)	29
Others (divorced, widowed, cohabiting together)	73% (11)	27% (4)	15
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 1.604, p = 0.448$			

4.2.6 Education level

Educational attainment empowers a parent/caretaker to become independent as regards decision making as well as to be liberated from cultural beliefs. This, in turn, may relax the perceptions in terms of child health as education may affect a person's attitudes about and way of looking at and understanding a particular phenomenon. In addition, as compared with those parents/caretakers who are less well educated, the parents/caretakers with secondary education may find it easier to find employment and this, in turn, will lead to higher incomes. They would, thus, be a position to pay for the transport fares required to travel to health facilities. In addition, an educated parent/caretaker is able to read the date for the next visit on the child's health passport and take the child for immunisation on the correct day. This is difficult for those parents/caretakers who have not received much education and who are not able to read. They may be unable to recall the correct follow up dates and this, in turn, may result in the children missing the correct vaccination dates (Taapopi, 2002).

Thus, the researcher in this study investigated the variable of 'education level'. The data pertaining to education are presented in Table 4.9 below.

The findings revealed that the majority 43% (n = 51) of the parents/caretakers had attained the primary level of education while 34% (n =41) of the parents/caretakers had had no formal education.

Table 4.9: Education level of parents and caretakers

Education level of parent/caretaker	Frequency	Percent
No education	41	34.2
Primary	51	42.5
Secondary +	28	23.3
Total	120	100

A higher level of education on the part of the parents/caretakers was associated with an improved immunisation status on the part of the children. The findings revealed that 100% [n = 28] of the children whose parents/caretakers had attained a secondary level education had been vaccinated as compared to the 66% [n = 27] of the children of parents/caretakers who had obtained no formal education and the 73% [n = 37] of children whose parents/caretakers had attained a primary level of education. Thus, this study found a statistically significant association between the level of education of the parents/caretakers and the immunisation status of their children with the higher the level of education of the parents/caretakers, the higher the vaccination levels of the children ($\chi^2 = 11.685$, $p = 0.003$).

Table 4.10: Association between the education level of the parents and caretakers and the measles vaccination status of the children

Education level of parent/caretaker	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
No education	66% (27)	34% (14)	41
Primary	73% (37)	27% (14)	51
Secondary+	100% (28)	0% (0)	28
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 11.685, p = 0.003$			

The findings from this study correlate with the findings of an earlier study which Taapopi (2002) conducted in Opuwo, as well as the findings of studies conducted in other African and non-African countries, namely, the Democratic Republic of Congo, Nigeria, Pakistan, Malawi, Mozambique, Kenya, India, Japan, and Austria. These studies were all conducted between 2004 and 2011. The researchers concluded that the higher the education levels of parents, the higher the vaccination coverage of their children.

Nevertheless, contradictory findings have also been published. The findings of a study conducted by Shikongo (2010) in the Outapi district, in Namibia, revealed immunisation coverage was less than 80% despite respondents' tertiary qualification as well as primary and secondary education.

4.2.7 Employment status of parents and caretakers

The employment status of a parent/caretaker may be reflected in the level of confidence and ability to address problems. In addition, an individual's perception of a particular social phenomenon is likely to be influenced by his/her employment

status. In this study the parents/ caretakers were asked whether they were employed at the time of the study. However, measuring employment is difficult because some of the parents/caretakers worked on family farms, in family businesses or in the informal sector where they were not paid directly for their work and, therefore, could not be regarded as being employed (Ministry of Health and Social Services and Macro International Inc., 2008).

The table below shows the percentage distribution of the parents/caretakers according to current and recent employment. The data show that more than two-thirds – 87% (n = 104) – of the parents/caretakers were unemployed, whereas 13% (n = 16) respondents were employed.

Table 4.11: Employment status of parents and caretakers

Employment status of parent/caretaker	Frequency	Percent
Employed	16	13.3
Unemployed	104	86.7
Total	120	100

The study revealed that 88% [n = 14] of the children whose parents/caretakers were employed had been immunised as compared to the 75% [n = 78] of children whose parents/caretakers were unemployed. Nevertheless, the study did not show a statistically significant relationship between the employment status of the parents/caretakers and the measles vaccination status of the children in the Opuwo

district ($p = 0.271$). The findings from this study correlate with the findings of an earlier study which Taapopi (2002).

Table 4.12: Association between employment status of parents and caretakers and measles vaccination status of children

Employment status of parent/caretaker	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Employed	88% (14)	12% (2)	16
Unemployed	75% (78)	25% (26)	104
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 1.211, p = 0.271$			

4.2.8 Financial support of unemployed parents and caretakers

In Namibia, if a person is not working, then he/she is presumably supported financially by family members, organisations or the government. Therefore, in this study, the unemployed parents/caretakers were asked whether they were receiving financial support. Parents and caretakers require money if they are to pay the transport fares to travel to the nearest health facilities. It is important to note here that unemployed parents often have either to walk or to use donkey carts to access the health facilities for immunisation services.

It emerged from the findings that 62% ($n = 74$) of the parents/caretakers were receiving financial support either from family members or from the government as compared to 38% ($n = 46$) who were not receiving any financial support.

Table 4.13: Financial support of unemployed parents and caretakers

Financial support of parent/caretaker	Frequency	Percent
Yes	74	61.7
No	46	38.3
Total	120	100

Thus, financial support was associated with the immunisation of the children ($p = 0.036$). For example, 70% [$n = 52$] of the children whose parents were unemployed and depended on financial support from their families had been vaccinated against measles as compared to the 87% [$n = 40$] of the children whose employed parents were not receiving financial support and the children of unemployed parents/caretakers who were not receiving any financial support.

In this study a statistically significant association was found between financial support received by the unemployed parents and caretakers and the vaccination status of the children ($\chi^2 = 4.415$, $p = 0.036$) with the vaccination status of those children whose parents and caretakers were receiving financial support being higher than that of those children whose parents and caretakers were not receiving financial support.

The findings are presented in Table 4.14 below.

Table 4.14: Association between financial support of unemployed parents and caretakers and measles vaccination status of children

Financial support of parent/caretaker	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Yes	70% (52)	30% (22)	74
No	87% (40)	13% (6)	46
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 4.415$, $p = 0.036$			

These findings concur with the findings of earlier studies which were conducted in Kinshasa in the DRC (Mapatano et al., 2008), Mozambique (Jani et al., 2008), Pakistan (Cockcroft et al., 2009), and Nairobi in Kenya (Mutua et al., 2011) and which concluded that financial barriers was significantly associated with the vaccination status of children. These studies found that most of the mothers were unemployed and, therefore, the fathers of the children or other family members had to provide transport fares for the mothers and caretakers. In other words, with financial barriers, the immunisation levels declined.

4.2.9 Main source of information about immunisation

Children require immunisation in order to protect them from dangerous diseases. These diseases may have serious complications and also increase both morbidity and mortality. If children are not vaccinated, increasing numbers of people will be infected and they will spread the disease to others. It is, thus, essential that parents and caretakers be informed and educated, through the media or health education at health facilities and in the communities, about the importance of immunising children. Thus, it was deemed crucial to investigate the source of information in this study in view of the fact that access to information is essential as regards increasing the level of knowledge and awareness and, therefore, enabling parents/caretakers to make informed choices. Accordingly, the parents and caretakers were asked who constituted their main source of information about immunisation. The data indicate that 73% [n = 87] of the parents and caretakers had received their information from

nurses and health workers whereas 27% [n = 33] had received information from the media.

Table 4.15: Main source of information about immunisation

Main source of information	Frequency	Percent
Nurses/health workers	87	72.5
Media (radio, television, newspapers)	33	27.5
Total	120	100

The study revealed that 78% [n = 68] of the children whose parents had received information about immunisation from nurses and health workers had been vaccinated against measles as compared to the 72% [n = 24] of children whose parents/caretakers had received information via the media. Nevertheless, there did not appear to be a statistically significant relationship between the main source of information and the measles vaccination status of children in the Opuwo Health District (p = 0.530).

