

ASSESSING THE FACTORS ASSOCIATED WITH UPTAKE OF CHILDHOOD  
IMMUNIZATION SERVICES AMONG CHILDREN AGED 12 TO 23 MONTHS IN  
ESWATINI

By

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A Mini-thesis submitted in partial fulfilment of the requirements for Degree of Masters in Public Health at the School of Public Health, Faculty of Community and Health Sciences, University of the Western Cape.



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## KEYWORDS

Antigens

Children

Factors

Immunization

Maternal

Prevention

Proxy-indicators

Rural

Urban

Vaccination



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## DECLARATION

I, Michelle Farai Mutandwa, declare that this thesis, entitled, “Assessing the factors associated with uptake of childhood immunization services among children aged 12 to 23 months in Eswatini” is my own work, and that all the sources used or quoted in this research study have been indicated and acknowledged by means of complete references. I further declare that this work has not been submitted for any other degree at any other institution.

Michelle Farai Mutandwa

**Researcher’s signature**

18<sup>th</sup> November 2022

**Date**



## ABBREVIATIONS

<b>AEFI</b>	<b>Adverse Event Following Immunization</b>
<b>BCG</b>	<b>Bacille-Calmette Guerin</b>
<b>CSO</b>	<b>Central Statistical Office</b>
<b>DT</b>	<b>Diphtheria Tetanus</b>
<b>DTP -HEP B-HIB</b>	<b>Diphtheria Tetanus Pertussis; Hepatitis B; Hemophilusinfluenza typeb</b>
<b>DTP</b>	<b>Diphtheria Tetanus Pertussis</b>
<b>EPI</b>	<b>Expanded Program on Immunization</b>
<b>IPV</b>	<b>Inactivated Polio Vaccine</b>
<b>MCV1</b>	<b>Measles Containing Vaccine 1</b>
<b>MCV2</b>	<b>Measles Containing Vaccine 2</b>
<b>MoH</b>	<b>Ministry Of Health</b>
<b>MR</b>	<b>Measles Rubella Vaccine</b>
<b>OPV</b>	<b>Oral Polio Vaccine</b>
<b>PCV13</b>	<b>Pneumococcal Conjugate Vaccine</b>
<b>RI</b>	<b>Routine Immunization</b>
<b>SIA</b>	<b>Supplemental Immunization Activity</b>
<b>UNICEF</b>	<b>United Nations Children’s Emergency Fund</b>
<b>VPDs</b>	<b>Vaccine-preventable Diseases</b>
<b>WHO</b>	<b>World Health Organization</b>

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## KEY TERMS DEFINITION

<b>Term</b>	<b>Definition</b>
<b>Socio-demographic of participant</b>	This refers to the socio-demographic characteristics of the participant including: maternal age, marital status, maternal educational status, religion, geographic location and employment status.
<b>Adverse events following immunization</b>	Any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine.
<b>Maternal age</b>	This is a reference to the mother's age at the time of delivery.
<b>Maternal education</b>	This relates to the mother's educational status, which is classified as having no education, primary education, secondary education, or tertiary education.
<b>Marital status</b>	This is a reference to the participant's legal marital status, which might be either single, married, cohabiting, separated, or widowed.
<b>Religion</b>	This is the respondent's religious affiliation. For this study it is categorized into Apostolic sect, Catholic, Pentecostal, Traditional African and Free Evangelical.
<b>Geographic location</b>	This refers to a place where the participant resides and it is categorized into rural and urban areas.
<b>Employment status</b>	This refers to the parents/caregivers' occupation which is categorized into unemployed, formally employed or self-employed.

<b>Family income</b>	The amount of money a family makes each month is characterized in this study as lower (R 2000), middle (R 2000 - R 4000), and high (> R 4000)
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## ABSTRACT

**Introduction:** Immunization is the use of vaccines on people, particularly children, to make them resistant to infectious diseases. The vaccines administered stimulate the body's immune system for protection against subsequent infection. Primary prevention through immunization diverts finite health care resources, including financial and human resources, from treating vaccine-preventable diseases to other healthcare needs, therefore, reducing strain on health care systems. The Eswatini government aims to achieve the 90/80 targets by 2030 as part of the Global Vaccine Action Plan (GVAP). The interventions for immunization include routine immunization and supplementary immunization activities. Despite the concerted efforts, there has been a significant downward trend in immunization coverage in all four regions of Eswatini since 2012.

**Aim:** This research aimed to determine the factors associated with the uptake of childhood immunization services among children aged 12 to 23 months in Eswatini.

**Methods:** The study's methodology was a quantitative cross-sectional analytical technique. In the four areas of Eswatini, parents and caregivers of children between the ages of 12 and 23 months were chosen through random sampling to participate in the study. The list of all the constituencies per region was assigned numbers which were put in a table. Every 5<sup>th</sup> number was selected; the selected numbers were reselected until five constituencies remained. For each constituency, twenty households were selected for interviewing per constituency based on whether or not they fit the study's inclusion criteria; if not they were skipped. This process was applied to all four regions. A structured interviewer-administered questionnaire was used to collect data. Data analysis was conducted using SPSS version 28.

**Results:** The majority of children who were included in the study were fully immunized according to their age at the time of the study (81.5%). The majority of the participants (89.2%) reported that they were aware of immunization. Similarly, more than half the respondents (63.8%) indicated that they knew about the immunization schedule. In the bivariate analysis, full vaccination compared to partial vaccination was associated with the age of the mother ( $p = 0.047$ ); relationship to the child ( $p < 0.001$ ), geographic location ( $p < 0.001$ ); marital status ( $p = 0.034$ ) and religious affiliation (being Free Evangelical:  $p = 0.03$ ; being Catholic:  $p = 0.025$ ; being Pentecostal:  $p = 0.005$ ). Additionally, self-reporting of awareness about immunization compared to not knowing



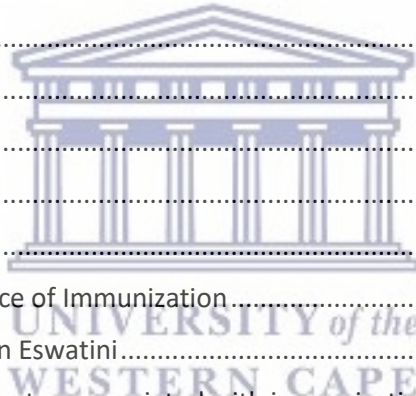
about immunization was associated with the age of the mother ( $p = 0.019$ ), marital status ( $p < 0.001$ ), education ( $p < 0.001$ ) and family income ( $p = 0.019$ ).

**Conclusion:** Socio-demographic factors associated with the uptake of immunization services demonstrate that community sensitization and empowerment are essential in ensuring the acceptance of immunization services.



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## Chapter 1\_Introduction

### 1.1 Background

Immunization is the use of vaccines (live or attenuated) on people, particularly children, to make them resistant to an infectious disease. The vaccines administered stimulate the body's immune system for protection against subsequent infection (World Health Organization, 2009). Primary prevention through immunization diverts finite health care resources, including financial and human resources, from treating vaccine-preventable diseases to other healthcare needs, therefore, reducing strain on health care systems.

Routine immunization in Eswatini is administered to children under five years (Ministry of Health, 2016). In the national immunization schedule, the children are expected to be vaccinated with the following vaccines: Bacille Calmette Guerin (BCG), Oral Polio Vaccine (OPV), Diphtheria-Tetanus-Pertussis-Hepatitis B-Haemophilus Influenza B (DTP-HepB-Hib), Measles-Rubella (MR), Pneumococcal Conjugate Vaccine (PCV13) and Rotavirus vaccine. These vaccines protect against vaccine-preventable diseases (VPDs), namely Tuberculosis, Poliomyelitis, Diphtheria, Tetanus, Pertussis, Hepatitis B, Haemophilus Influenza type B, Rotavirus (causes diarrhoea), Pneumonia, Measles and Rubella. Full vaccination coverage is determined at the age of 23 months (two years), whereby a child should have received all the antigens for protection against vaccine-preventable diseases (WHO, 2009). A child is fully immunized at the age of 23 months if they have received one dose of BCG, three doses of DPT-Hep B-Hib, two doses of Rotarix, three doses of PCV 13, one dose of IPV and two doses of MR. Among the vaccines, routine Tetanus Diphtheria is administered to pregnant women and women of child-bearing age (WHO, 2009).

The proxy indicators used for immunization are Measles-Rubella 1 (MR1), indicating fully vaccinated children, DPT-Hep B-Hib 1 for determining accessibility to services and DPT-Hep B-Hib 3 for determining immunization coverage (WHO, 2020). According to the WHO Global Vaccine Action Plan (90/80 target), immunization coverage targets are to reach 90% national coverage and 80% in every district or equivalent administrative unit. The dosage of vaccines will include three doses of DPT- Hep B- Hib containing vaccines and two doses of Measles-Rubella vaccine (WHO, 2020). The immunization coverage rates in Eswatini using the national proxy indicators revealed a downward trend in DPT-Hep B-Hib 3 coverage rates from 88% in 2014 to 81.9% in 2020. Additionally, there was a decrease in coverage rates for the measles-rubella vaccine

(MR1) from 78.2% in 2014 to 70.4% in 2020 (MoH, 2021). Eswatini is one of the countries that signed the Addis Declaration on Immunization which took place in Ethiopia in 2016 (WHO, 2018). The Addis Declaration on Immunization commits to ensuring that everyone in Africa receives full benefits of immunization despite their social class. Consequently, the Immunization Programme is clearly articulated in the National Health Sector Strategic Plan NHSSP III 2019 – 2023 under strategic intervention 2: Promoting Health Through the life course (MoH, 2019). Eswatini, having committed to the Addis Declaration on Immunization and having an NHSSP on immunization, aim to ensure that the 90/80 immunization coverage target is achieved, hence the concerns in the downward trend of immunization rates.

### 1.2 Expanded Programme on Immunization in Eswatini

In 1979, the World Health Organization and Save the Children Fund collaborated to create the Eswatini Expanded Programme on Immunization (EPI) (Ministry of Health, 2008). Later, the Canadian Public Health Association, Rotary International, USAID and UNICEF all provided funding for the initiative. The programme was formally inaugurated in 1980 after a lameness survey was completed in 1979, which revealed a large number of cases of post-polio lameness in the nation, along with increased rates of measles and neonatal tetanus (Ministry of Health, 2008).

The Expanded Programme on Immunization (EPI) has a well-established distribution infrastructure. Through two fundamental strategies, namely outreach and fixed strategies, provide communities with access to routine immunization services and other child survival initiatives (MoH, 2008). EPI now receives full government funding for the acquisition of vaccines, injection equipment, employee salary, and the execution of other scheduled operations as part of the Ministry's directorate-led child survival programs. The program's major objective is to protect children from diseases such as Haemophilus influenza type B, poliomyelitis, measles rubella, hepatitis B, diphtheria, pertussis, tetanus, and hepatitis B that vaccines can prevent. Additionally, the program ensures that there are projects for child survival including vitamin A supplementation and deworming for children under five years of age. During the period between 2013, 2015 and 2016, the program effectively introduced new vaccines like pneumococcal (PCV13), Rota (prevention against diarrhoea), IPV and rubella. The program consists of five components which

are; Program management, Service delivery, Diseases surveillance and control, Vaccine supply & cold chain and Advocacy & communication.

The Immunization Programme is clearly articulated in the National Health Sector Strategic Plan (NHSSP) III 2019 – 2023 under strategic intervention 2: Promoting Health Through the life course (MoH, 2019). The health sector aims to improve the delivery of high-quality, comprehensive child health care and eliminate preventable infant death. The goal of the health sector is to enhance the provision of thorough, high-quality pediatric healthcare and end avoidable infant mortality. People and communities will consequently have access to the proper goods in the correct quantities, at the appropriate location, for the appropriate clients, and at costs, they can afford. This strategic intervention includes monitoring vaccine-preventable diseases, eradicating and eliminating VPDs, provide safe, potent, high quality and adequate vaccines to the eligible population at all health services delivery according to the national immunization schedule. The strategy is also meant to create demand for immunization services targeting areas with low coverage.

### 1.3 Problem Statement

Immunization is essential in preventing vaccine-preventable diseases (VPDs) (Ministry of Health, 2016). It ensures that children live fulfilling lives, and this reduces microeconomic and macroeconomic costs for families and countries. Noteworthy is that Eswatini has been polio-free since 1989 (Ministry of Health, 2016).

The government of Eswatini aims to achieve the 90/80 targets by 2030 as part of the Global Vaccine Action Plan (GVAP) (WHO, 2020). The interventions for immunization include routine immunization and supplementary immunization activities (SIAs, e.g., national immunization campaigns). Nonetheless, these have not yielded the desired outcomes, as immunization coverage has declined in all four regions in Eswatini since 2012. The immunization coverage rates in Eswatini, using the national proxy indicators, revealed a downward trend in DPT-Hep B-Hib 3 coverage rates from 88% in 2014 to 81.9% in 2020. Additionally, there was a decrease in coverage rates for the measles-rubella vaccine (MR1) from 78.2% in 2014 to 70.4% in 2020 (MoH, 2021). The ramifications of low immunization coverage rates cannot be understated; these include exposing the most vulnerable people to diseases, who can be protected from diseases through herd immunity. Herd immunity is achieved when a sufficient proportion of a population is immune to an infectious disease through immunization or prior illness (Center for Disease Control, 2022).

This protects the population against diseases, particularly those who are vulnerable to diseases because of a weak immune system or pre-existing conditions.

#### 1.4 Purpose of the Study

There is currently no research that has been conducted which reveals the variables linked to the uptake of immunization services in Eswatini. However, a study using secondary data from the Swaziland Demographic Health Survey was carried out in 2015, seven years ago (Tsawe et al., 2015). My research's aim is to identify the factors that influence the uptake of immunization services in Eswatini among children aged 12 to 23 months because the results could differ from those from 2015. This study provides primary data as a reference source for future programme implementation activities. Furthermore, community engagement is a core component in the expanded programme on immunization. It was imperative to assess what influenced the uptake of childhood immunization services for informing the public health fraternity during programme planning to devise mitigating strategies and possibly institute sustainable interventions, particularly in community engagement activities.