Table 4.16: Association between main source of information about immunisation and measles vaccination status of the children

Main source of information	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Nurses/health workers	78% (68)	22% (19)	87
Media	72% (24)	28% (9)	33
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 0.395, p = 0.530$			

Although no statistical significance between measles vaccination status and information source was found, these findings correlate with the findings of the earlier studies which were conducted in Kinshasa in the DRC (Mapatano et al., 2008) and in Mozambique (Jani et al., 2008) to the effect that most mothers had acknowledged health workers as their major source of information on immunisation with the mothers indicating that they trusted these health workers.

4.2.10 Mode of transport of parents and caretakers

Transport is important in the lives of people and in society. People use various modes of transport including cars, donkey carts, motorcycles, or bicycles, depending on the income of the individuals (Taapopi, 2002). The variable, “mode of transport”, was, thus, investigated in this study. The data are presented in the table below.

Table 4.17: Mode of transport of parents and caretakers

Mode of transport of parents/caretakers	Frequency	Percent
On foot	82	68.3
Donkey cart	16	13.4
Car	22	18.3
Total	120	100

The mode of transport was found to be associated with the immunisation status of the children ($\chi^2 = 10.996$, $p = 0.004$). In this study the measles immunisation level of the children of parents and caretakers who had to walk to health facilities tended to be

higher than that of children whose parents/caretakers travelled either by car or donkey cart to the nearest health facility (see Table 4.18). For example, 85% [n = 70] of the children from parents who walked to health facilities had been immunised against measles as compared to the 59% [n = 13] of the children of parents and caretakers who used cars to travel to health facilities and the 56% [n = 9] of children whose parents and caretakers travelled by donkey cart. This may be attributed to the fact that the parents and caretakers who lived near to health facilities or outreach points were able to walk to avail themselves of the immunisation services as compared to the parents and caretakers who lived at some distance from health facilities/outreach points and who, thus, needed transport. In other words, in the context of this study, it is assumed that this means that when extra money was required for transport fare, the immunisation rates tended to decline.

Table 4.18: Association between mode of transport of parents and caretakers and measles vaccination status of children

Mode of transport of parents/caretakers	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
On foot	85% (70)	15% (12)	82
By donkey cart	56% (9)	44% (7)	16
Car	59% (13)	41% (9)	22
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 10.996, p = 0.004$			

The findings of this study concur with the findings of the earlier studies which were conducted in Opuwo in Namibia (Taapopi, 2002), in the Lagos metropolis in Nigeria (Adeiga et al., 2005), and in Mozambique (Jani et al., 2008), with these studies all

finding that the transport to health facilities was associated with low immunisation coverage.

4.2.11 Travelling time required by parents and caretakers to reach health facility/outreach point

The travelling time to the nearest health facility was one of the most important variables investigated in this study and it is important to note that, in general, the longer the travelling time, the more difficult it was to reach the health facilities.

Table 4.19: Travelling time required by the parents and caretakers to reach the health facility/outreach point

Travelling time required by parents/caretakers to reach health facility/outreach point	Frequency	Percent
Less than 30 minutes	8	6.7
One hour	88	73.3
More than one hour	24	20.0
Total	120	100

The time required to travel to the nearest health facility was found to be associated with the immunisation status of the children ($\chi^2 = 16.372$, $p = 0.000$) with the study finding that the children of parents and caretakers who had to travel for one hour or less were usually vaccinated against measles. For example, 46% [$n = 11$] only of the children whose parents and caretakers had to travel for more than one hour to the nearest health facility had been vaccinated against measles as compared to the 85%

[n = 74] of children whose parents had to travel for one hour or less to the nearest health facility (see Table 4.20).

These findings correlate with the findings of the earlier studies which were conducted in Outapi district in Namibia (Shikongo, 2010) that the long time required to travel to the health facilities contribute to low EPI coverage.

Table 4.20: Association between travelling time required by the parents and caretakers to reach a health facility/outreach point with the measles vaccination status of children

Travelling time to health facilities	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Less than 30 minutes	75% (6)	25% (2)	8
One hour	85% (75)	15% (13)	88
More than one hour	46% (11)	54% (13)	24
	77% (92)	23% (28)	120 (100%)
$\chi^2 = 16.372, p = 0.000$			

4.2.12 Waiting time for immunisation services

In most of the health facilities in Namibia customers, clients or patients complain of long waiting times of an hour or more for health care delivery. Accordingly, it was deemed important that this study investigate this variable. The findings presented in the table below indicate that 65% [n = 78] of the respondents had waited for less than one hour for immunisation whereas the rest – 35% [n = 42] – had waited for more than one hour.

Table 4.21: Waiting time for immunisation services

Waiting time for immunisation services	Frequency	Percent
Less than one hour	78	65.0
More than one hour	42	35.0
Total	120	100

The length of time spent waiting for vaccination services at health facilities was found to be associated with the immunisation status of the children ($\chi^2 = 10.615$, $p = 0.001$). In this study it appeared that the children whose parents and caretakers had to wait for less than one hour had usually been vaccinated against measles. For example, 86% [$n = 67$] of the children whose parents and caretakers had waited for less than one hour for immunisation services had been vaccinated against measles as compared to the 60% [$n = 25$] of children whose parents and caretakers had waited for more than one hour. The findings are presented in Table 4.22. It emerged that the quicker the service was provided the higher the immunisation coverage.

Table 4.22: Association between the waiting time for immunisation services and the measles vaccination status of the children

Waiting time for immunisation services	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Less than one hour	86% (67)	14% (11)	78
More than one hour	60% (25)	40% (17)	42
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 10.615$, $p = 0.001$			

4.2.13 Availability of registers at the health facility

If immunisation is to be the most beneficial it must be administered on time, according to the immunisation schedule with adherence to this schedule being documented in a register kept at the health care facility. It is, thus, important that the register is available at health facilities in order to maintain an accurate and complete immunisation history of the children. In addition, the register would also help the health worker to track children in the area who have missed their follow up appointments. The health worker would also realise the need to conduct public awareness campaigns regarding the ongoing importance of child vaccinations. Accordingly, this study assessed the availability of the registers at health facilities. The data indicates that 16% [n = 19] of the respondents only had agreed that there were registers at the nearest health facilities whereas 84% [n = 111] had indicated either that no registers were available or, if available, they were not aware of their availability.

Table 4.23: Responses regarding the availability of registers at health facilities

Register available at the health facility	Frequency	Percent
Yes	19	15.8
No	91	75.8
Do not know	10	8.3
Total	120	100

It was found that the availability of registers in which the immunisation follow up dates were recorded at health facilities was associated with the immunisation status of the children ($\chi^2 = 27.132$, $p = 0.000$). In this study the vaccination level of the

children of parents and caretakers who attended health facilities that kept registers tended to be higher than that of children whose parents and caretakers who attended health facilities that did not keep registers. The study revealed that 84% [n = 16] of the children who attended health facilities that kept registers had been vaccinated against measles as compared to the 82% [n = 74] and the 10% [n = 26] respectively of children from areas where the health facilities either did not keep registers or the parents had no idea whether registers were available or not.

Table 4.24: Association between the availability of registers at the health facility and the measles vaccination status of the children

Register available at health facility	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Yes	84% (16)	16% (3)	19
No	82% (75)	18% (16)	91
Do not know	10% (1)	90% (9)	10
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 27.132, p = 0.000$			

4.3 SECTION B: Measles immunisation status of the child

It was mentioned in the background information provided that immunisation is one of the most cost-effective health interventions while it has been proved to prevent 24% of the 10 million annual deaths of children under the age of five years (Sanou et al., 2009). Measles is an extremely contagious viral disease that affects almost every child throughout the world. In Namibia the EPI was established to ensure the

immunisation of children within the prescribed time frame. The programme focuses on strengthening routine immunisation and to eradicate the incidence of measles. It is the aim of the programme to achieve an immunisation coverage of above 90% in each district. In the problem statement it was indicated that approximately 40% of all children only in Opuwo had been immunised against measles (Ministry of Health and Social Services and Macro International Inc., 2008).

Accordingly, this section focuses on the demographic data of the children, including age, gender, birth order, and measles vaccination status. In addition, data on the reasons for not being vaccinated against measles, the frequency with which immunisation is offered at health facilities, the availability of outreach points and the information provided to the parents and caretakers during immunisation of the children were also collected. The information about the measles vaccination status of the children was obtained from the children's health passports with additional information being obtained from the parents and caretakers.

The parents and caretakers of 120 children aged between 12 and 23 months were interviewed and the children's measles vaccination status assessed. The tables below present the socio-demographic data and the measles vaccination status of the children.

4.3.1 Ages of the children

The study focused on children who were aged between 12 and 23 months at the time of the study. The parents/caretakers were asked to indicate the ages of their children.

The information about the ages of children was obtained from the children's health passports with additional information being obtained from the verbal histories provided by the parents and caretakers. The findings indicated that the majority of the children were between 17 and 21 months (40%, while 33% were between 12 and 16 months and 27% were aged 22 months and above.

Table 4.25: Ages of the children

Age of the child (months)	Frequency	Percent
12–16	40	33.3
17–21	48	40.0
22+	32	26.7
Total	120	100

Table 4.26: Association between ages of the children and the measles vaccination status

Age of the child (months)	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
12–16	63% (25)	37% (15)	40
17–21	88% (42)	12% (6)	48
22+	78% (25)	22% (7)	32
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 7.675, p = 0.022$			

The study found a statistically significant relationship between the age of a child and the child's measles immunisation status ($\chi^2 = 7.675, p = 0.022$). It emerged that the children between the ages of 17 and 21 months were more likely to be vaccinated as compared to the children between the ages of 12 and 16 months.

4.3.2 Gender of the child

The majority of the children, 51% [n = 61], were female while 49% [n = 59] were male (see Table 4.27).

Table 4.27: Gender of the children

Gender of the child	Frequency	Percent
Male	59	49.2
Female	61	50.8
Total	120	100

The study revealed that 77% [n = 47] of the female children had been vaccinated against measles as compared to 76% [n = 45] of the male children. However, the study did not show a statistically significant relationship between the gender of the child and the incidence of measles vaccination in the Opuwo Health District ($p = 0.920$). These findings concur with the findings of studies conducted in Malawi (Munthali, 2007), Surat in India (Trivedi et al., 2009) and in Mozambique (Jani et al., 2008) which did not show any significant relationships between the gender of the child and the vaccination status of the child. However, these findings are contrary to the findings of a study conducted in Chandigarh in India (Sharma et al., 2008) that indicated that the measles immunisation coverage was lower in female children than in male children.

Table 4.28: Association between gender of children and the measles vaccination status

Gender of children	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Male	76% (45)	24% (14)	59
Female	77% (47)	23% (14)	61
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 0.010, p = 0.920$			

4.3.3 Birth order

Information about the birth order of the children was also collected from the parents/caretakers and the children's health passports (yellow). The majority of the children in the study, 64% [n = 77], were the first to third-born children while 23% [n = 28] were fourth- to fifth-born children. The data are presented in Table 4.29.

Table 4.29: Birth order of the children

Birth order of the children	Frequency	Percent
1-3	77	64.2
4-5	28	23.3
6+	15	12.5
Total	120	100

The study revealed that 79% [n = 61] of the children who were the first to the third born and the fourth to the fifth born had been vaccinated against measles as compared to the 60% [n = 9] of sixth-born children (see Table 4.30). However, the study did not show a statistically significant relationship between the birth order of

the children and their measles vaccination status in the Opuwo Health District ($p = 0.264$). This finding is contrary to the findings of studies conducted in Malawi (Munthali, 2007) and Japan (Matsumura et al., 2005) which revealed that vaccination coverage among first-born children was higher than those children born later in the birth order.

Table 4.30: Association between the birth order of children and measles vaccination status

Birth order of children	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
1–3	79% (61)	21% (16)	77
4–5	79% (22)	21% (6)	28
6+	60% (9)	40% (6)	15
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 2.667, p = 0.264$			

4.3.4 Measles vaccination

The information on the measles vaccination status of the children as well as the age at which the measles vaccine had been administered was obtained from the children's yellow health passports and from the verbal histories provided by the parents and caretakers.

The findings revealed that 77% [$n = 92$] of the children had been immunised against measles while 23% [$n = 28$] had not been immunised while those who had been immunised had been administered the measles vaccine at 9 to 12 months.

Table 4.31: Measles vaccination status of the children

Measles vaccination of the children	Frequency	Total
Yes	92	76.7
No	28	23.3
Total	120	100

4.3.5 Age at which the children received the measles vaccination (months)

The study investigated the age at which the children had received the measles vaccination in order to ascertain whether the children had been administered their measles vaccinations at the recommended age of 9 to 12 months. The findings are presented in Table 4.32.

Table 4.32: Age at which the children received the measles vaccination

Age at which received measles vaccination (months)	Frequency	Percent
9	79	85.9
10–12	13	14.1
Total	120	100

4.3.6 Awareness of the provision of immunisation services at health facilities

The findings show that 91% [n = 109] of the parents and caretakers of the children had indicated that they were aware that immunisation services were offered on a daily basis at the health facility while 9% [n = 11] of the respondents indicated that

they had no idea whether these services were offered as their children were either partially immunised or not immunised at all.

Table 4.33: Awareness of the provision of immunisation services at health facilities

Awareness of daily immunisation services	Frequency	Percent
Aware of daily services	109	90.8
Not aware of daily services	11	9.2
Total	120	100

It is evident from Table 4.34 that 84% [n = 92] of the children whose nearest health facilities provided immunisation services on a daily basis had been immunised against measles vaccination as compared to the 100% [n = 11] of children who had not been vaccinated against measles because their parents had no idea about how often immunisation services were provided at the health facilities. The study showed a statistically significant relationship between the availability of daily immunisation services and the measles vaccination status of the children ($\chi^2 = 39.790$, $p = 0.000$).

These findings correlate with the findings of studies conducted in Opuwo in Namibia (Taapopi, 2002), Spain (Calvente et al., 1992), the DRC (Mapatano et al., 2008) and Mozambique (Jani et al., 2002). These studies found that risk factors such as no vaccine available at the clinic on certain days and no information about the days for vaccination were associated with incomplete vaccination. See also Table 4.39.

Table 4.34: Association between the awareness of the provision of immunisation services at health facilities and the measles vaccination status of the children

Awareness of provision of immunisation services at health facilities	Measles vaccination status		Frequency
	Vaccinated	Not vaccinated	
Aware of daily services	84% (92)	16% (17)	109
Not aware of daily services	0% (0)	100% (11)	11
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 39.790, p = 0.000$			

4.3.7 Availability of outreach points in the areas

The respondents were asked to indicate whether there were nearby outreach points to which they could take their children for immunisation. A majority of 57% [n = 68] responded that there were no outreach points in their areas because they lived near clinics, 38% [n= 46] indicated that no outreach points were available in the area despite the fact that they were far from the clinics while 5% [n = 6] only indicated that outreach points were available in their areas.

Table 4.35: Availability of outreach points in the areas

Near outreach point	Frequency	Percent
Yes	6	5.0
No	46	38.3
Not applicable	68	56.7
Total	120	100

The study revealed that there was no difference between the vaccination status of children from areas where there were outreach points and the vaccination status of

children from the areas where no outreach points were available. However, the study did not show any statistically significant relationship between the availability of outreach points and the measles vaccination status of children in the Opuwo Health District ($p = 0.106$).