#### 1.5 Aims and Objectives

##### 1.5.1 Aim

To determine the factors associated with the uptake of childhood immunization services among children aged 12 to 23 months in Eswatini.

##### 1.5.2 Objectives

- To describe the socio-demographics of parents/caregivers of children aged 12 to 23 months in all four regions in Eswatini.
- To determine the socio-demographic factors associated with the uptake of childhood immunization services among parents/caregivers of children aged 12 to 23 months in all four regions in Eswatini.
- To describe the knowledge about immunization and immunization schedule among parents/caregivers of children aged 12 to 23 months in all four regions in Eswatini.

#### 1.6 Mini Thesis Outline

Chapter 1: This will include the background, problem statement, purpose of the study and mini-thesis outline.



Chapter 2: This is the literature review which discusses similar studies that other researchers have conducted. Additionally, its' purpose is to gain an understanding of the existing research and debates relevant to the topic under investigation.

Chapter 3: This chapter is an outline of the research methodology, which provides details on how the study was conducted. It will include the study design, study setting, population, sampling technique, data collection, data analysis, validity and reliability, study limitations, ethical considerations and risk-benefit analysis.

Chapter 4: The results chapter presents the findings obtained in the study.

Chapter 5: This chapter discusses the findings of the study and links to studies conducted to answer similar research questions.

Chapter 6: This chapter provides recommendations for future studies and a conclusion of the study.



## Chapter 2\_Literature Review

### 2.1 Introduction

The main subject of this literature review will be factors associated with the uptake of childhood immunization. It will involve research on parental socio-demographic factors linked to the uptake of immunization services among children aged 12 to 23 months in Africa and globally. Mothers' age, education level, marital status, employment situation, place of residence, religion, and immunization awareness are among the socio-demographic characteristics.

### 2.2 Global and Regional Prevalence of Immunization

With continuing evidence of the efficacy of immunization programs, the Addis Declaration on Immunization was endorsed in 2016 by African leaders (WHO, 2018:2). The Addis Declaration on immunization commits to the following: 1. “Keep universal access to immunization at the forefront of efforts to reduce child mortality”; 2. “Increase and sustain domestic investments and funding allocations for immunization”; 3. “Address the persistent barriers in vaccine and healthcare delivery systems, especially in the poorest, vulnerable and most marginalized communities”; 4. “Increase the effectiveness and efficiency of immunization delivery systems as an integrated part of strong and sustainable primary healthcare systems”; 5. “Attain and maintain high quality surveillance for targeted vaccine-preventable diseases”; 6. “Monitor progress towards achieving the goals of the global and regional immunization plans”; 7. “Ensure polio legacy transition plans are in place by end-2016”; 8. “Develop a capacitated African research sector to enhance immunization implementation and uptake”; 9. “Build broad political will for universal access to life-saving vaccines”; 10. “Promote and invest in regional capacity for the development and production of vaccines.” Despite this commitment, there are existing challenges to achieving universal immunization in Africa. In 2018, there was an estimated 19.4 million infant deaths associated with lack of or incomplete routine immunization, such as three doses of the DTP vaccine (WHO, 2018). According to WHO (2018) statistics, 60% of these deaths took place in low- and middle- income countries in Africa. Globally, nearly 20 million children are un-or-under vaccinated, and almost half of them are on the African continent (WHO & UNICEF, 2020). Immunization coverage has plateaued over the past decade, signalling that more unvaccinated

children will be susceptible to vaccine-preventable diseases and erosion of herd immunity. The disparities in immunization coverage are appalling. As of 2019, high-income countries had 95% immunization coverage of the DTP- Hep B-Hib 3 (pentavalent), compared to only 81% in low- and middle- income countries (WHO & UNICEF, 2020). Similarly, the national coverage for Measles Rubella 1 (MR1) vaccine was 85% globally and 69% for the African region in 2019, reflecting that many countries in the global South struggle to attain international immunization rates.

### 2.3 Prevalence of Immunization in Eswatini

In Eswatini, between 2014 and 2020, the coverage rates for all vaccines stagnated below the target of 80% at the regional level. The immunization coverage rates in Eswatini using the national proxy indicators reveal a downward trend in DPT-Hep B- Hib 3 coverage rates from 88% in 2014 to 81.9% in 2020. Additionally, there is a decrease in coverage rates for the measles-rubella vaccine (MR1) from 78.2% in 2014 to 70.4% in 2020 (MoH, 2021). The immunization coverage is below the national targets of 90% coverage and the regional target of 80% coverage. The ramifications of low immunization coverage rates are detrimental to communities and countries; these include outbreaks, e.g. the measles outbreak, which occurred in the neighbouring countries Mozambique and South Africa early last year (MoH, 2021). Furthermore, the benefits of implementing routine immunization include eradicating vaccine-preventable diseases (VPDs), for example, polio eradication; noteworthy is that Eswatini has been polio-free since 1989 (MoH, 2016).

### 2.4 Parental socio-demographic factors associated with immunization

The use of childhood immunization services has been correlated with a number of socio-demographic characteristics. These include maternal age (Negussie et al., 2016; Wemakor et al., 2018); maternal education (Duru et al., 2016; Animaw et al., 2014); marital status (Chris-Otubor et al., 2015; Anokye et al., 2018); religion (Bbaale at al., 2013; Sanou et al., 2009); geographic location (Sarker et al., 2019; Masood et al., 2020) and employment status (Mukungwa, 2015; Legesse & Dechasa, 2015).

#### 2.4.1 Maternal age

An Ethiopian case-control study with 548 children aged 12 to 23 months found that maternal age influenced the uptake of childhood immunization, with mothers over 19 years being approximately

ten times more likely than mothers under 19 years to have their children complete all immunization doses (Negussie et al., 2015). Conversely, the mother's age was not linked to the infant's full immunization status in a study conducted in Kwabre East District, Ghana, to ascertain the prevalence and causes of incomplete immunization in 322 children (12-23 months) (Wemakor et al., 2018). In Southern Ethiopia, the authors Negussie et al. (2015) claim that younger mothers (< 19 years) were more prone than mothers older than 19 years of age to skip their children's immunizations. Similarly, in the Amhara region of Ethiopia, among 575 mothers, the age group of 40 years and older was an independent predictor of immunization of infants aged 12 to 23 months (Abede et al., 2018).

#### 2.4.2 Maternal education

The awareness of immunization services is significantly influenced by maternal education. According to Animaw et al. (2014), no education, primary education, secondary education, and tertiary education are the categories used to describe education status. In a study conducted in Nigeria, the mother's level of education was the demographic factor that was most frequently mentioned as impacting children's vaccine uptake because of comprehension of immunization by the mothers (Duru et al., 2016). The authors state that having a primary education or higher resulted in mothers being approximately eight times more likely to be knowledgeable about immunization than women with no formal education. Accordingly, the level of education (secondary/higher) of the mother among 400 mothers sampled in Cameroon, determined the infant's immunization status (Chiabi et al., 2017). Similarly, the authors Animaw et al. (2014) assert that full immunization of children was linked with the mother's education status (secondary education or higher) in their research of 630 children aged 12 to 23 months from 15 districts in Ethiopia.

#### 2.4.3 Marital status

In a study involving 280 women in Ghana, it was discovered that parental stability, which refers to being raised in a family with both a mother and a father, and marital status, impact children's immunization status (Anokye et al., 2018). According to the authors, complete immunization was three fold more among infants' whose mothers were married compared to mothers who were divorced. Similarly to this, Wemakor et al. (2018) assert that there was a borderline correlation ( $p = 0.0048$ ) between a mother's marital status and a child obtaining all advised vaccines.

In a study conducted in Nigeria, married women, in comparison to their contemporaries who were unmarried, were more likely to have children with a higher immunization rate because of spousal support. The spousal support would be in the form of reminders to take the child for immunization and accompanying the wife and child to the clinic (Chris-Otubor et al., 2015). According to Anokye et al. (2018), single young women might have failed to complete their education because of teenage pregnancy and did not have sufficient knowledge of the benefits of immunization. Additionally, they lack spousal support hence lower immunization rates compared to married women.

#### 2.4.4 Religion

Community factors associated with immunization include religion, cultural factors and social norms. In Burkina Faso, religion has resulted in some children failing to get fully immunized (Sanou et al., 2009). The Muslim group did not fully immunize their children because of a probable lack of information pertaining to the effectiveness and imperativeness of immunization and knowledge about the immunization schedule (Sanou et al., 2009). Correspondingly, in a demographic health survey conducted in Uganda, immunization of infants was affected by the religious group of the parents/caregivers. Muslim families utilized immunization services less than Catholic families because Muslim families did not believe in immunization of children (Bbaale et al., 2013). In Nigeria, differences in religious affiliation were associated with varied immunization rates, i.e. 66% among Christians and 32% among Muslims (Glatman-Freedman & Nichols, 2012). Religion plays a pivotal role in determining whether or not a child will get vaccinated. In Mozambique, viewing immunization as acceptable in one's religion (Catholic, Apostolic, Muslim, etc.) resulted in mothers taking their infants for complete immunization (Jani et al., 2008). On the contrary, a study by Anokye et al. (2018) revealed that respondents' religion had no significant association with children being partially vaccinated. This study was conducted among 280 mothers of children aged 12 to 23 months in Ghana.

#### 2.4.5 Geographic location

Geographic location (i.e. rural versus urban residence) correlates with immunization of infants (Eze et al., 2015). Children who reside in urban areas were stated to have better immunization status than those living in rural areas (Sarker et al., 2019). Correspondingly, in Eswatini, in a study conducted by reviewing secondary data by Tsawe et al. (2015), rural residence resulted in a low immunization rate. However, the study was conducted six years ago, and the reasons for the poor

uptake of immunization services might have changed. In Pakistan, full immunization of children occurs in urban more than in rural areas due to parents being unaware of the need for vaccination or the importance thereof among rural residents (Masood et al., 2020). Additionally, it may be due to the affordability of transport and accessibility of health care services (Sarker et al., 2019). Results from the National Demographic Health Survey, including 5754 children in Nigeria between the age of 12 and 23 months, showed an association between place of residence (urban vs rural) and immunization status of children (Adedokun et al., 2017). In comparison to children living in rural regions, children living in urban areas had a higher vaccination rate. This may be explained by the higher likelihood of education among urban parents, which may have increased their awareness of the value of childhood vaccination compared to parents residing in rural areas.

#### 2.4.6 Employment status and family income

In a study conducted by Sarker et al. (2019), there was a correlation between a high-income index and the percentage of children who receive all recommended vaccinations. Similarly, Mukungwa (2015) claims that children of parents who live in poverty in Zimbabwe are less likely to receive a full course of immunization since their parents spend most of their time working to make a living in order to supply basic necessities for their family. Correspondingly, in Dehli, India, a family's steady income was linked to a higher likelihood of immunizing children (Glatman-Freedman & Nichols, 2012). The maternal occupation was statistically related to child immunization uptake in a cross-sectional study in the Sinana District of Ethiopia, which included 591 children aged 12 to 23 months (Legesse & Dechasa, 2015). Stay-at-home mothers had a higher percentage of children who were not fully immunized. Mothers who were farmers were also nearly twice as likely to complete their children's immunization schedule and were less likely to be completely financially dependent on their husbands. One possible explanation for this is that women would no longer be dependent on their partners to pay for transportation costs to take their children for immunization. Additionally, due to their access to the media, they most likely learnt about the advantages of childhood immunization uptake (Legesse & Dechasa, 2015). The findings of this study are synonymous with another cross-sectional study in Ethiopia (Tamirat & Sisay, 2019).

## 2.5 Knowledge about immunization and immunization schedule

Case-control research in Northern Ethiopia found that having high maternal awareness of childhood immunization was a predictor for children receiving their recommended doses of vaccines. Children whose mothers had adequate immunization knowledge were three times more likely to have received all recommended vaccinations than children whose mothers had inadequate immunization knowledge (Aregawi et al., 2017). Paternal education has been linked with the uptake of immunization services in Burkina Faso because parents will be knowledgeable about the benefits and importance of immunization (Sanou et al., 2009). Similarly, in Nigeria, immunization was associated with higher tertiary education of parents and delivery at a hospital by the mother (Oleribe et al., 2017). Maternal education in Dehli, India, particularly about vaccines and the immunization schedule, resulted in the full immunization of infants (Glatman-Freedman & Nichols, 2012). Interestingly in Uganda, lack of education about vaccines which culminated in misinformation resulted in poor participation in National Immunization Days due to concerns that vaccines cause malaria or contain contraceptives (Glatman-Freedman & Nichols, 2012).

Knowledge about the place of vaccination and parents' awareness of vaccination were associated with the uptake of immunization services in a study conducted in Sindh, Pakistan (Masood et al., 2020). Similarly, in a rural area in Zimbabwe, the failure to fully vaccinate infants was due to a lack of information about immunization (Kusena, 2017). In a systematic review by Biset and colleagues (2020), four studies asserted that mothers who are informed about the national immunization schedule have a higher probability of getting their children vaccinated compared to mothers without information about the immunization schedule. Correspondingly, in a study conducted in Kwabre East District, Ghana, to determine the prevalence and factors associated with incomplete immunization of 322 children aged 12 to 23 months (with 85.5% fully immunized), most of the mothers (95.7%) had knowledge of how vital immunization was (Wemakor et al., 2018).

## 2.6 Conclusion

This chapter has discussed the factors that were found to be statistically linked with the immunization of infants aged 12 to 23 months. Based on the literature review, mothers who are older fully comprehend the importance of taking their children for immunization compared to

teenage mothers (Negussie et al., 2015). Furthermore, education of at least primary level results in infants getting immunized because the mother will be knowledgeable about the immunization schedule and associated benefits (Duru et al., 2016). Infants of parents who reside in urban areas are more likely to get immunized than those who reside in rural areas because of their access to both information on immunization and health services (Sarker et al., 2009). Correspondingly, knowledge about immunization and immunization schedules showed a positive correlation with full immunization status of infants (Aregawi et al., 2017; Biset et al., 2020). The following chapter will discuss the research methodology which was used for conducting the study.





## Chapter 3: Research Methodology

### 3.1 Introduction

An outline of the research methods utilized to carry out the study is provided in this chapter. It covers the study's design, setting, population, sampling method, data collection, analysis, validity, and reliability, as well as its limitations, ethical issues, and risk-benefit analysis.

### 3.2 Study Design

In this study, a quantitative research methodology was used, and the study design was an analytical cross-sectional survey. A few considerations guided the selection of the quantitative methodology. Firstly, the variables used for the study were pre-determined based on the findings from the literature review (Thiese, 2014). Secondly, this study aimed to measure the factors that determine the uptake of immunization services among parents/caregivers of children aged 12 to 23 months. Quantitative research was appropriate because it uses measurable data that can be numerically manipulated i.e. it can be analysed using various statistical software (Robson & McCartan, 2016). Thirdly, the study aimed to identify possible factors that determine immunization uptake among all four regions in Eswatini, and a quantitative study was appropriate because it can be conducted on a wide scale with a large sample size (Simon & MacFarlane, 1995).

### 3.3 Study Setting

The study was conducted in Eswatini's Hhohho, Lubombo, Manzini, and Shiselweni regions (Ministry of Health, 2008). The mountainous, landlocked nation of the Kingdom of Eswatini, formerly known as Swaziland, has a total area of 17,364 square kilometers. South Africa and Mozambique border three-quarters and one-quarter of Eswatini, respectively. The population distribution of the regions varies, with most of the population found in the Manzini (31.4%) and Hhohho (27.1%), followed by Shiselweni and Lubombo regions with 20.5% and 20.4%, respectively. The population for U5s is as follows; Hhohho – 45,023; Lubombo – 29,990; Manzini – 50,213; and Shiselweni – 27,396 (Ministry of Health, 2016).

Hhohho region is the capital in the western part of Eswatini and consists of rural and urban areas. Manzini region is the second capital region in the central part of Eswatini, comprising both rural and urban areas. Lubombo region runs from north to south of the country, and it consists of rural

settings. Shiselweni region is rural and sparsely populated and runs across the southern section of Eswatini.

Two sites were chosen for each region as follows; one urban community for both the Hhohho and Manzini regions and two rural communities for the Lubombo and Shiselweni regions which consist of rural settings. The sites for the study were chosen based on how long the EPI programme has been operating at the nearby facilities and the community's population in the catchment area.

### 3.4 Study Population

The study population included parents or caregivers of children under 23 months old who were fully immunized, partially immunized, or had never been immunized and were born exactly 12 months prior to the interview date. The participants in the study came from each of Eswatini's four regions (MoH, 2008). A father, mother or other person catering to the well-being of the child was considered the child's caretaker.

#### 3.4.1 Inclusion criteria

- All children aged between 12 and 23 months were included in the study regardless of immunization status

#### 3.4.2 Exclusion Criteria

- If a family had two young children who qualified to take part in the study, the youngest child was chosen to take part in the study.
- Visitors' children were not included in the study.
- Children whose parents declined to take part in the study were not included in the study.
- The study excluded parents or caregivers with communication problems, such as deaf or mute.

### 3.5 Sampling Technique

A probability type of sampling, namely simple random sampling, was used to select study participants. The sampling frame was a list of all the constituencies (Tinkundla) in a region. Each constituency per region is divided into different areas (sigodzi). This allowed the researcher to randomly select the constituencies to access for interviews during the study. The list of all the

constituencies per region was assigned numbers, and these were tabulated. The country is divided into 55 political and administrative constituencies (Tinkhundla), providing a structure for electoral processes and implementation of national development initiatives and programmes. Every 5<sup>th</sup> number was selected; the selected numbers were reselected until five constituencies remained. For each constituency, twenty households were selected for interviewing per constituency based on whether or not they fit the study's inclusion criteria; if not they were skipped. This process applied to all four regions.

### *Sample Size Calculation*

The minimum sample size required for the study was calculated using Dobson's formula as shown below (Robson & McCartan, 2016):

$$\text{Sample size} = (z)^2 p (1-p) / e^2$$

### Assumptions

- z is a constant at 95% confident interval = 1.96
- e is the standard error = 0.05
- p is assumed to be 0.5



$$\text{Sample size} = \frac{(1.96)^2 \times 0.5(1-0.5)}{0.05^2}$$

$$= 384.16 \text{ (Minimum sample size)}$$

The minimum sample size was **384 participants**. In total, 240 respondents participated in the study. Data analysis was conducted for 232 participants (**96.7% response rate**) because the remaining 8 participants felt uncomfortable answering the question on family income and decided to discontinue participating in the study; hence they were excluded from the analysis.

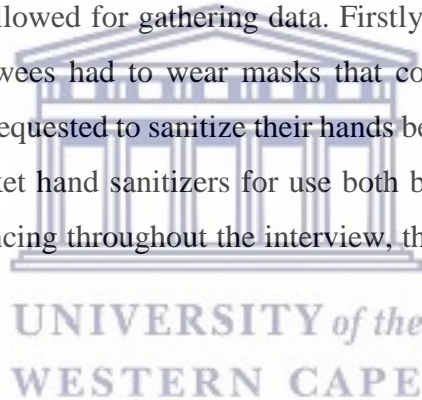
### 3.6 Data Collection

During the research, a questionnaire created by the researcher that was delivered by an interviewer was used. The questionnaire was designed to gather socio-demographic data. The interviewer-administered questionnaire was the most effective measurement strategy for this research since it allowed for the rapid collection of numerous variables. The questionnaire was pre-tested on a small sample of participants in the Manzini region, 50 kilometers from the research site. The pilot study included 30 participants with children aged 12 to 23 months who were either fully/partially/unimmunized. The questionnaire included closed-ended questions, implying that the variables had a set of responses from which to choose. This was appropriate for this study because the questions were quick and easy to answer; it allowed for comparison of the respondent's answers; the answers were simple to analyse, and the response options clarified the questions. After the pilot study was conducted, there were no changes required on the questionnaire despite the error in the numbering of the questions.

The COVID-19 protocol was followed for gathering data. Firstly, during the interview, both the data collectors and the interviewees had to wear masks that covered their mouths and noses. Secondly, the participants were requested to sanitize their hands before signing the consent forms, and the data collectors had pocket hand sanitizers for use both before and after each interview. Lastly, to guarantee social distancing throughout the interview, the data collector and the subject sat at least one meter apart.

### 3.7 Data Analysis

In Excel, the data was cleaned and examined for errors and outliers before being imported into the statistical data analysis program SPSS version 28. Frequencies were used to investigate the data for categorical variables (such as marital status, location, wealth quintile, and education level), while means and standard deviation were used to examine the central tendency and dispersion of numerical data (such as age). To determine whether there were any significant correlations between socio-demographic factors and results, the bivariate analysis was performed by generating chi-square tests and associated p-values at a 95% significance level (immunization status of infants and knowledge about immunization). The association between the independent variables age of parent/caregiver, paternal education, location, religion, wealth quintile, and marital status was finally determined using logistic regression.



## 3.8 Validity and reliability

### 3.8.1 Validity of the study

Construct validity implies identifying the correct operational measures for the concepts being studied (Gordis, 2009). This was achieved by defining full immunization and categorizing the socio-demographic factors being studied. Face validity was ensured by having a well-defined inclusion and exclusion criteria so that the appropriate participants were included in the study and the study measured exactly what it was supposed to measure (Robson & McCartan, 2016). The inclusion and exclusion criteria are included in section 3.4 of the methodology section. The selection bias of this study was reduced by having a clear definition of the study population (Gordis, 2009). This implies that the study population was well-defined at the beginning of the study.

### 3.8.2 Reliability of the study

The reliability of the study was ensured by training the data collectors for standardization in the use of data collection tools and a common understanding of the questions (Robson & McCartan, 2016). The questionnaire was pre-tested to check for errors and inconsistencies in the interpretation. Pre-testing of the questionnaire was done to check whether or not the participants understood the questions. Additionally, it was done to estimate the time taken to complete the questionnaire and ensure that it was not too long and to check for any errors (e.g. phrasing and order of questions) in the questionnaire that required correction (Gordis, 2009).

## 3.9 Limitations of the Study

The estimated sample size was not achieved because some parents and caregivers were unwilling to participate in the study because several studies were conducted in the regions, and they felt they needed compensation for being involved in various studies. This particularly occurred in Hhohho and Manzini regions which were selected as the urban settings; hence the two regions had small sample sizes. Furthermore, data was collected based on responses from the interviewees, which introduces respondent bias if the respondent was dishonest in answering some questions. This is because respondents may have introduced bias (depending on how they interpreted the questions). Additionally, some of the questions required information on sensitive issues such as household income, resulting in non-responses and these being excluded from data analysis.

### 3.10 Ethical Considerations

The UWC Research Committee and the UWC Biomedical Research and Ethics Committee received the researcher's application for ethical approval before this study could be conducted. The ethics registration number is BM21/10/6. Additionally, approval to carry out this study in Eswatini was requested via the research ethics website, <https://srhswaziland.rhinno.net> and an online application form was completed from the National Health and Human Research Board of Eswatini.

The participants who were invited to participate in the study were given a detailed explanation of its objective. By conducting the interviews in private and making sure that the participants' names were not written on the questionnaire but rather a participant code, confidentiality was maintained throughout the study. The participant information sheet, consent form, and questionnaire (Appendices B, D, & F) all included information on the study's objectives and a description of how data was collected. The researcher stated that participation in the study was voluntary, and they were free to stop at any time without any consequences. A SiSwati-translated informed consent form was required to be signed by each participant (Appendix D). The information gathered only included identifying numbers rather than the participants' real names (e.g. 01, 02). At that National EPI office, the consent forms and completed surveys were locked in a cabinet with the principal investigator responsible for the key. The lead investigator carried out data analysis after coding the acquired data for data entry. The material was stored on a password-protected computer that only the researcher was familiar with. The hard copies will be destroyed after five years, and the data on the computer's hard disk and USB will be permanently erased.

### 3.11 Risk-Benefit Analysis

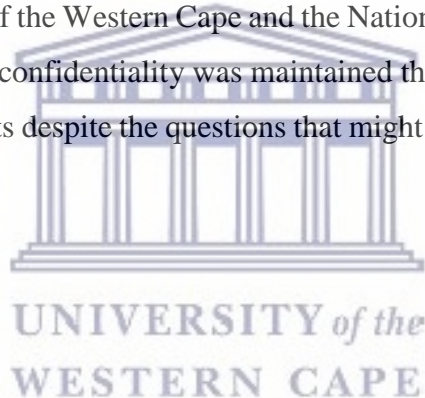
The interviewees may have found the questions about household income to be sensitive. Thus, they were given the option of not responding if they so desired. Despite this, there were no additional risks that were predicted from taking part in this study. The other questions could be skipped if the participants felt uncomfortable answering them.

Although the purpose of this study was not to personally assist participants with a health programme, the findings might be useful to the researcher in understanding the factors that

influence the use of immunization services. The results will also be communicated to the relevant stakeholders for program planning and enhancing the nation's immunization programme.

### 3.12 Summary

This chapter provided an overview of the study methodology. It showed how a quantitative research methodology was used. The study setting was provided as all four regions in Eswatini, namely Hhohho, Lubombo, Manzini and Shiselweni. The sample size calculation was done using Dobson's formula for sample size calculation adopted from Robson & McCartan (2016). The data collection method for this study was an interviewer-administered questionnaire. The data was cleaned and checked for errors and outliers in excel and then imported to SPSS version 28 software, a statistical programme for data analysis. The validity of this study was maintained by ensuring that there were well-defined inclusion and exclusion criteria for recruiting participants. Furthermore, reliability was maintained by pre-testing the questionnaire to check for errors and inconsistencies in the interpretation of the questionnaire. Ethical approval to conduct this study was sought from the University of the Western Cape and the National Health and Human Research Board of Eswatini. Participants' confidentiality was maintained throughout the study. There were no anticipated risks to participants despite the questions that might have been of a sensitive nature.



## Chapter 4: Results

### 4.1 Introduction

This chapter presents the results obtained from the study. It includes the socio-demographic characteristics of infants, participants, knowledge about immunization and immunization schedule, social factors regarding immunization and factors associated with full immunization compared to partial immunization. Moreover, this section presents bivariate analyses to assess the association between variables.