This finding could mean that outreach services were not always run in the district which would make parents/caretakers travel to health facilities for immunisation of their children (Shikongo, 2010).

Table 4.36: Association between the availability of outreach points in the areas and the measles vaccination status of the children

Outreach point available	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Yes	67% (4)	33% (2)	6
No	67% (31)	33% (15)	46
Not applicable	83% (57)	17% (11)	68
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 4.495, p = 0.106$			

4.3.8 Information provided to parents and caretakers during the vaccination of the children

It is crucial that information be given to parents and caretakers during the vaccination of their children regarding the type of vaccine administered to the children, indication of the vaccine, possible adverse effects and follow up date and, thus, the study investigated this variable. The parents and caretakers were asked to indicate what information was normally provided to them by nurses during the vaccination of

their children. The findings revealed that 45% [n = 54] had been informed about the type of antigen being administered, 40% [n = 48] had been informed about the follow up dates for the next visits, 13% [n = 15] were not able to remember what information had been given to them while 3% [n = 3] had been informed what to do should fever and abscesses develop.

Table 4.37: Information provided to respondents during the vaccination of their children

Information provided during vaccination	Frequency	Percent
What antigen was being administered	54	45.0
What to do should fever and abscesses develop	3	2.5
Follow up date for next visit	48	40.0
Do not remember	15	12.5
Total	120	100

The findings established that the type of information provided to parents and caretakers during the immunisation of the children was associated with the immunisation status of the children ($\chi^2 = 54.340$, $p = 0.000$). It emerged from this study that there was a greater likelihood that the children of parents who had been informed what antigens were being given would be immunised compared to those children whose parents had not received such information. For example, 94% [n = 51] of the children whose mothers had been informed about what antigens were being administered were immunised as compared to the 33% [n = 1] of children whose mothers had been informed what to do should fever and abscesses develop. Table 4.38 presents the findings.

The findings of the study concur with the findings of earlier studies conducted in the Lagos metropolis in Nigeria (Adeiga et al., 2005), the Lucknow district in India (Nath et al., 2007), Karachi in Pakistan (Siddiqi et al., 2007), rural Nigeria (Odusanya et al., 2008), Surat in India (Trivedi et al., 2009) and in the Opuwo district in Namibia (Taapopi, 2002). These studies had found that the parents' knowledge about immunisation programmes was significantly correlated with an increase in the vaccination status of their children.

Table 4.38: Association between the information provided to parents and caretakers during vaccination and the measles vaccination status of the children

Information provided during vaccination	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
What antigen was being administered	94% (51)	6% (3)	54
What to do should fever and abscesses develop	33% (1)	67% (2)	3
Follow up date for next visit	81% (39)	19% (9)	48
Do not remember	7% (1)	93% (14)	15
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 54.340, p = 0.000$			

4.4 SECTION C: Perceptions of parents about the importance of immunisation

In the literature review above on the discussion of the Health Belief Model (HBM), it was indicated that personal beliefs or perceptions about a disease and the strategies available to decrease its occurrence influence health behaviour. Accordingly, it was deemed important to investigate the beliefs and perceptions of the parents and caretakers in this study and this section, therefore, focuses on the awareness, beliefs,

experiences and opinions of the parents, guardians and caretakers as regards immunisation. This information was collected by means of both close-ended and open-ended questions which were posed to the parents and caretakers. Table 4.39 below presents the findings on the beliefs and perceptions of the respondents as regards the importance of immunisation.

4.4.1 Awareness regarding the immunisation of children

The parents/caretakers were asked to indicate whether they were aware that their children should be immunised. The findings revealed that 99% of the parents and caretakers were aware that their children should be immunised. This included the parents and caretakers of both vaccinated and non-vaccinated children.

Table 4.39: Immunisation awareness on the part of parents and caretakers

Immunisation awareness on the part of parents and caretakers	Frequency	Percent
Yes	119	99.2
No	1	0.8
Total	120	100

Among the parents/caretakers who were aware that their children should be immunised, 77% [n = 92] of their children had been vaccinated against measles as compared to the 0% [n = 0] of children of parents/caretakers who were not aware of the availability of immunisation services. However, the study did not show a

statistically significant relationship between the immunisation awareness on the part of parents/caretakers and the measles vaccination status of the children ($p = 0.069$).

Table 4.40: Association between the immunisation awareness on the part of parents and caretakers and the measles vaccination status of the children

Immunisation awareness on the part of parent/caretaker	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Yes	77% (92)	23% (27)	119
No	0% (0)	100% (1)	1
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 3.313, p = 0.069$			

4.4.2 Perceptions of parents and caretakers about the need to immunise every child

The parents and caretakers of the children were asked whether they believed that immunisation was for healthy or sick children, malnourished or well-breastfed children, male or female children or for first-born children only. The researcher wanted to determine their perception about whether all children should be immunised.

The findings indicated that 100% of the parents and caretakers believed that every child in the world should be immunised as per the immunisation programme, even the parents and caretakers of children who had not been immunised. The findings of the study concur with the findings of earlier studies conducted in the Outapi district,

Namibia (Shikongo, 2010). This study found that more than 80% of the respondents belief in immunisation.

Table 4.41: Perceptions of parents and caretakers regarding immunisation

Parent/caretaker's belief in immunisation	Frequency	Percent
Yes	120	100.0
No	0	0.0
Total	120	100

4.4.3 Advantages of immunisation

The parents and caretakers were asked to indicate what they believed were the advantages of immunisation. Of the 120 participants, the majority, namely, 80% [n = 96], indicated that immunisation protected the child against diseases because it strengthened the immune system of the child, 18% [n = 21] believed that immunisation kept the child healthy and 2% [n = 3] indicated that they had no idea about the advantages of immunisation.

Table 4.42: Parents and caretakers' knowledge about the advantages of immunisation

Advantages of immunisation	Frequency	Percent
Keep the child healthy	21	17.5
Protect the child against diseases by strengthening immune system	96	80.0
Do not know	3	2.5
Total	120	100

The study established that 79% [n = 76] of the children whose parents/caretakers had reported that immunisation protects the child against diseases by strengthening the immune system had been vaccinated against measles as compared to the 0% of the children whose parents/caretakers had indicated that they had no idea about the advantages of immunisation and the 76% [n = 16] of children whose parents/caretakers had reported that immunisation keeps the children healthy. In this study the children of parents/caretakers who were aware of the fact that immunization protects the children against diseases by strengthening their immune systems tended to be immunised. The study showed a statistically significant relationship between knowing about the advantages of immunisation and the measles vaccination of the children ($\chi^2 = 10.195$, $p = 0.006$). See Table 4.43 for the findings.

Table 4.43: Association between the knowledge of parents and caretakers about the advantages of immunisation and the measles vaccination status of the children

Advantages of immunisation	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Keeps the child healthy	76% (16)	24% (5)	21
Protects the child against diseases by strengthening the immune system	79% (76)	21% (20)	96
Do not know	0% (0)	100% (3)	3
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 10.195$, $p = 0.006$			

4.4.4 Local substitutes for immunisation

The parents/caretakers were asked whether they believed there were any local substitutes available for immunisation with the majority (99%) [n = 119] of parents and caretakers reporting that there were no local substitutes for immunisation.

Table 4.44: Beliefs of parents and caretakers about the availability of local substitutes for immunisation

Local substitutes available	Frequency	Percent
Yes	1	0.8
No	119	99.2
Total	120	100

The study revealed that 100% [n = 1] of the children whose parents/caretakers believed that local substitutes were available had been vaccinated against measles as compared to the 76% [n = 91] of children whose parents/caretakers did not believe that local substitutes for immunisation were available. The study did not show a statistically significant relationship between the availability of local substitutes and the measles immunisation status of the children ($p = 0.580$).