### 4.2 Socio-demographic characteristics of participants

In total, 240 respondents participated in the study. Data analysis was conducted for 232 participants (**96.7% response rate**) because the remaining 8 participants felt uncomfortable answering the question on family income and decided to discontinue participating in the study. Hence they were excluded from the analysis. The study included participants from the four regions of Eswatini, namely Hhohho (15.1 %), Lubombo (21.1 %), Manzini (29.3 %) and Shiselweni (34.5%). At least half the participants were from the rural area (58.6%), and 41.4% were from the urban area. The infants were aged 12 to 23 months at the time of the study, with a mean age of 18 months (standard deviation: 3.82). More than half the infants were female (52.2%), and 47.8% were male. The majority of the infants (81.5%) were fully vaccinated according to their age at the time of the study, and 18.5% were partially vaccinated. Among the partially vaccinated infants, more than half (58.1%) were from the Manzini region. Noteworthy is that all the parents/caregivers interviewed were female. The age range of the parents/caregivers was 17 to 56 years old; the mean age was 28.85 years (standard deviation of 6.67). More than half (54.3%) of the participants interviewed were in the 25 – 34 years age group. **Table 1** below summarizes the demographic characteristics of the respondents who took part in the study:

**Table 1: Demographic characteristics of infants and participants**

	Hhohho	Lubombo	Manzini	Shiselweni	Total
<b>Demographic characteristics of infants</b>					
<b>Variable</b>	<b>Number (%)</b>	<b>Number (%)</b>	<b>Number (%)</b>	<b>Number (%)</b>	<b>Number (%)</b>
<b>BCG Scar</b>					
No	0 (0)	1 (25)	2 (50)	1 (25)	4 (100)
Yes	35 (15.4)	48 (21.1)	66 (28.9)	79 (34.6)	228 (100)
<b>Vaccination status</b>					
Fully vaccinated	26 (13.8)	44 (23.3)	43 (22.8)	76 (40.2)	189 (100)



Partially vaccinated	9 (20.9)	5 (11.6)	25 (58.1)	4 (9.3)	43 (100)
<b>Geographic Location</b>					
Rural	0 (0)	49 (36)	7 (5.1)	80 (58.8)	136 (100)
Urban	35 (36.5)	0 (0)	61 (63.5)	0 (0)	96 (100)
<b>Socio-demographic characteristics of parents/caregivers</b>					
<b>Age group of parents/caregiver</b>					
< 18 years	0 (0)	0 (0)	3 (42.9)	4 (57.1)	7 (100)
18 – 24 years	3 (6.1)	11 (22.4)	11(22.4)	24 (49.0)	49 (100)
25 – 34 years	18 (14.3)	30 (23.8)	34 (27.0)	44 (34.9)	126 (100)
35 – 44 years	12 (27.3)	8 (18.2)	16 (36.4)	8 (18.2)	44 (100)
45 – 55 years	2 (40)	0 (0)	3 (60)	0 (0)	5 (100)
> 55 years	0 (0)	0 (0)	1 (100)	0 (0)	1 (100)
<b>Relationship to child</b>					
Mother	29 (14.5)	48 (24.0)	47 (23.5)	76 (38.0)	200 (100)
Caregiver	6 (28.6)	1(4.8)	10 (47.6)	4 (19.0)	21 (100)
Social worker*	0(0)	0 (0)	11 (100)	0 (0)	11 (100)
<b>Marital Status</b>					
Single	3 (12.5)	4 (16.7)	14 (58.3)	3 (12.5)	24 (100)
Married	14 (16.1)	20 (23.0)	29 (33.3)	24 (27.6)	87 (100)
Cohabiting	11 (15.7)	14 (20)	10 (14.3)	35 (50)	70 (100)
Separated	4 (11.1)	11 (30.6)	3 (8.3)	18 (50)	36 (100)
Widowed	3 (75.0)	0 (0)	1 (25.0)	0 (0)	4 (100)
Unknown	0 (0)	0 (0)	11 (100)	0 (0)	11 (100)
<b>Education</b>					
Primary	3 (9.4)	5 (15.6)	6 (18.8)	18 (56.3)	32 (100)
Secondary	28 (17.0)	40 (24.2)	39 (23.6)	58 (35.2)	165 (100)
Tertiary	4 (20)	3 (15.0)	11 (55)	2 (10)	20 (100)
None	0 (0)	1 (25.0)	1 (25.0)	2 (50)	4 (100)
Unknown	0 (0)	0 (0)	11 (100)	0 (0)	11 (100)
<b>Religious Sect</b>					
Free Evangelical	2 (2.8)	19 (26.8)	4 (5.6)	46 (64.8)	71 (100)
Catholic	14 (51.9)	0 (0)	10 (37.0)	3 (11.1)	27 (100)

Pentecostal	12 (10.7)	27 (24.1)	46 (41.1)	27 (24.1)	112 (100)
Traditional African	0 (0)	3 (75.0)	1 (25.0)	0 (0)	4 (100)
Apostolic sect	7 (50)	0 (0)	7 (50)	0 (0)	14 (100)
None	0 (0)	0 (0)	0 (0)	4 (100)	4 (100)
<b>Occupation</b>					
Formally employed	5 (8.9)	9 (16.1)	9 (16.1)	33 (58.9)	56 (100)
Self-employed	18 (28.1)	13 (20.3)	24 (37.5)	9 (14.1)	64 (100)
Unemployed	12 (11.9)	27 (26.7)	24 (23.8)	38 (37.6)	101 (100)
Unknown	0 (0)	0 (0)	11 (100)	0 (0)	11 (100)
<b>Spouse Occupation</b>					
Formally employed	21 (16.9)	27 (21.8)	29 (23.4)	47 (37.9)	124 (100)
Self-employed	7 (15.6)	14 (31.1)	12 (26.7)	12 (26.7)	45 (100)
Unemployed	1 (4.5)	3 (13.6)	3 (13.6)	15 (68.2)	22 (100)
Unknown	0 (0)	0 (0)	11 (100)	0 (0)	11 (100)
Not applicable	6 (20)	5 (16.7)	13 (43.3)	6 (20)	30 (100)
<b>Family Income</b>					
Lower (< R2000)	7 (5.1)	24 (17.4)	42 (30.4)	65 (47.1)	138 (100)
Middle (R2000 – R4 000)	35 (15.1)	49 (21.1)	68 (29.3)	80 (34.5)	94 (100)
High (R4 000)					

\* In Manzini region, a social worker brought the children for immunization during one of the interview days. The term social worker was not included as an option of caregivers in the questionnaire on page 51 because the researcher did not know she would encounter such a situation. However, the researcher found it necessary to include the results because it provided some statistical significance. This resulted in some unknown responses in the following categories: marital status, education, occupation and spouse occupation because the social worker could not provide much information about the demographics of the parents/caregivers whose children she had brought for immunization. She only provided details on religion and family income (all of them were unemployed during the time of the study).

#### 4.3 Knowledge about immunization and immunization schedule among participants

The results from the study revealed that the majority of the participants (89.2%) reported that they were aware of immunization. Similarly, more than half the respondents (63.8%) indicated that they knew about the immunization schedule. **Table 2** below shows the results and the participants' responses when asked about the specific age children get vaccinated. More than half the participants (60.8%) feared the adverse events following immunization.

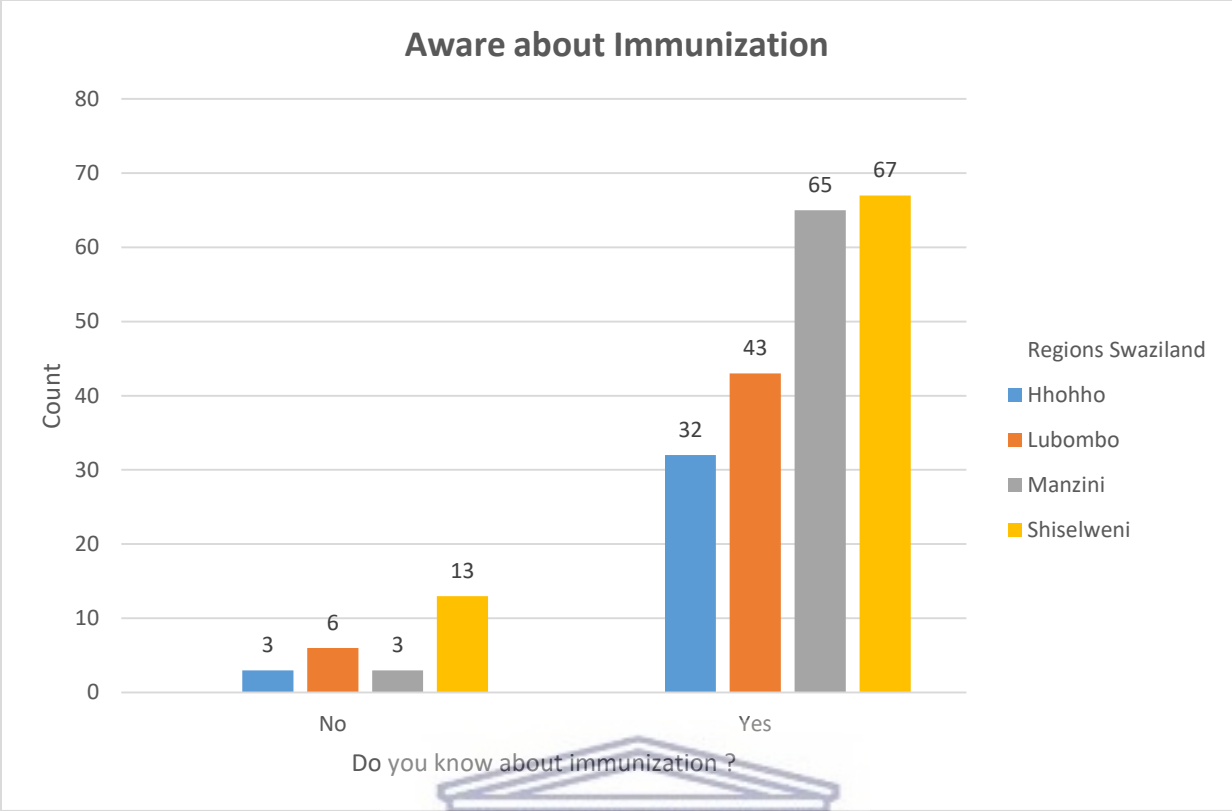
**Table 2: Knowledge about immunization and immunization schedule**

<b>Variable</b>	<b>Poor N (%)</b>	<b>Good N (%)</b>
Awareness about immunization	25 (10.8)	207 (89.2)
Awareness of the immunization schedule	84 (36.2)	148 (63.8)
<b>When does a child get vaccinated:</b>	<b>No</b>	<b>Yes</b>
At birth	33 (14.2)	199 (85.8)
At 10 days	134 (57.8)	98 (42.2)
At 6 weeks	20 (8.6)	212 (91.4)
At 10 weeks	23 (9.9)	209 (90.1)
At 14 weeks	12 (5.2)	220 (94.8)
At 6 months	85 (36.6)	147 (63.4)
At 9 months	17 (7.3)	215 (92.7)
At 18 months	43 (18.5)	189 (81.5)
Fear of AEFIs (adverse events following immunization)	91 (39.2)	141 (60.8)

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#### 4.4 Awareness about immunization

**Figure 1** below depicts the distribution of awareness about immunization in the four regions of Eswatini. As indicated, Shiselweni is the region with the highest proportion (32.4%) of participants knowledgeable about immunization, and the Hhohho region had the least proportion (15.5%) who were knowledgeable about immunization.



**Figure 1: Knowledge about immunization among the regions**

4.5 Social factors regarding immunization

**Table 3** below shows the social factors regarding immunization. It depicts that most of the respondents (98.7%) indicated a general acceptance of immunization of children. Nearly a tenth (8.2%) of the participants stated that there is a religious sect in their community that does not accept the vaccination of children.

**Table 3: Social factors regarding immunization**

Variable	No N (%)	Yes N (%)
Does the community accept the immunization of children	3 (1.3)	229 (98.7)
Among those who reside in rural areas, do RHM's talk about immunization during home visits	20 (14.7)	116 (85.3)
Is there a religious sect that does not accept the immunization of children	213 (91.8)	19 (8.2)

Are there cultural values that would stop you from getting your child vaccinated?	231 (99.6)	1 (0.4)
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#### 4.6 Religious sect and immunization uptake

Of the 19 responses that indicated that a religious sect does not accept the immunization of children, more than half of them (63.2%) were from the Manzini region. The Apostolic sect was the dominant religious sect among all four regions, which did not accept the immunization of children. **Table 4** presents the religious sect that was reported not to accept the immunization of children.

**Table 4: Religious sect that does not accept the immunization of children**

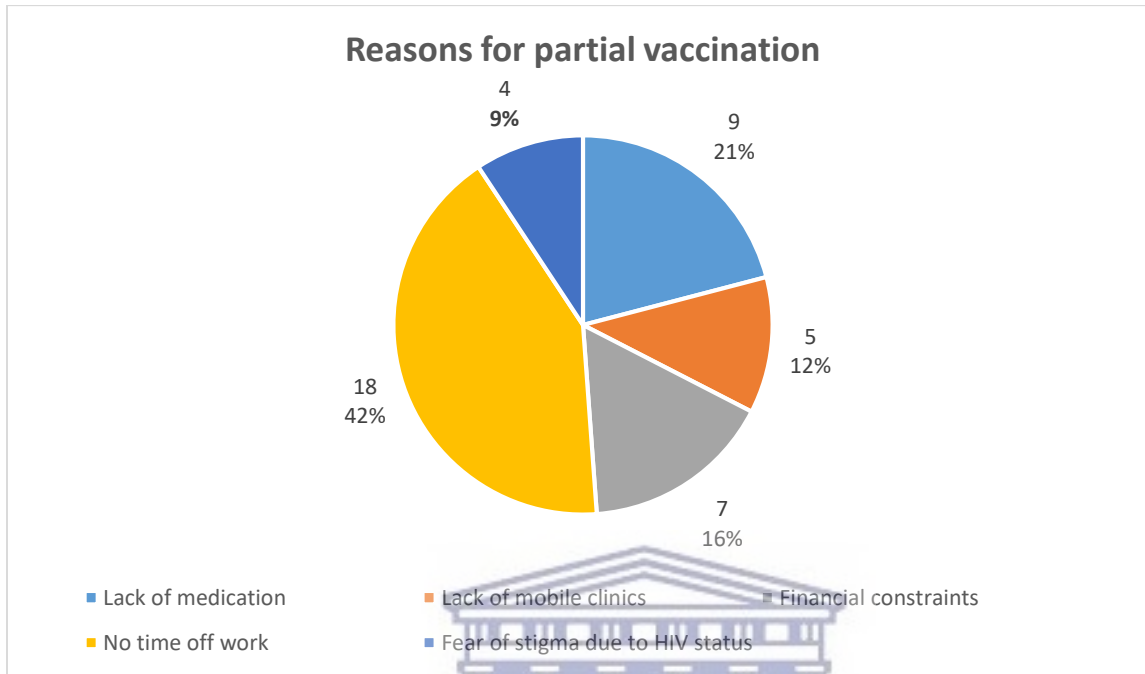
Region	No N (%)	Yes N (%)	Name of Religious sect
Hhohho	34 (16)	1 (5.3)	Apostolic sect
Lubombo	48 (22.5)	1 (5.3)	Apostolic sect
Manzini	56 (26.3)	12 (63.2)	Apostolic sect Church of God Prophecy
Shiselweni	75 (35.2)	5 (26.3)	Apostolic sect Jehovah's witness Makhosini

#### 4.7 Reasons for partial vaccination of children

An open-ended question was used to elicit responses on reasons for partial immunization of children. Of the 43 respondents who had children who were partially vaccinated, nearly half of them (42%) mentioned that lack of time off work resulted in them failing to take their children for immunization. Some parents fail to take their children for immunization because they work in factories which do not allow a day off, and they can only go to the clinic during the weekend. Some parents (9%) travel from rural areas to the urban area clinics to protect their HIV status.

According to other parents, they do not feel comfortable visiting the health centres in their communities due to fear of stigmatization.

**Figure 2: Reasons for partial vaccination of children**



#### 4.8 Factors associated with full immunization compared to partial immunization of children

This section details a bivariate analysis of vaccination status and demographic characteristics and knowledge about immunization and demographic characteristics. In the bivariate analysis, full vaccination compared to partial vaccination was associated with the age of the mother ( $p = 0.047$ ), relationship to the child ( $p < 0.001$ ), geographic location ( $p < 0.001$ ); marital status ( $p = 0.034$ ) and religious affiliation (being Free Evangelical:  $p = 0.03$ ; being Catholic:  $p = 0.025$ ; being Pentecostal:  $p = 0.005$ ). Additionally, knowledge about the place of vaccination was associated with full vaccination status of infants ( $p < 0.001$ ). The results of the analysis are shown in **table 5** below.

**Table 5: Bivariate analyses of full immunization and demographic characteristics**

Variable	Odds Ratio (univariate)	95% CI Lower limit – upper limit	p-value	Chi-square value

<b>Age of mother</b>	1.049	1.001 – 1.101	p = 0.047*	3.881
<b>Relationship to child</b>				
Father				
Mother	3.5	1.288 – 9.508	p < 0.001*	45.001
Caregiver				
Organizational social worker				
<b>Geographic location</b>				
Rural	4.301	2.101 – 8.802	p < 0.001*	17.438
Urban	0.501	0.380 – 0.660		
<b>Marital status</b>				
Single	0.959	0.284 – 3.236	0.946	
Married	0.469	0.120 – 1.828	0.275	
Cohabiting	0.806	0.193 – 3.370	0.786	
Separated	15	1.225 – 183.630	0.034	49.587
Widowed	-		0.998	
Unknown			-	
<b>Education</b>				
Primary	1.487	0.417 – 5.229	0.540	
Secondary	3.222	0.676 – 15.352	0.142	
Tertiary	9.667	0.977 – 95.673	0.052	
None	-		0.998	
Unknown	-		-	
<b>Religious affiliation</b>				
Free Evangelical	3.972	1.142 – 12.590	0.030*	14.978
Catholic	2.955	1.142 – 7.642	0.025*	
Pentecostal	32.5	2.911 – 362.845	0.005*	
Traditional African	2.955	0.642 – 13.592	0.164	
Apostolic	0		0.999	
None	-		-	
<b>Occupation</b>				
Formally employed	1.615	0.588 – 4.438	0.352	40.920
Self-employed	1.034	0.387 – 2.764	0.947	
Unemployed	0		0.998	
Unknown	-		-	
<b>Family Income</b>				
Lower (< R2000)	0.843	0.426 – 1.669	p = 0.625	0.241
Lower middle (R2000 – R3 999)	-		-	
<b>Knowledge about place of vaccination</b>				
Health facility	72.774	9.137 – 579.656	0.001*	36.788

Mobile site	-		-	
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\* Denotes statistical significance:  $p\text{-value} < 0.05$

**Table 6** below shows the bivariate analysis of knowledge about immunization and demographic characteristics. In the bivariate analysis, self-reporting of knowledge about immunization compared to not knowing about immunization was associated with the age of the mother ( $p = 0.019$ ), marital status ( $p < 0.001$ ); education ( $p < 0.001$ ) and family income ( $p = 0.019$ ).

**Table 6: Bivariate analyses of knowledge about immunization and demographic characteristics**

<b>Variable</b>	<b>Odds Ratio</b>	<b>95% CI lower limit – upper limit</b>	<b>p-value</b>	<b>Chi-square</b>
<b>Age of mother</b>	1.096	1.015 – 1.182	0.019*	6.338
<b>Relationship to child</b>				
Father	-		-	
Mother	2.727	0.350 – 21.252	0.338	3.786
Caregiver	-		0.999	
Organizational social worker	-		-	
<b>Geographic location</b>				
Rural	2.436	0.934 – 6.350	0.069	3.704
Urban	-		-	
<b>Marital status</b>				
Single	2.7	0.695 – 10.483	0.140	
Married	2.6	0.637 – 10.618	0.241	
Cohabiting	0.520	0.142 – 1.904	$p < 0.001^*$	14.738
Separated	-		0.483	
Widowed	-		0.283	
Unknown	-		-	
<b>Education</b>				
Primary	7.015	2.816 – 17.475	$p < 0.001^*$	25.243
Secondary	-		0.998	
Tertiary	-		0.999	
Unknown	-		0.999	
<b>Religious affiliation</b>				
Free Evangelical	-		0.998	
Catholic	2.058	0.866 – 4.890	0.102	14.562
Pentecostal	-		0.999	
Traditional African	-		0.999	
Apostolic	-		0.740	



None	-		-	
<b>Occupation</b>				
Formally employed	0.908	0.231 – 3.560	0.890	6.403
Self-employed	0.409	0.130 – 1.289	0.127	
Unemployed	-		0.999	
<b>Family Income</b>				
Lower (< R2 000)	5.753	1.670 – 19.882	0.019*	10.942
middle (R2000 – R4 000)	-		-	

\* Denotes statistical significance:  $p$ -value < 0.05

#### 4.9 Summary of the study findings

The findings of the study revealed that all the 232 participants who were interviewed were female. The majority of the participants who were interviewed were from the Shiselweni region (34.5%) and the remaining were from Manzini region (29.3%); Lubombo region (21.1%) and Hhohho region (15.1%). The age range of the mothers was 17 to 56 years, with a mean age of 29 years. At least half the participants who were interviewed were from rural areas (58.6%) and 41.4% were from the urban areas. The infants were aged 12 to 23 months at the time of the study, with a mean age of 18 months (standard deviation: 3.82). More than half the infants were female (52.2%), and 47.8% were male. The majority of the infants (81.5%) were fully vaccinated according to their age at the time of the study, and 18.5% were partially vaccinated. There were no unvaccinated infants, according to the results of this study.

The majority of the participants (89.2%) reported that they were aware of immunization. Similarly, more than half the respondents (63.8%) indicated that they knew about the immunization schedule. In the bivariate analysis, full vaccination compared to partial vaccination was associated with the age of the mother ( $p = 0.047$ ); relationship to the child ( $p < 0.001$ ); geographic location ( $p < 0.001$ ); marital status ( $p = 0.034$ ) and religious affiliation (being Free evangelical:  $p = 0.03$ ; being Catholic:  $p = 0.025$ ; being Pentecostal:  $p = 0.005$ ). Additionally, self-reporting of knowledge about immunization compared to not knowing about immunization was associated with the age of the mother ( $p = 0.019$ ); marital status ( $p < 0.001$ ); education ( $p < 0.001$ ) and family income ( $p = 0.019$ ).

## Chapter 5: Discussion

### 5.1 Introduction

This chapter is a discussion of the results of this study. These results will be compared with other studies using recent literature.

### 5.2 Socio-Demographic Factors Associated with Uptake of Childhood Immunization Services

Immunization coverage is a key indicator of population health and measures the quality of healthcare services provided (WHO, 2018). In this study, all the interviewed parents and caregivers were female. Similar studies in Nigeria, Ethiopia and Ghana showed that mothers and female caregivers bear the responsibility of ensuring that children are immunized (Eze et al., 2021; Negussie et al., 2015; Wemakor et al., 2018). This is an indication of how society regards the woman as the caregiver. In this study, the age range of the mothers/caregivers was 17 to 56 years; the mean age was 28.85 years (standard deviation of 6.67). More than half (54.3%) of the participants interviewed were in the 25 to 34 years age group. This is synonymous with a study conducted by Wemakor et al. (2018), whereby the mean age of the mothers interviewed was 29.9 years. The results of the study revealed that there was an association between the age of the mother (> 19 years) and full immunization status of the infant ( $p = 0.047$ ). Correspondingly, in an Ethiopian case-control study involving 548 children aged 12 to 23 months, maternal age was one of the factors influencing childhood immunization uptake, with mothers over 19 years of age being approximately ten times more likely to have their children fully immunized than mothers under 19 years of age (Negussie et al., 2015). This implies that older mothers are more likely to have their infants vaccinated than mothers less than 19 years of age because they will be fully aware of the benefits of vaccination.

Findings from the study revealed that full vaccination compared to partial vaccination, was associated with rural versus urban geographic location, and this was statistically significant in the bivariate analysis ( $p < 0.001$ ). On the contrary, studies conducted in Nigeria and Pakistan showed that full immunization of children occurred in urban more than in rural areas due to urban residents being unaware of the need for vaccination or the importance thereof (Eze et al., 2021; Masood et al., 2020). In Eswatini, knowledge about immunization is attributed to community awareness campaigns and supplementary immunization activities, including National Immunization Days (Ministry of Health, 2019). The study revealed that the majority of respondents (85.3%) who reside

in rural areas reported that rural health motivators talk about immunization during home visits which may have contributed to more rural residents having their infants immunized compared to urban residents. Additionally, rural health motivators were identified as being present to provide health education through door-to-door campaigns, particularly during supplementary immunization activities (MoH, 2019). This may also explain why more rural residents had infants who were fully vaccinated compared to urban residents. Moreover, the study sample included more rural residents (58.6%) compared to urban residents (41.4%) because the Shiselweni and Lubombo regions (where the majority of the study participants were obtained) are rural settings.

According to the study results, there were various immunization rates according to religious affiliation, and it indicated that the Apostolic sect had the least proportion (1.7%) of children who were immunized. The Apostolic sect was also cited as the dominant religious sect which did not vaccinate their children in all four regions of Eswatini. In the bivariate analysis, full vaccination compared to partial immunization was associated with the following religious affiliations (being Free Evangelical:  $p = 0.03$ ; being Catholic:  $p = 0.025$ ; being Pentecostal:  $p = 0.005$ ). This indicates how religious affiliation plays a vital role in the uptake of immunization services. Similarly, in a study conducted in Nigeria, differences in religious affiliation were associated with varied immunization rates, i.e. 66% among Christians and 32% among Muslims (Glatman-Freedman & Nichols, 2012). Correspondingly, in a study conducted in Mozambique, mothers who considered immunization to be unacceptable in their religion were less likely to fully immunise their children than mothers who did not consider immunization to be inappropriate in their religion (Jani et al., 2008). On the contrary, a study by Anokye et al. (2018) among 280 infants aged 12 to 23 months in Ghana revealed that respondents' religion had no significant association with children being partially vaccinated.

In this study, an open-ended question was used to elicit responses on reasons for partial immunization of children. Of the 43 respondents who had partially vaccinated children, 16 % stated financial constraints as a barrier to immunization. This is synonymous with the studies conducted by Glatman-Freedman & Nichols (2012), Mukungwa (2015) and Sarker et al. (2019). The researchers stated that financial constraints resulted in some children being partially vaccinated because parents/caregivers did not have money for transportation or were too busy working; hence they could not take their children for immunization. Furthermore, lack of time off

work (42%) was the main reason some parents failed to take their children for immunization. Noteworthy is that the primary health care department responsible for immunization will be closed during the weekend. This is synonymous with a study conducted by Mukungwa et al. (2015), they assert that some parents fail to fully immunise their children because they spend most of their time at work in an effort to avert abject poverty.

### 5.3 Knowledge about immunization and immunization schedule

Noteworthy is that most participants (89.2%) reported being knowledgeable about immunization. Likewise, more than half the respondents (63.8%) indicated that they knew about the immunization schedule, and (91.4%) knew about where children can get vaccinated (i.e. hospital, clinic or reach-out services). There was a positive correlation between knowledge of vaccination location and full vaccination status ( $p < 0.001$ ). This is comparable to a study conducted in Ghana, in which the majority of 322 mothers (95.7%) were aware of immunization and its importance (Wemakor et al., 2018). Similarly, a study in Sindh, Pakistan, reported that knowledge about the location of vaccination and parental awareness of it was associated with the uptake of immunization services (Masood et al., 2020).

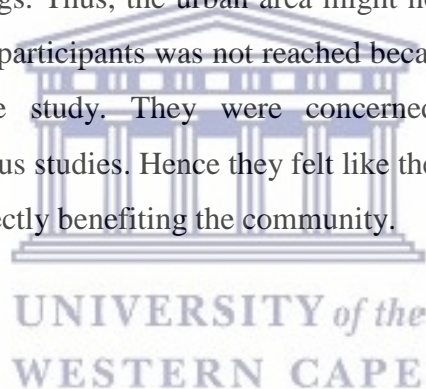
In Nigeria, maternal education is an essential determining factor in the knowledge of immunization services. According to Duru et al. (2016), uptake of childhood immunization services was frequently determined by maternal education. The authors assert that mothers with primary education or higher were eight fold more knowledgeable about immunization compared to mothers with no formal education (Duru et al., 2018). In this study, the results showed an association between primary education and knowledge about immunization ( $p < 0.001$ ). This may be explained by the fact that students are taught about health issues from primary school, and in Eswatini, learners are used as a channel for information pertaining to national health programs, including immunization (MoH, 2019). However, this does not explain why mothers below 19 years do not fully vaccinate their infants compared to older mothers. This is an area that may warrant further investigation because of existing confounding factors.