Table 4.45: Association between the beliefs of parents and caretakers about the availability of local substitutes and the measles vaccination status of the children

Local substitutes available	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Yes	100% (1)	0% (0)	1
No	76% (91)	24% (28)	119
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 0.307, p = 0.580$			

4.4.5 Awareness about measles as a disease

Parents and caretakers were asked whether they were aware that measles was a disease that may cause complications. Of the 120 respondents, the majority, namely (87%) [n = 104], reported that they were aware that measles was a deadly disease that may cause impaired vision, blindness, hearing problems, disability or death while 13% [n = 16] only, of the parents and caretakers reported that they were not aware that measles was a complex disease.

Table 4.46: Awareness on the part of parents and caretakers about measles as a disease

Awareness of parent/caretaker about measles as a disease	Frequency	Percent
Yes	104	86.7
No	16	13.3
Total	120	100

The children of parents and caretakers who were aware that measles was a disease were more likely to have been immunised than the children whose parents and caretakers were not aware that measles was a disease with 79% [n = 82] of the former having been vaccinated against measles as compared to the 63% [n = 10] of children whose parents/caretakers were not aware that measles was a disease. The study did not show a statistically significant relationship between the awareness of measles as a disease and the measles immunisation status of the children ($p = 0.150$).

Table 4.47: Association between awareness of the parents and caretakers about measles as a disease and the measles vaccination status of the children

Awareness of parent/caretaker about measles as a disease	Measles vaccination status		Total
	Vaccinated	Not vaccinated	
Yes	79% (82)	21% (22)	104
No	63% (10)	37% (6)	16
Total	77% (92)	23% (28)	120 (100%)
$\chi^2 = 2.071, p = 0.150$			

4.4.6 Suggestions of parents and caretakers regarding the improvement of the immunisation coverage

The respondents were asked to give their suggestions regarding the improvement of the immunisation coverage in the Opuwo Health District. The majority of parents and caretakers made the following suggestions:

- Increase outreach visits (73%)
- Improve health education on the importance of immunisation (20%)
- More clinics to be constructed in the district (5%)
- Health workers to check the children's health passports during health facility visits to ascertain whether the children were immunised or not before leaving the clinic or being discharged from hospital (2%).

4.4 Summary

A retrospective study about the factors associated with the low measles immunisation coverage was conducted among 120 children aged between 12 and 23 months in rural villages in the Opuwo district in the Kunene region in Namibia. The aim of the

study was to assess the parents' socio-demographic and socio-economic status, their beliefs and perceptions about immunisation and their measles vaccination status of the children. The data were collected by administering a structured questionnaire to the respondents.

The findings showed that all the respondents were females aged between 18 and 60 years and they all lived in rural areas. In addition, 89% of the 120 respondents reported that they were the biological mothers of the children who were involved in the study. The majority (43%) of the respondents reported they had received primary education while 34% had not received any formal education at all. The majority of the respondents were unemployed with 61% depending on their families for financial support. Most of the mothers walked to the nearest health facilities and they spent one or more hours at the health facilities waiting for their children to be immunised.

The information on the measles immunisation status of the children was obtained from the children's yellow health passports and the verbally recalled history provided by the parents and caretakers. The results show that 77% children had been immunised against measles while 23% had not been immunised. All the parents/caretakers were aware that their children should be immunised. Of the 120 parents/caretakers 87% were aware that measles is a disease that may cause complications. The parents and caretakers suggested strengthening of outreach services, improved health education to the community on the importance of immunisation and also the construction of more clinics in the district in order to improve the immunisation coverage in the district.

The bivariate analysis revealed that various factors were associated with the measles vaccination status of the children in the Opuwo Health District, namely, ethnicity and education level of parents/caretakers, financial support, transport available, travelling time required to access health facilities, waiting time at health facilities for immunisation service, availability of registers at health facilities, daily immunisation services, information provided during vaccination of the children, knowledge about the advantages of immunisation, and negative experiences of immunisation.

In the next chapter the conclusions, recommendations and study limitations will be discussed.

CHAPTER FIVE

CONCLUSIONS, RECOMMENDATIONS, AND LIMITATIONS OF THE STUDY

5.1 Introduction

The research results and literature control were presented in the previous chapter. Therefore, in this chapter, the discussion incorporates the conclusions regarding the research findings, the realisation of the research objectives, possible recommendations as well as any limitations identified during the study.

The purpose of this study was to investigate the factors associated with the low measles immunisation coverage in the Opuwo Health District in the Kunene region.

The objectives of the study were

- to determine the demographic and socio-economic factors pertaining to the parents and caretakers of immunised children as well as the parents and caretakers of non-immunised children
- to determine the factors, other than socio-demographic factors, that may be associated with the current immunisation status of children in the Opuwo Health District
- to examine the perceptions of parents and caretakers in the Opuwo Health District regarding the immunisation of their children.

5.2 Conclusions

The research objectives aimed at ascertaining the factors associated with the low measles immunisation coverage in the Opuwo Health District. The conclusions and recommendations will be presented under the relevant objectives of the study.

5.2.1 Objective 1: To determine the demographic and socio-economic factors pertaining to the parents of immunised children as well as the parents of non-immunised children

5.2.1.1 Conclusions

The researcher conducted interviews with the parents and caretakers of 120 immunised and non-immunised children. Seven demographic and socio-economic characteristics of the parents and caretakers emerged from the data analysis and with which there was statistically a significant association with the low measles vaccination coverage in the Opuwo Health District. These characteristics included:

- ethnicity ($p = 0.001$)
- education level ($p = 0.003$)
- financial support ($p = 0.036$)
- transport ($p = 0.004$)
- travelling time ($p = 0.000$)
- waiting time ($p = 0.000$)

- availability of registers at health facilities ($p = 0.000$)

The findings of the study are in agreement with the findings of a study conducted earlier in the same study area to the effect that ethnicity and education levels were both associated with the vaccination status of the children (Taapopi, 2002). As a result of the fact that p-values of the above characteristics were less than 0.05, the null hypothesis (H_0) was rejected because there was statistically a significant difference between the parents and caretakers of immunised and non-immunised children with regard to both demographic and socio-economic factors.

Based on the study findings, the following conclusions may be drawn, namely, when parents/caretakers belong to the Himba ethnic group, parents/caretakers have not attained formal education, parents/caretakers are unemployed and not receiving any financial support, parents/caretakers live far from either health facilities or outreach points and are not able to afford transport fares, parents/caretakers are forced to travel long distances with the travelling time lasting for, at the least, more than one hour, parents and caretakers have to wait for the immunisation services for more than one hour or health facility concerned does not keep an immunisation register for follow up purposes, then the children of these parents/caretakers will have a lower immunisation status than other children.

5.2.1.2 Recommendations

Social factors such as education are always important as regards access to health services and health seeking behaviour, including immunisation uptake. In the context

of a high level of illiteracy, which is the case in the Opuwo Health District, it is recommended that adult literacy be taken into account and accommodated through health promotion mechanisms in order to improve the immunisation coverage rate.

The study recommended the following:

- More health facilities should be established in the villages in the Opuwo Health District and health workers motivated to work in these difficult to access regions in the district by offering them with monetary incentives.
- It is recommended to expand and improve the outreach services to target the immunisation uptake in the remote areas of the district to provide better opportunities for the children to access the vaccination services.
- At present the goal of improved accessibility to health facilities is also hampered by poor household economic conditions. However, at district level, taking into account critical economic periods and conditions in the implementation of interventions may help to address this limitation.
- At the district level, the study also recommends assigning community health extension workers to all the villages in the district to provide the communities with comprehensive information and communication about immunisation in an effort to enhance of immunisation awareness of community members.

5.2.2 Objective 2: To determine factors other than socio-demographic that may be associated with the current immunisation status of children in the Opuwo Health District

5.2.2.1 Conclusions

The study reveals that other factors associated with the low measles vaccination coverage in the Opuwo Health District include the availability of immunisation services at health facilities ($p = 0.000$) and the information provided to parents and caretakers during the vaccination of their children ($p = 0.000$).