#### 5.4 Conclusion

Overall in this study, there was an association between full vaccination status of children and the age of the mother (> 19 years), geographic location (rural vs urban), primary education and higher, religious affiliation and knowledge about the place of vaccination. There was no statistical association between maternal marital status, occupation, wealth quintile and vaccination status of children. This could be due to a lack of association between these factors and child immunization status in the selected study areas or to the study's lack of statistical power to identify associated immunization factors.

#### 5.5 Limitations

The study had some limitations which should be taken into consideration in the interpretation of the results. Firstly, using a cross-sectional study design in which the immunization coverage and determinants were assessed simultaneously implied that a cause-effect relationship could not be established. Secondly, the sample size included the majority of participants from two regions composed of mainly rural settings. Thus, the urban area might not have been fully represented. Lastly, the target sample of 345 participants was not reached because some community members declined to participate in the study. They were concerned because Non-governmental organizations conducted numerous studies. Hence they felt like they were manipulated to achieve organizational goals without directly benefiting the community.



## Chapter 6: Conclusion and Recommendations

The study aimed to ascertain the factors associated with full immunization of infants aged 12 to 23 months in all four regions in Eswatini. This chapter includes the conclusion of the study based on the findings that were discussed in the previous chapter. Furthermore, recommendations according to the thematic areas for the study will be provided.

### 6.1 Conclusion

Immunization is the process of administering live or attenuated vaccines to individuals, primarily children, in order to increase their resistance to infectious diseases. Vaccinations stimulate the body's immune system to defend against infections. This study aimed to identify the socio-demographic variables connected to infant immunization in Eswatini's rural and urban regions.

This study revealed that all the parents/caregivers who were interviewed were female. Furthermore, there was a positive association between the mother's age, rural vs urban geographic location, religious affiliation, primary and higher education and knowledge about the place of vaccination and full vaccination status of infants. Mothers who participated in the study displayed knowledge about immunization and place of immunization, which may have attributed to the majority of infants being fully immunized. Among the participants who had partially immunized infants, nearly half of them mentioned that lack of time off work resulted in them failing to take their children for immunization. Other parents cited that they travelled from the rural areas to the urban area clinics to protect their HIV status. According to them, they did not feel comfortable visiting the health centers in their communities due to fear of stigmatization.

The results of this study provide primary data that can be used as a source of reference for upcoming program implementation actions. The information from research can assist in strengthening existing programme activities and ensuring that all infants are vaccinated timely and do not die from vaccine-preventable diseases. Additionally, a key element of the expanded programme on immunization is community engagement. The associated factors that were ascertained to affect the adoption of childhood immunization services in Eswatini can help policy makers during programme planning to improve community engagement.

## 6.2 Recommendations

Based on the findings of the study, the following recommendations are made. Recommendations will be discussed according to the themes.

### 6.2.1 Socio-demographic factors associated with uptake of childhood immunization

The study's findings revealed that religious affiliation was associated with the uptake of immunization services, excluding members of the Apostolic sect. Additionally, rural vs urban geographic location was associated with the uptake of immunization services.

- The Apostolic sect, particularly the leaders, need more health education and community-based interventions, namely door-to-door sensitization and meetings during church gatherings. This will be conducted to scale up community sensitization of immunization activities and increase acceptance of immunization among the religious sect.
- The primary health care department should be opened during weekends to cater for working mothers who cannot take their infants for immunization during weekdays.
- Risk communication on immunization should be scaled-up in urban areas so that all parents/caregivers know the risks and implications of not vaccinating against vaccine-preventable diseases.

### 6.2.2 Knowledge about immunization and immunization schedule

The majority of the participants interviewed self-reported awareness of immunization. Knowledge about immunization and place of vaccination culminates in full vaccination status of infants, and this was statistically significant in the bivariate analysis.

- Strengthening health education in clinics and through door-to-door visits by rural health motivators will help in reaching more mothers.
- Provision of information, education and communication material in vernacular language to ensure that the community members understand better the immunization information.
- Introduce the use of edutainment in communities to ensure adequate sensitization.

### 6.2.3 Recommendations for future research

- The research should be conducted on a wider scale to ensure equal representation of both rural and urban areas. Additionally, all four regions should have the same sample size included in the study.

- Researchers could conduct a qualitative study to obtain in-depth information on the reasons some community members decline to immunize their infants against vaccine-preventable diseases.





## References

- Abebe A, Mengistu T, Mekuria A. (2018). Measles case, immunization coverage and its determinant factors among 12–23 month children, in Bassona Worena Woreda, Amhara Region, Ethiopia. *BMC Res Notes*. 12 (1): 17.
- Adedokun S, Uthman O, Adekanmbi V, Wiysonge C. (2017). Incomplete childhood immunization in Nigeria: a multilevel analysis of individual and contextual factors. *BMC Public Health*. Vol 17 (1): 236.
- Anokye R, Acheampong E, Budu-Ainooson A, Edusei A, Okyere P, Dogbe J. (2018). Socio-demographic determinants of childhood immunization incompleteness in Koforidua, Ghana. *BMC Res Notes*. Vol 11(1): 656.
- Animaw W, Taye W, Merdekios B, Tilahun M, Ayele G. (2014). Expanded program of immunization coverage and associated factors among children age 12–23 months in Arba Minch town and Zuria District, Southern Ethiopia. *BMC Public Health*. Vol 14(1): 464.
- Aregawi H, Gebrehiwot T, Abebe Y, Meles K, Wuneh A. (2017). Determinants of defaulting from completion of child immunization in Laelay Adiabo District, Tigray region, northern Ethiopia: a case-control study. *PLoS One*. Vol 12(9): e0185533. [Online], Available at: <https://doi.org/10.1371/journal.pone.0185533>.
- Bbaale E. (2013). Factors Influencing Childhood Immunization in Uganda. *J Health Popul Nutr*. Vol 31 (1):118–9.
- Biset., G. Wooday, A., Mihret., S. & Tsihay, M. (2020). Full immunization coverage and associated factors among children age 12-23 months in Ethiopia: systematic review and meta-analysis of observational studies. *Human vaccine immunotherapeutics*. [Online], Available at: <https://doi.org/10.1080/21645515.2020.1870392>

Center for Disease Control. (2022). *Vaccine Glossary of Terms*. [Online], Available at: <https://www.cdc.gov/vaccines/terms/glossary.htm#c>.

Chiabi A, Nguefack F, Njapndounke F, Kobela M, Kenfack K, Nguefack S. (2017). Vaccination of infants aged 0 to 11 months at the Yaounde Gynaecobstetric and pediatric hospital in Cameroon: how complete and how timely? *BMC Pediatrics*. Vol 17(1): 206.

Chris-Otubor G, Dangiwa D, Ior D, Anukam C. (2015). Assessment of knowledge, attitudes and practices of mothers in Jos north regarding immunization. *Int Organ Scientific Res J Pharm*. Vol 5(6):34–45

Duru C, Iwu A, Uwakwe K, Diwe K, Merenu I, Emerole C. (2016). Assessment of immunization status, coverage and determinants among under 5-year-old children in Owerri, Imo state, Nigeria. *OALib*; 03(06):1–17.

Eze, P., Agu, U. J., Aniebo, C.L., Agu, A.S., Lawani, O.L. & Acharya, Y. (2021). Factors associated with incomplete immunization in children aged 12–23 months at subnational level, Nigeria: a cross-sectional study. *BMJ Open*, 11:e047445. [Online], Available at: <https://doi:10.1136/bmjopen-2020-047445>

Glatman-Freedman, A. & Nichols, K. (2012). The effect of social determinants on immunization programs. *Human Vaccines & Immunotherapeutics*, 8 (3): 293-301.

Gordis, L. (2009). *Epidemiology* (4th edition). Philadelphia: Sanders.

Jani J, De Schacht C, Jani I, Bjune G. (2008). Risk factors for incomplete vaccination and missed opportunity for immunization in rural Mozambique. *BMC Public Health*. 8(1):161.

Kusena, P. (2017). Factors Influencing Full Immunization Coverage among Children Aged 12-23 months in Chadereka Rural Community, Zimbabwe. *Texila International Journal of Public Health*, 5(4).

Legesse, E, Dechasa, W. (2015). An assessment of child immunization coverage and its determinants in Sinana District, Southeast Ethiopia. *BMC Pediatr*. Vol 15 (1):31.

Masood, T., Mehraj, J., Guriro, S. & Shaikh, M. A. (2020) Factors affecting full immunization coverage among children aged 12-23 months in urban and rural areas of Sindh. *Indian Journal of Science and Technology* 13(12): 1283-1292. [Online], Available at: <https://doi.org/10.17485/IJST/v13i12.149859>

Ministry of Health Swaziland. (2016). *Expanded Programme on Immunization, Comprehensive Multi-year Plan 2017-2021*. Swaziland

Mukungwa, T. (2015). Factors associated with full immunization coverage amongst children aged 12-23 months in Zimbabwe. *African Population Studies*, 29:(2).

Negussie A, Kassahun W, Assegid S, Hagan A. (2015). Factors associated within complete childhood immunization in Arbegona district, southern Ethiopia: a case – control study. *BMC Public Health*. 2015; 16(1):27.

Oleribe, O., Kumar, V., Olumo, A. A. & Robinson, S.D.T. (2017). Individual and Socio-economic factors associated with childhood immunization coverage in Nigeria. *Pan African Medical Journal*, 26:220.

Robson, C. and McCartan, K. (2016). *Real World Research*. London: John Wiley & Sons Ltd.

Sanou, A., Simboro, S., Kougate, B., Dugas, M., Graham, J. & Bibeau, G. (2009). Assessment of factors associated with complete immunization coverage in children aged 12-23 months: a cross-sectional study in Nouna district, Burkina Faso. *Bio Med Central*, 9(1): S10.

Sarker, A.R., Akram, R., Ali, N. & Sultana, M. (2019). Coverage and factors associated with full immunization among children aged 12-59 months in Bangladesh: insights from the nationwide cross-sectional demographic and health survey. *BMJ Open*, 9:e028020.

Silman, A. J. & MacFarlane, G. J. (1995). *Epidemiological studies: a practical guide*. Ch 1. Scope of epidemiological enquiry and overview of main problem areas. Cambridge: Cambridge University Press. Pages 3–7

Tamirat K, Sisay M. (2019). Full immunization coverage and its associated factors among children aged 12–23 months in Ethiopia: further analysis from the 2016 Ethiopia demographic and health survey. *BMC Public Health*. Vol 19(1): 1019

Tsawe, M., Moto, A., Netshivera, T., Ralesego, L., Nyathi, C. & Susuman, A.S. (2015). Factors Influencing the use of maternal healthcare services and childhood immunization in Swaziland. *International Journal for Equity in Health*, 14(32).

Thiese, M.S. (2014) ‘Observational and interventional study design types; an overview’, *Biochemia Medica*, 24(2), pp. 199–210. doi:10.11613/BM.2014.022.

Wemakor, G.A., Helegbe, G. K., Abdul-Mumin<sup>3</sup>, A., Amedoe, S., Zoku, K.K. & Dufie, D. I. (2018). Prevalence and factors associated with incomplete immunization of children (12–23 months) in Kwabre East District, Ashanti Region, Ghana. *Archives of Public Health*. [Online], Available at: <https://doi.org/10.1186/s13690-018-0315-z>

WHO, UNICEF, World Bank. (2009). *State of the world’s vaccines and immunization*, 3<sup>rd</sup> edition. Geneva: World Health Organization.

WHO. (2013). *Global Vaccine Action Plan 2011-2020*. Geneva: World Health Organization.

WHO, CSDH (Commission on the Social Determinants of Health). (2008). *Executive Summary. Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of Health*. Geneva: WHO: 1 – 33. [Online], Available at: [www.who.int/social-determinants/thecommission/finalreport/en/index.html/](http://www.who.int/social-determinants/thecommission/finalreport/en/index.html/)

World Medical Association. (2018). *Medical Ethics*. [Online], Available at: [wma.net/what-we-do/medical-ethics/](http://wma.net/what-we-do/medical-ethics/)

Ministry of Health. (2008). *National Health Sector Strategic Plan 2008-2013*. Mbabane: Government Of The Kingdom of Swaziland

## APPENDICES

### Appendix A: Data collection Tool \_ English

#### **Assessing the factors associated with uptake of childhood immunization services among children aged 12 to 23 months in Eswatini**

Good day to you. My name is..... and I am conducting a research on Eswatini's use of childhood immunization services. The results of this study's findings will be handled with the utmost confidence and only be utilized for educational purposes. To preserve your anonymity, your name or any other identifying information will not be collected. A consent form that you sign and keep a copy of will serve as proof of your consent to take part in the study.

Questionnaire number ..... Date of interview..... /...../.....  
Interviewer name .....  
Region ..... Tinkundla.....  
Geographic Location Rural [ ] Urban [ ]  
Results of interview Completed [ ] Partially Completed [ ]

#### **Section A: Demographic characteristics (Tick where appropriate)**

##### **Demographic information of child**

1. How old if your child (age in months) \_\_\_\_\_
2. Gender of child Male [ ] Female [ ]
3. Do you have a vaccination card for the child?  
Yes [ ] No [ ]

(you may request to see the vaccination card if the parent/caregiver is willing)

4. Vaccination status of child: Fully vaccinated [ ] Partially vaccinated [ ]  
Unvaccinated [ ]
5. BCG scar No [ ] Yes [ ]

##### **Demographic information of parent/caregiver**

6. What is your relationship with the child? Mother [ ] Father [ ]  
Caregiver [ ]

7. When were you born? (age in years) \_\_\_\_\_

8. Gender: Male [ ] Female [ ]

9. What is your marital status?

Single [ ] Married [ ] Co-habiting [ ] Separated [ ] Divorced [ ] Widowed [ ]

11. Highest level of education attained: None [ ] Primary [ ] Secondary [ ] Tertiary [ ]

12. Which religious sect do you belong to? Free Evangelical [ ] Catholic [ ]  
Pentecostal [ ] Traditional African [ ] Muslim [ ] Apostolic [ ]

Other (specify).....

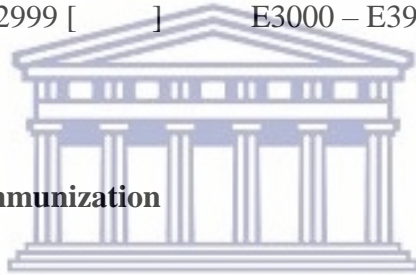
13. What is your current occupation? Unemployed [ ] formally employed [ ]  
self-employed [ ]

14. What is your spouse's occupation? Unemployed [ ] formally employed [ ]  
self-employed [ ]

15. On average, how much family income (including you and spouse) do you make in a month?

<E2000 [ ] E2000 – E2999 [ ] E3000 – E3999 [ ] E4000+ [ ]

(1 Emalangen (E) = 1 Rand)



**Section B: Knowledge about immunization**

1. Do you know about immunization?

No [ ]

Yes [ ]

2. Do you know about the immunization schedule?

No [ ]

Yes [ ]

3. When does a child get vaccinated (kindly tick the no/yes response and check that interviewee is not referring to the immunization card)

At birth No [ ] Yes [ ]

At 10 days No [ ] Yes [ ]

At 6 weeks No [ ] Yes [ ]

- |              |              |               |
|--------------|--------------|---------------|
| At 10 weeks  | No [       ] | Yes [       ] |
| At 14 weeks  | No [       ] | Yes [       ] |
| At 6 months  | No [       ] | Yes [       ] |
| At 9 months  | No [       ] | Yes [       ] |
| At 18 months | No [       ] | Yes [       ] |

4. Do you fear that your child will get sick/have an AEFI (adverse event following immunization) after vaccination?

No [       ]

Yes [       ]

5. Where do children get vaccinated?

Health facility [       ]

Mobile vaccinate site [       ]

**Social Factors Regarding Immunization**

6. Generally, does the community accept immunization of children?

No [       ]

Yes [       ]

7. Are there rural health motivators who conduct home visits and talk about vaccination?

No [       ]

Yes [       ]

8. Do you have a religious sect in your community that does not accept immunization of children?

No [       ]

Yes [       ]

What is the name of the religious sect? \_\_\_\_\_

9. Are there cultural values that would stop you from getting your child vaccinated?

No [       ]

Yes [       ]



**Kuhlola timbangela letiphatselene nekuvikeliswa kwebantfwana (labanetinyanga letingu 12 kuya etinyangeni letingu 23 (Assessing the factors associated with uptake of childhood immunization services among children aged 12 to 23 months in Eswatini).**

Sanibonani. Libito lami ngingu .....ngenta lucwaningo ekusebentiseni kugomiswa kwebantfwa eveni laka Ngwane.umningwane lototfolakala kulelicwaningo utawuphatfwa ngemfihlo futsi ngeku usebentiselwe temfundo. Umniningwane loyimfohlo weminyfu lotolekelela ekutfoleni lwati kulesihloko angeke ubekwe ebaleni kepha utoba yimfihlo. Imvumo yakho yekuba yincenye yalelicwaningo itobonakala ngesivumelwano lesigcotjiwe bese uba necopy yaso.

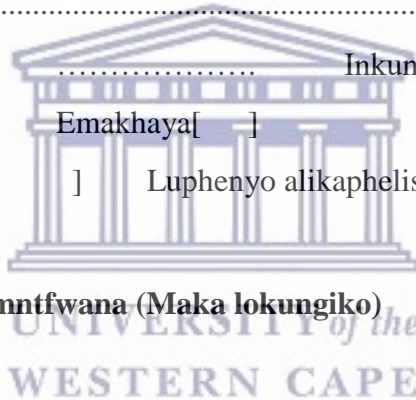
Nombolo yemibuto ..... Lisuku lelipheno..... /...../.....

Libito lalophenyako .....

Sifundza ..... Inkundla.....

Geographic Location(Indzawo) Emakhaya[ ] Dolobheni [ ]

Luphenyo luphelile [ ] Luphenyo alikaphelisisk [ ]



**Sehluko A: Umniningwane wemntfwana (Maka lokungiko)**

1. Unangaphi umntfwana wakho tinyanga) \_\_\_\_\_

2. Uyini umntfwana Umfana [ ] intfombatane [ ]

3. Unalo yini likhadi lekugoma umntfwana?

Yebo [ ] Cha[ ]

(Ungacela kubona lelikhadi lekugoma lemntfwana Uma Umtali avuma)

4. Simo sekugoma semntfwana: Ugome ngalokuphelele [ ] Ugome

ngalokungaka pheleli [ ]

Akagomi [ ]

5. BCG scar (Sibati se BCG) Cha[ ] Yebo [ ]

6. Watalwa nini? (Umnyaka) \_\_\_\_\_

7. Bulili: Umfana [ ] Intfombatane [ ]

8. Utsetfwe nome?



Awukatsatfwa [ ] utsetfwe [ ] kuhlalisana [ ] nehlukeno [ ] sehlukeniso [ ]  
umfelokati [ ]

9. Lizinga lekufundza: awukafundzi [ ] iPrimary [ ] iSecondary [ ] iTertiary [ ]

10. Ukuyiphi inkholo? Free Evangelical [ ] Catholic [ ] Pentecostal [ ] Traditional  
African [ ] Apostolic [ ]

Lokunye (cacisa).....

11. Uyasebenta yini? Angisebenti [ ] ngichashiwe [ ]

Ngichashiwe kwesikhashana [ ] ngyatisebenta [ ]

12. Lona lohlekisana naye uyasebenta yini? Unemployed [ ] formally employed [ ]  
informally employed [ ] self-employed [ ]

13. Luholo lelibhekekile ngenyanga?

<E2000 [ ] E2000-E3000 [ ] E3000-E4000 [ ] E5000+ [ ]

**(1 Emalangenani (E) = 1 Rand)**

### Sehluke B: Lwati ngekugoma



1. Uyati yini ngekugoma?

Cha

Yebo

2. Uyati yini ngeluhlelo lekugoma?

Cha

Yebo

3. Uvekeliswa nini umntfwana (maka yebo Noma cha bese uyanaka kutsi kabuki yini  
ekhadini lekugoma lemntfwana)

Naka talwa Cha [ ] Yebo [ ]

Nakana 10 wemalanga Cha [ ] Yebo [ ]

Nakana 6 wemaviki Cha [ ] Yebo [ ]

Nakana 10 wemaviki Cha [ ] Yebo [ ]

Nakana 14 wemaviki Cha [ ] Yebo [ ]

Nakana 6 wetinyanga Cha [ ] Yebo [ ]

Nakana 9 wetinyanga Cha [ ] Yebo [ ]

Nakana 18 wetinyangav

Cha [       ]

Yebo [       ]

4. Unako yini kwesaba kutsi umntfwana wakho angaba bekugula lokungabangwa kujova?  
No                    [       ]  
Yes                    [       ]
5. Ugoma kuphi umntfwana wakho?  
Etikweni letemphilo                    [       ]  
Kubomahamba nendlwana                    [       ]

Kuphila lokuphatselene ngekugoma (Social Factors)

6. Ingabe dive siyakumukela yini kugoma kwebantfwana?  
Cha                    [       ]  
Yebo                    [       ]
7. Bakhona yini banakekeli labahamba babgena Emakhaya bakhulumisa tindzaba tekuvikeliswa kwebantfwana?  
Cha                    [       ]  
Yebo                    [       ]
8. Ninabo yini bantfu benkholo tsite esigodzini sangakini labangakwemukeli kugomiswa kwebantfwana?  
Cha                    [       ]  
Yebo                    [       ]
9. Ikhona yini imihambo nemasiko lengakubimba ekugomiseni umntfwana?  
Cha                    [       ]  
Yebo                    [       ]



**CONSENT FORM**

**Title of Research Project: Assessing the factors associated with uptake of childhood immunization services among children aged 12 to 23 months in Eswatini**

I have received a comprehensive written explanation of the study that I can fully understand and my inquiries on the study have been addressed. I am aware of the potential repercussions of my participation, and I consent to it voluntarily. I am aware that my identity will not be disclosed to anyone. I am aware that I am free to leave the study at any moment without having to give a reason or worry about suffering consequences or losing out on benefits.

\_\_\_ I agree to be [videotaped/audiotaped/photographed] during my participation in this study.

\_\_\_ I do not agree to be [videotaped/audiotaped/photographed] during my participation in this study.



The COVID-19 protocol will be followed for gathering data. Firstly, during the interview, both the data collectors and the interviewees will need to wear masks that protect their mouths and noses. Secondly, the participants will be requested to sanitize their hands before signing the consent forms, and the data collectors will carry pocket hand sanitizers for cleaning their hands before and after each interview. Lastly to guarantee social distancing during the interview, the data collector and the participant shall sit at least one meter apart.

Participant's name.....

Participant's signature.....

Date.....

**SISWATI CONSENT FORM**

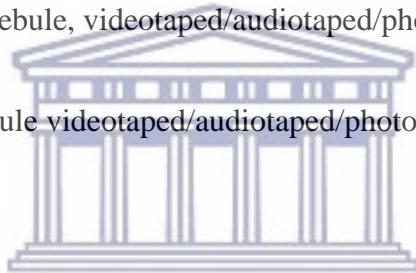
**Sihloko seluphenyo lekuvikeliswa kwebantfwana**

Kuhlolisisa timbangela letiphatselene neku Gina/ vikeliswa kwebantfwana labangephasi kweminyaka leli shumi nakunye kuta etinyangeni letingemashumi lamabili nakutsafu.

Lesihloko lokukhulunywa ngaso ngichazelwe ngaso ngelulwimi lengilwatiko. Umbuto lengingaba nawo ngalesihloko sewuphendulekile. Ngiyati kutsi kumbandzanyeka kwamib kuyini, futsi ngiyavuma kumbandzanyeka ngekwemvumo nesincumo sami. Imininingeane yami ifihlakele kutsi yatiwe ngumuntfu. Ngiyati kutsi ngingayekela kuba yincenye yalesihloko kunoma ngabe ngusiohi sigaba salelicwaningo ngaphandle kwekutichaza nekwesaba lokubi lokungase kuyangivelela Noma kungilahlekele.

\_\_\_ ngiyavuma kutsi [ningitsebule, videotaped/audiotaped/photographed] emkhatsini nalelucwaningo.

\_\_\_ angivumi kutsi [ningitsebule videotaped/audiotaped/photographed] during my participation in this study.



UNIVERSITY of the  
WESTERN CAPE

Imigomo yonkhe yeCOVID 19 itawulandzelwa kusentiwa lolucwaningo. Labatabebabuta nalabo labatabe babutwa ngalolucwaningo kubhekeke bagcoke emamask, baphatse emasantizer baphindze bacekelane sigaba lesingu 1m.

Participant's name (Libito .....

Participant's signature (Kutibophelela).....

Date (Lusuku).....

## INFORMATION SHEET

**[Instructions:** This is an information sheet for participants who volunteer to participate in the study so that they can understand the purpose of the study and ask any questions regarding their participation in the study].

**Project Title:** Assessing the factors associated with uptake of childhood immunization services among children aged 12 to 23 months in Eswatini

### **What is this study about?**

This is a research project being conducted by Michelle Mutandwa at the University of the Western Cape. We are inviting you to participate in this research project because you have been selected through random sampling and have a child who is between the ages of 12 and 23 months of age. The purpose of this research project is to assess the factors associated with uptake of childhood immunization services in Eswatini. This study will provide primary data as a reference source for future programme implementation activities. Furthermore, community engagement is a core component in the expanded programme on immunization. It is important to assess what influences the uptake of childhood immunization services for informing the public health fraternity during programme planning so that it can devise mitigating strategies and possibly institute sustainable interventions. Please feel free to ask any questions if you require clarification or further information.

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

You will be asked to answer a set of questions from a structured interviewer administered questionnaire. Firstly, you will be asked to produce your child's vaccination card if it is accessible and if you are willing to. This will be done to check whether the child has a vaccination card. Secondly, you will be asked a set of questions that will require information about your socio-economic status (e.g., age, marital status, religion, location, occupation, salary, social factors) and knowledge about immunization. This will be done to understand the factors that might have influenced the uptake of childhood immunization services. The interview should take approximately 15 minutes.

### **Would my participation in this study be kept confidential?**

The researchers undertake to protect your identity and the nature of your contribution. To ensure your anonymity, the questionnaire will be coded and will not include the real names of the participants rather, identifier codes will be used. To ensure your

confidentiality, the completed questionnaire will be kept in locked filing cabinets with the principal investigator responsible for the key. If we write a report or article about this research project, your identity will be protected.

### **What are the risks of this research?**

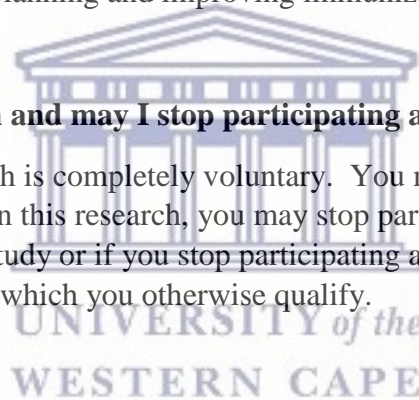
There are no anticipated risks associated with participating in this study. If you are uncomfortable answering any of the questions, you may skip them.

### **What are the benefits of this research?**

This research is not designed to help you personally, but the results may help the investigator learn more about factors associated with uptake of immunization services and this will be used by stakeholders for programme planning and improving immunization services in the country.

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

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.



### **Research during COVID 19 pandemic**

The COVID-19 protocol will be adhered to during data collection. Firstly, both the data collectors and the interviewees will be required to wear masks covering both the mouth and nose during the interview. Secondly, the data collectors will have pocket hand sanitizers for sanitizing before and after each interview, the participants will also be asked to sanitize before signing the consent forms. Lastly, during the interview, the data collector and the participant will sit at least 1 metre apart to ensure social distancing.