The findings indicate that p-values of less than 0.05 for these two factors and, thus, the study rejects the null hypothesis (H_0) on the grounds that there is a statistically significant difference between the parents and caretakers of immunised and non-immunised children with regard to other possible factors that may or may not influence the level of immunisation.

Thus, the conclusion may be drawn that, in this study, when the parents/caretakers were not aware that immunisation services were available and, indeed, offered on a daily basis, or parents and caretakers were not provided with information about possible adverse reactions to vaccines and what to do should these adverse reactions, their children will have a lower immunisation status than other children.

5.2.2.2 Recommendations

It is important that the parents/caretakers be provided with adequate information about what antigen is to be given, what to do should fever and abscesses develop and what the follow up date is for next visit. Armed with this information, the

parents/caretakers will be enabled to make decisions about whether or not to take their children for vaccinations.

The primary goal of EPI activities should be to help people to understand what vaccination entails and what is at stake. It would appear that poor communication about immunisation and inadequate knowledge about the purpose of vaccination account for the low measles immunisation coverage in the study area.

Therefore, the study recommends the following:

- At the district level it is recommended that health workers should provide comprehensive information about immunisation to the communities, particularly to the parents and caretakers.
- At the district level, the routine immunisation services in every health facility should be improved so that children may be vaccinated on any day that they visit the health facilities.
- At the district level, the vigilance on the part of health professionals should also be enhanced to minimise missed opportunities for administering the various types of vaccinations which should be given concurrently when the mother presents at the hospital, health centre or clinic with her child.

5.2.3 Objective 3: To examine the perceptions of parents and caretakers as regards the immunisation of their children in the Opuwo Health District.

5.2.3.1 Conclusions

One factor that is associated with the low measles immunisation coverage in the Opuwo Health District is the perceptions of parents/caretakers about immunisation ($p = 0.006$). This may be attributed to the fact that parents/caretakers who are provided with information on the adverse effects of vaccines understand and believe in the efficacy of immunisation, which may enable them to decide to take their children to be immunised or not since they are aware that vaccination involves some degree of discomfort and may cause pain, redness or tenderness at the site of the injection. However, the pain is minimal compared to the pain, discomfort and trauma of the diseases which these vaccines prevent. The more the parents and caretakers understand the adverse effects of vaccinations the less they will be concerned about vaccination and they will take their children to be immunised.

According to the findings mentioned above, the p-value was less than 0.05 and, the null hypothesis (H_0) is rejected on the grounds that there is statistically a significant difference between the parents and caretakers of immunised and non-immunised children with regard to their perceptions about immunisation.

5.2.3.2 Recommendations

An increased level of understanding on the part of parents and caretakers will help them to realise the following: that immunisation may save their children's lives, that immunisation promotes health and prevent diseases in children; that vaccines are safe and effective although they may involve some degree of discomfort which may cause pain, redness or tenderness at the site of injection; that immunisation against children

contracting diseases from other people and that immunisation may reduce and eliminate several diseases in the country as well as throughout the world. Such information may help parents/caretakers to make the correct decisions.

The study recommends the following:

- An advocacy of the importance of immunisation to community leaders who may influence the cultural beliefs and opinions about immunisation that needs to be carried out in order to ensure that the people in the Opuwo Health District accept the principle of vaccination and to mobilise them to immunise their children.
- Health workers need to strengthen maternal beliefs regarding the efficacy of immunisation through health education during both antenatal care (ANC) and postnatal care (PNC) visits.

5.3 General recommendations

Several recommendations may be made as a result of this research study. These recommendations are all aimed at improving the measles immunisation coverage in the Opuwo Health District in the Kunene region in Namibia:

5.3.1 Improve routine immunisation

- ❖ It is recommended that the Opuwo Health District should improve the routine Expanded Program on Immunisation (EPI) services at all the health facilities

with the emphasis on reducing missed opportunities for vaccination and increasing the access of all eligible children to the immunisation services.

- ❖ Outreach services should be expanded from one team to three or four teams in the district to enable the teams visit remote communities on a monthly basis.
- ❖ At the district level, health interventions should take into account the critical economic situation of the community members in order to help address the issue of accessibility to health facilities.
- ❖ It is recommended that Opuwo Health District should involve private agencies, NGOs, traditional leaders, other stakeholders and the media in disseminating information about the importance of the complete immunisation of children.
- ❖ It is recommended at district level that the vigilance of health professionals should be enhanced to minimise missed opportunities for the administration of the various types of vaccinations which should be given concurrently when the mother presents at the hospital, health centre, or clinic with her child. It is also essential that health professionals provide adequate information to the parents and caretakers during the vaccination of their children.
- ❖ It is recommended that community health extension workers be assigned to all areas that are far (more than 5km) from health the facilities to provide parents and caretakers with information about the importance of immunisation and to refer the parents and caretakers of children to health facilities for vaccination.

- ❖ Programmes should be implemented at district level to target the mothers of lower socio-economic status, including those with no education, those in poor households and with several children.
- ❖ At the district level, in line with the findings of this study, the recommendations of the study conducted by Taapopi (2002) to the effect that the ongoing monitoring of vaccination coverage through routine monthly reports and surveys conducted at least every five years may timeously identify factors which hamper the measles vaccination coverage in the Opuwo Health District in particular and in the Kunene region in general are still valid and applicable.
- ❖ It is recommended that the Opuwo Health District keeps immunisation registers at all the health facilities to enable the nurses to follow up children in their areas who have missed their vaccinations.
- ❖ The district should strengthen the Reach Every District (RED) approach which assists health centres and clinics to map the population in their catchment areas and to improve the general access to the immunisation services.
- ❖ The Opuwo Health District health workers should promote the importance of immunisation to the community leaders who may influence the cultural beliefs and opinions about the importance of immunisation to ensure that the people of the Opuwo District, in particular, the Himba community, accept the principle of vaccination and to mobilise them to immunise their children.

- ❖ It is recommended at regional level that additional posts be motivated and proposed as the current district structure of an outreach team comprising one registered nurse and three enrolled nurses is not sufficient to visit all the outreach posts on a monthly basis.
- ❖ At the regional level, it is also recommended that more health facilities be established in the district where they are needed in order to be able to reach of the more communities living in remote areas.
- ❖ Ministry of Health and Social Services currently conduct a Community Based Health Workers Project pilot programme to be implemented in the Kunene region in the Opuwo Health District. The study also recommends that the Ministry of Health and Social Services, through the Opuwo Health District, include the programme in the national budget to ensure that it is maintained and rolled out to all the villages in the Opuwo district as well as to other districts and regions in the country.
- ❖ Ministry of Regional and Local Government, Housing and Rural Development, Kunene Regional Council, to build roads to remote areas through the Food/Cash for Work Programme to ensure that community members residing in these areas are visited and provided with immunisation services on a regular basis.

5.4 Recommendations for further research

The study recommends that further research be conducted after five years to investigate the factors associated with vaccination coverage after the implementation of the Community Health Extension Workers Programme in the Opuwo Health District.

5.5 Limitations of the study

The researcher identified the following limitations in the study that may have diminished the credibility of the study:

5.5.1 Limitations with regard to the sampling

The study employed the probability sampling approach through cluster random sampling. There was no list available of all the households in the population. Some of the villages included a small number of households which were some distance away from each other. It was also difficult to differentiate between some of the households because there were few families who were related but lived in the same dwelling. As a result of limited resources, it is possible that the researcher may have either an overrepresented or underrepresented population in terms of certain characteristics which may skew the results of the study. Nevertheless, despite the fact that it was a challenge, the researcher did manage to obtain information from the parents and caretakers of 120 children from seven villages in the Opuwo Health District.

5.6 General conclusion

The importance of immunisation against measles, in a developing country such as Namibia must not be overemphasised. The low measles immunisation coverage of 77%, which was documented in this study among children in the rural villages of the Opuwo Health District in the Kunene region, indicates the need for strategies to be designed to address the situation. The results of this study also indicate the need to emphasise the timely administration of the measles vaccine. The vigilance on the part of the health professionals should also be enhanced through training to minimise missed opportunities with regard to the administration of measles vaccine and the various other types of vaccine which should be administered concurrently when the parents/caretakers present at the hospital, health centre or clinic with their children.

The study concluded that the parents/caretakers of children aged between 12 and 23 months are aware of the importance of immunising their children. The factors associated with measles vaccination in the Opuwo Health District includes the ethnicity and education level of the parents and caretakers, financial support, transport to health facilities, travelling time required to access the health facilities, waiting time for immunisation services, availability of immunisation registers at health facilities, the awareness on the part of the parents/caretakers about the immunisation services provided at the health facilities and information given to parents and caretakers during the immunisation of their children.

This study also identified specific areas for intervention as far as the factors associated with a low level of measles vaccination are concerned. Programmes target

the mothers of lower socio-economic status, including those mothers with no education, those in poor households and those residing far from health facilities, are required. Such programmes may include the expansion of the outreach services, health education and immunisation campaigns at the community level in order to improve the measles vaccination coverage. The involvement of other stakeholders such as traditional leaders, NGOs (e.g. Namibian Red Cross Society), regional councils and local authorities may lead to the much needed political, civil society and media support for the importance of immunising children in the Opuwo Health District.

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ANNEXURES

**Annexure A: Letter of approval from the Post Graduate Studies Committee -
University of Namibia**

UNIVERSITY OF NAMIBIA

Private Bag 13301, 340 Mandume Ndemufayo Avenue, Pionierspark, Windhoek, Namibia



FACULTY OF MEDICAL AND HEALTH SCIENCES

**Letter of permission:
Post graduate students**

To: Post graduate students
From: Dr K. Hofnie-//Hoëbes

Date: 7 June 2011

Dear Student: Ms K. Tjiveze (Student number: 8900558)

The post graduate studies committee has approved your research proposal.

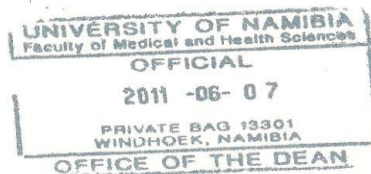
Factors associated with the low measles immunization coverage in the Opuwo Health District, Namibia

You may now proceed with your study and data collection.

It may be required that you need to apply for additional permission to utilize your target population. If so, please submit this letter to the relevant organizations involved. It is stressed that you should not proceed with data collection and fieldwork before you have received this letter and got permission from the other institutions to conduct the study. It may also be expected that these organizations may require additional information from you.

Please contact your supervisors on a regular basis.


Dr K. Hofnie-//Hoëbes



**Annexure B: Letter of approval from the Ministry of Health and Social Services
– Office of the Permanent Secretary**



9 - 0/0001

REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198	Ministerial Building	Tel: (061) 2032510
Windhoek	Harvey Street	Fax: (061) 227786
Namibia	Windhoek	E-mail: eshaama@mhss.gov.na
Enquiries: Ms. E.N. Shaama	Ref.: 17/3/3	Date: 02 August 2011

OFFICE OF THE PERMANENT SECRETARY

Ms. Katarina Tjiveze
P.O. Box 48
Opuwo
Namibia

Dear Ms. Tjiveze

Re: Factors associated with the low measles coverage in Opuwo Health District

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 completion of your MPH Degree;
 - 3.2 No other data should be collected other than the data stated in the proposal;
 - 3.3 A quarterly report to be submitted to the Ministry's Research Unit;
 - 3.4 Preliminary findings to be submitted upon completion of study;
 - 3.5 Final report to be submitted upon completion of the study;
 - 3.6 Separate permission should be sought from the Ministry for the publication of the findings.


Yours sincerely,


MR. K. KAHUURE
PERMANENT SECRETARY

"Health for All"

Annexure C: Letter of permission from the Kunene Regional Health Directorate – Office of the Regional Director

9 - 0/0001



REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 3003	Tel. no.: 065 – 272827
Opuwo	Fax no.: 065 – 273022
Enquiries: Ms. L.L. Nambundunga	17 August 2011

OFFICE OF THE REGIONAL DIRECTOR

To: Mrs. K. Tjiveze
Control Registered Nurse
MoHSS
Private Bag 3003
Opuwo

Dear Mrs. Tjiveze

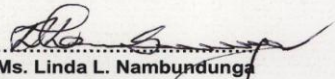
REQUEST FOR AUTHORIZATION TO CONDUCT THE STUDY OF FACTORS ASSOCIATED WITH MEASLES IMMUNIZATION COVERAGE OPUWO HEALTH DISTRICT, KUNENE REGION

Your letter dated 12 August 2011 bears reference.

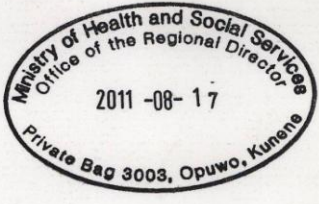
Authorization is hereby granted to you to conduct the above study in Opuwo District.

I would like to make use of this opportunity to wish you all the best in carrying out the study.

Sincerely yours



Ms. Linda L. Nambundunga
Regional Director



Cc Dr. E.O.Nkire, GMO
Dr. P. Bwalya, PMO

"Health for All"

Annexure D: Research instrument – Questionnaire

Factors associated with the the measles immunisation coverage in the Opuwo Health District in the Kunene region in Namibia

Information

Ask whether there is a child aged between 12 and 23 months in the house. If yes, seek informed consent to conduct the interview from the parent/caretaker.

Proceed to interview the parent/caretaker.

Date of visit:

Informed Consent

Hello. My name is Katarina Tjiveze. I am working with the Ministry of Health and Social Services and I am studying MPH at UNAM. I am authorised by the Ministry of Health and Social Services to conduct a study about the factors that associated with the measles coverage in the Opuwo Health district in terms of children aged between 12 and 23 months.

I would, therefore, like to ask you some questions about your socio-economic status, about immunisation, and about the measles immunisation status of your child.

The study has two main purposes

1. The information is needed academically as a requirement for the completion of the MPH course.
2. The information to be collected will help the district to plan the improvement of the Expanded Programme Immunisation services.

The survey takes approximately 10 to 15 minutes to complete. Whatever information you provide will be kept strictly confidential and your anonymity is guaranteed. As a result you may answers the questions as honestly as possible.

Participation in this study is voluntary and, if we could come to the question you do not want to answer, just let me know and I will go on to the next question. You may also stop the interview at any time. However, we hope that you will participate in this study since your views are extremely important. We would very much appreciate your participation in the study.

At this time, do you want to ask me anything about the study?

Do you agree to be interviewed? Yes No

Signature of the interviewer:

Factors associated with the measles immunisation coverage in the Opuwo Health District in the Kunene region in Namibia

Respondent ID: _____

Name of the village:

Tick what is applicable

SECTION A: DEMOGRAPHIC DATA AND SOCIOECONOMIC STATUS OF THE PARENT/GUARDIAN

1. Gender.....
2. Age.....
3. Place of residence
 1. Urban
 2. Rural
4. How are you related to the child?
 1. Parent
 2. Caretaker
5. Tribe
 1. Himba
 2. Herero
 3. Zemba
 4. Vambo
 5. Damara
 6. Others
6. Marital status
 1. Single
 2. Married
 3. Divorced
 4. Widowed
 5. Cohabiting
7. Have you ever attended school?
 1. Yes
 2. No
8. If yes, what is the highest level of education you attained?
 1. Primary
 2. Secondary
 3. Higher

- 4. College
- 5. Degree
- 6. Do not know

9. What is your current employment situation?

- 1. Employed full time
- 2. Employed part time
- 3. Looking for a job
- 4. Self employed
- 5. Unemployed
- 6. Retired

10. If unemployed, what is your main source of financial support?

- 1. Family support
- 2. Disability benefits
- 3. Veteran's benefits
- 4. None
- 5. Not applicable

11. Who is your main source of information about immunisation? (*Tick all mentioned*)

- 1. Nurses/health workers
- 2. Parents
- 3. Friends
- 4. Church
- 5. Traditional leaders
- 6. Media (Radio, television, newspapers, etc.)

12. What mode of transport do you usually use to go to the health facility or outreach point?

- 1. On foot
- 2. Donkey cart
- 3. Bicycle
- 4. Car
- 5. Motorbike

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

- 1. Less than 30 minutes
- 2. One hour
- 3. More than one hour
- 4. Do not know

14. How much time did you spend in the health facility waiting for the child to be immunised?

1. Less than one hour
2. More than one hour
3. The whole day
4. Do not know
5. Not applicable

15. Is there a register at the health facility in your area in which your children are registered for immunisation follow ups?

1. Yes
2. No
3. Do not know
4. Not applicable
5.

SECTION B: IMMUNISATION STATUS OF THE CHILD

1. Age of the child: _____ months
2. Gender
 1. Male
 2. Female

3. Birth order

1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th

4. Has the child received his/her measles vaccination? (*compare with the passport*)

1. Yes
2. No

If yes, at which age? _____ months

5. Are immunisation services provided on a daily basis at your nearest health facility?

1. Yes
2. No
3. Not applicable

6. Is there an outreach point nearby to which you may take your child for immunisation?

1. Yes
2. No
3. Not applicable

7. What information are you normally given before your child is immunised?
(Tick what is relevant)

- | | |
|--|--------------------------|
| 1. What antigen is to be given | <input type="checkbox"/> |
| 2. What to do should fever and abscesses develop | <input type="checkbox"/> |
| 3. Follow up date for next visit | <input type="checkbox"/> |
| 4. I do not remember | <input type="checkbox"/> |
| 5. Nothing at all | <input type="checkbox"/> |
| 6. Not applicable | <input type="checkbox"/> |

**SECTION C: PERCEPTIONS OF PARENTS REGARDING THE IMPORTANCE
OF IMMUNISATION**

1. Are you aware that your child should be immunised?

- | | |
|--------|--------------------------|
| 1. Yes | <input type="checkbox"/> |
| 2. No | <input type="checkbox"/> |

2. Do you believe that immunisation is for a healthy child or a sick child?

- | | |
|------------------|--------------------------|
| 1. Healthy child | <input type="checkbox"/> |
| 2. Sick child | <input type="checkbox"/> |
| 3. Both | <input type="checkbox"/> |

3. Do you believe that immunisation is for a malnourished child or a well breastfed child?

- | | |
|-------------------------|--------------------------|
| 1. Malnourished child | <input type="checkbox"/> |
| 2. Well breastfed child | <input type="checkbox"/> |
| 3. Both | <input type="checkbox"/> |
| 4. Do not know | <input type="checkbox"/> |

4. Do you believe that immunisation is or male children only or for female children only?

- | | |
|--------------------|--------------------------|
| 1. Male children | <input type="checkbox"/> |
| 2. Female children | <input type="checkbox"/> |
| 3. Both | <input type="checkbox"/> |
| 4. Do not know | <input type="checkbox"/> |

5. Do you believe that immunisation is for first-born children only?

- | | |
|----------------|--------------------------|
| 1. Yes | <input type="checkbox"/> |
| 2. No | <input type="checkbox"/> |
| 3. Do not know | <input type="checkbox"/> |

6. What positive things do you believe about immunisation?

- 1. Keeps the child healthy
- 2. Protects the child against diseases
- 3. Strengthens the immune system of the child
- 4. Do not know

7. Do you believe that there are local substitutes for immunisation?

- 1. Yes
- 2. No
- 3. Do not know

If yes, please share

8. Are you aware that, as a disease, measles may cause complications?

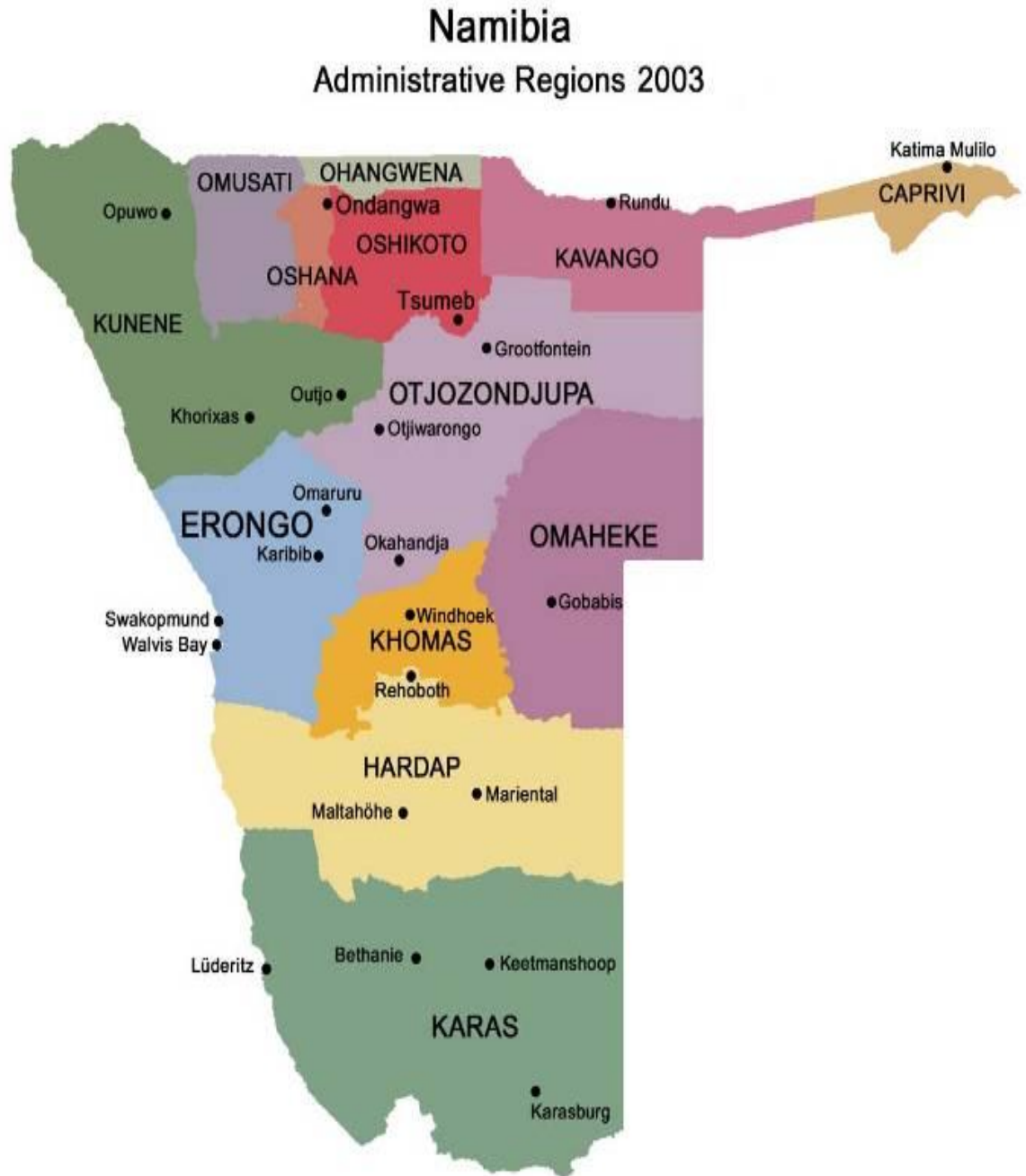
- 1. Yes
- 2. No

If yes, please mention these complications

9. What suggestions would you make regarding the improvement of the immunisation coverage in this district?

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

Annexure E: Map of Namibia



Annexure F: Map of Kunene Region