### **What if I have questions?**

This research is being conducted by [Michelle Mutandwa from the School of Public Health] at the University of the Western Cape. If you have any questions about the research study itself, please contact Michelle Mutandwa [principal investigator's name] at: +268 79398245 or mutandwa.michelle@gmail.com.

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

Professor Uta Lehmann

Head of Department: School of Public Health

University of the Western Cape

Private Bag X17

Bellville 7535

[ulehmann@uwc.ac.za](mailto:ulehmann@uwc.ac.za)

Professor Anthea Rhoda

Dean: Faculty of Community and Health Sciences

University of the Western Cape

Private Bag X17

Bellville 7535

[chs-deansoffice@uwc.ac.za](mailto:chs-deansoffice@uwc.ac.za)



This research has been approved by the University of the Western Cape's Biomedical Research Ethics Committee.

Biomedical Research Ethics Committee

University of the Western Cape

Private Bag X17

Bellville

7535

Tel: 021 959 4111

e-mail: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)

**SiSwati INFORMATION SHEET** (Umniningwane Welicwaningo Lekugoma Kwebantfwana)

[**Imitsetfo:** Leli Liphepha lwemningwane lwalelucwaningo lekugoma kwebantfwana lelifuna kutsi bantfu labatinikele kulekelela kulucwaningo balati batotfola injongo/ inhloso yalelicwaningo, bese babuta imibuto mayelana nekumbandzanyeka kwabo kulelicwaningo lebantfu laba].

**Sihloko:** Kuhlola timbanga letiphatselene neku goma/ kusebentiswa kwe kuvikeliswa kwebantfwana labangephasi kweminyaka leli shumi nakubili kuya etinyangeni letimashumi lamabili nakutsatfu eveni lase Swatini.

**Lingani lelicwaningo?**

Leli lucwaningo lelentiwa ngu Michelle Mutandwa e University yase Western Cape. Siyakumema kutsi ube yincenye yaleli cwaningo ngoba ukhetsiwe ngemphatsi nemiti esigodzini sakho ngoba nemntfeana lokuleminyaka ledzingekako kulelicwaningo ukhona lakhaya, lomntfwana kumele abe neminyaka lengu 12 kuya Ku 23 wetinyanga. Inhloso yalelicwaningo kutsi kuhlolwe timbangela letiphatselene nekuvikeliswa kwebantfwana ekukhuleninkwabo eveni laka Ngwane. Lelicwaningo litoletsa umniningwane losewuvele ukhona njenge sibonelo kulelinye lucwaningo lelingenteka emvakwaleli. Kusebentisana ngemphakatsi kumcoka kulelitiko lekuvikeliswa bantfwana. Kubalulekile lucwaningo kutsi yini lokubangela kugcugcuteleka kwekugimisa bantfwana kute kutisebsntiswa lomniningwane ekwatiseni public health khona batosebentisa lokutfolakele Uma bahlela kusebenta nekuchubekela embili kwalelitioko. Cela ukhululeke ubute imibuto kute utoba nekuvisisa kutsi lingani lelicwaningo phondze utfolwe lwati kabanti ngalo.

**Kutawubhekeka kutsi ngente ini ngingavuma kubanyincenye yalelicwaningo?**

Utawubhekeka kutsi uphendvule imibuto ketsetselwe kulelinye ngumntfu locondzene lwalelucwaningo. Kwekucala, utawucelwa kutsi ube nelikhadi lekugomisa lomntfwana Uma likhona futsi Uma uvuma, lokunkutokwentiwa kute kutobonakala kutsi lomntfwana unalo yini lelikhadi Noma Ute. Kwesibili, utawubutwa imibuto letodzinga umniningwane wesimonsakho mayelana ngemunyaka, kutsi ushadile Noma awukatsatfwa, inkholo, indzawo, umsebenti, luholo, emphilo yakho) bese sati kabanti ngelwati lwakho kutekuvikelisa bantfwana. Lemibuto itosita kubona kutsi loku kuyasifaka yini sandla ekugomiseni umntfwana. Lemibuto itotsatsa emashumi lasihlanu imizuzu.



### **Kumbandzanyaneka kwami kulelicwaningo kutoba yimfihlo yini?**

Laba balelicwaningo kwamele bakuvikele bunguwe bakho nalotakusho. Kute beciniseke kutsi awatiwa, lemibuto ngeke ifake libito lakho kepha batawusebentisa indlela yekubita lengeke ikhombe bunguwe bakho. Kuciniseka kutsi umningwane lotowusho ngeke ufike etandleni tesive utawuvalelwa ema fayeleni alosetulu kuleluphenyo . Uma kutobhalwa umbiko walokutfolakele umningwane lefihlakele angeke ibhalwe utawuvikeleka.

### **Yini tingoti tekuyincenye yalelicwaningo?**

Kute lokungaba tingoti lokubinakele. Uma umuntu akhetsa kubanyincenye yalelicwaningo, futsi Uma umuntu angakhululeki ngekuhendula Umbuto tsite angaweca ngaphandle kwekuvinjwa.

### **Yini longakuzuzwa ngekuba yincenye yalelicwaningo?**

Lelicwaningo alikakhiwa kutsi litosuta wena, kepha lemiphumela yalo itosita Noma ilekelele Lona lophetse lelicwaningo atfole lwati kabanti kutsi yini lephetseleni nekugongyiswa kwebantwana bese basebentisa lelwati labatalitsola ekuhleleni kutfutukisa Tona tekugoma kwebantwana.

### **Kumele yini ngibe kulelicwaningo futsi ngingayekela yini?**

Kuba yincenye yalesihloko kungekufusa kwakhe umuntu. Ungakhetsa kungabi yincenye yalelicwaningo futsi Noma uvumile ungayekela Noma nini. Uma ukhetsa kungabi yincenye yalelicwaningo angeke ube ulahlekelwe lutfo lokumele ukutfole.

### **Imigomo yeCOVID 19**

Imigomo yonkhe yeCOVID 19 itawulandzelwa kusentiwa lolucwaningo. Labatabebabuta nalabo labatabe babutwa ngalolucwaningo kubhekeke bagcoke emamask, baphatse emasanitizer baphindze bacekelane sigaba lesingu 1m.

### **Uma nginemubuto ke?**

Lelicwaningo lelentiwa ngu [Michelle Mutandwa eskolweni sePublic Health] eUniversity yase Western Cape. Uma unemibuto ngalelicwaningo, ungashayela Michelle Mutandwa [principal investigator's name] at: +268 79398245 or [mutandwa.michelle@gmail.com](mailto:mutandwa.michelle@gmail.com).

Uma kwenteka uba nemibuto ngalelicwaningo nemalungelo akho njengalotinikele kulekelela kutsola umningwane, Noma ufisa kubika inkings lobhekene nayo usenta lelicwaningot:

Professor Uta Lehmann

Head of Department: School of Public Health

University of the Western Cape

Private Bag X17

Bellville 7535

[ulehmann@uwc.ac.za](mailto:ulehmann@uwc.ac.za)

Professor Anthea Rhoda

Dean: Faculty of Community and Health Sciences

University of the Western Cape

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Bellville 7535

[chs-deansoffice@uwc.ac.za](mailto:chs-deansoffice@uwc.ac.za)



This research has been approved by the University of the Western Cape's Biomedical Research Ethics Committee.

Biomedical Research Ethics Committee

University of the Western Cape

Private Bag X17

Bellville

7535

Tel: 021 959 4111

e-mail: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)

[Appendix G: Permission request letter](#)

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809 Fax: 27 21-959 2872

E-mail: [soph-comm@uwc.ac.za](mailto:soph-comm@uwc.ac.za)

Eswatini Health and Human Research Review Board

To whom it may concern

**RE: Request to conduct research study in Eswatini**

Project Title: Assessing factors associated with uptake of childhood immunization services among children aged 12 to 23 months in Eswatini

This is a research project being conducted by Michelle Mutandwa at the University of the Western Cape. The purpose of this project is to describe the factors associated with uptake of childhood immunization services among children aged 12 to 23 months in all four regions in Eswatini. I am requesting permission to conduct this study in both rural and urban communities in Hhohho, Lubombo, Manzini and Shiselweni regions.

Immunization is essential in the prevention of Vaccine-preventable Diseases. This ensures that children live a fulfilling life, and it reduces microeconomic and macroeconomic costs on the families and countries, respectively. Furthermore, the benefits of implementing routine immunization include eradication of vaccine-preventable diseases (VPDs), for example, polio eradication; noteworthy is that Eswatini has been polio-free since 1989 (MoH, 2016).

The government of Eswatini aims to achieve the 90/80 targets by 2030 as part of the Global Vaccine Action Plan (GVAP) (WHO, 2020). The interventions for immunization include routine immunization and supplementary immunization activities (SIAs e.g., national immunization campaigns). Despite the concerted efforts, there has been a significant downward trend in immunization coverage in all four regions Eswatini since 2012. The immunization coverage rates in Eswatini using the national proxy indicators reveal a downward trend in DPT-Hep B-Hib 3 coverage rates from 88% in 2014 to 81.9% in 2020. Additionally, there is a decrease in coverage rates for the measles-rubella vaccine (MR1) from 78.2% in 2014 to 70.4% in 2020 (MoH, 2021). The ramifications of low immunization coverage rates cannot be understated, and these include outbreaks, e.g., the measles outbreak, which occurred in the neighboring countries Mozambique and South Africa early last year.

Currently, there is no recent study of reference which provides information on factors associated with uptake of immunization services in Eswatini. The last study was conducted in 2015 using secondary data from the Swaziland Demographic Health Survey and it was not exhaustive on the factors associated with uptake of childhood immunization services neither was it analytical

(Tsawe et al., 2015). Given the positive impact of immunization on individuals, communities and healthcare systems the reduction of immunization coverage rates in Eswatini warrants further investigation. It is important to conduct this study to elucidate the factors associated with uptake of childhood immunization services in Eswatini. This study will provide primary data as a reference source for future programme implementation activities. Furthermore, community engagement is a core component in the expanded programme on immunization. It is imperative to assess what influences the uptake of childhood immunization services for informing the public health fraternity during programme planning so that it can devise mitigating strategies and possibly institute sustainable interventions.

If there be any questions about the research study itself, please contact Michelle Mutandwa at +26878398245 or [mutandwa.michelle@gmail.com](mailto:mutandwa.michelle@gmail.com). Should there be further questions regarding this study, please contact:

Professor Uta Lehmann

Head of Department: School of Public Health

University of the Western Cape

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Professor Anthea Rhoda

Dean of the Faculty of Community and Health Sciences

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[chs-deansoffice@uwc.ac.za](mailto:chs-deansoffice@uwc.ac.za)

This research has been approved by the University of the Western Cape's Senate Research Committee (REFERENCE NUMBER: \_\_ BM21/10/6\_\_\_\_\_)

Appendix H: Eswatini Research Protocol certificate



**ESWATINI  
HEALTH AND HUMAN  
RESEARCH REVIEW BOARD**  
MBANDZENI HOUSE, 3<sup>RD</sup> FLOOR, CHURCH STREET  
P.O. BOX 3, MBABANE, ESWATINI

**ONE YEAR RESEARCH PROTOCOL APPROVAL CERTIFICATE**

BOARD REGISTRATION NUMBER	FWA 0005661/TRB 0011253				
PROTOCOL REFERENCE NUMBER	EHHRRB101/2021				
Type of review	Expedited	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Full Board	<input type="checkbox"/>
Name of Organization	Master' Student				
Title of study	Assessing the factors associated with the uptake of child immunization services among children aged 12-23 months in Eswatini				
Protocol version	1.0				
Nature of application	New	<input type="checkbox"/>	Amendment	<input type="checkbox"/>	Renewal
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Extension	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CT updates	<input type="checkbox"/>
List of study sites	Hhohho, Shiselweni, Manzini and Lubombo regions				
Name of Principal Investigator	Ms. Michelle Eland Mankhawa				
Names of Co- Investigators	N/A				
Names of steering committee members in the case of clinical trials	N/A				
Names of Data and Safety Committee members in the case of clinical trials	N/A				
Level of risk (Tick appropriate box)	Minimal	<input checked="" type="checkbox"/>	More than minimal	<input type="checkbox"/>	High
Initial study Approval information	Approved	<input checked="" type="checkbox"/>	Study	<input type="checkbox"/>	Certificate
	Approval date	17/05/2022	Completion date	17/05/2023	Expiry Date
Study renewal approval information	Renewal date		End date		
Study amendment approval information	Amendment date		Start date		
Study extension approval information	Extension date		Start date		
Signature of Chairperson					
Signing date	17/05/2022				
Secretary Contact Details	Name of contact officer	Bhehabe Shongwe			
	Email address	elabhehabe@esrbb.org			
	Telephone no.	+268 2604 7781			

**APPROVAL CONDITIONS**

Ref.	Conditions	Indication of conditions (tick appropriate box)				
1	Implementation of approved version of protocol					
2	Provide a specific insurance cover certificate in respect of this particular study within 14 days of receiving this Ethics Clearance certificate					
3	Update information on adverse events both on the addendum and the informed consent form to include measures for addressing life threatening adverse events that occur at home.					
4	Reporting of adverse events within 5 days of occurrence					
5	Submission of progress reporting for multi-year studies	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
6	Submission of end of project report (Hard copy)	✓				
7	Submission of end of project report (Soft copy)	✓				
	Submission of data sets	✓				

**List of reviewed documents**

Ref.	Documents	Reviewed documents (tick appropriate box)
1	Completed application form	✓
2	Cover letters	✓
3	Evidence of administrative permission to conduct the research by involved institutions/sites (where applicable)	
4	Detailed current resume or curriculum vitae of Principal Investigator/s including Principal investigator declaration	✓
5	Summary resume or biography for other investigator(s)	✓
6	Evidence of approval/rejection by other Ethics Committees, including comments and requested alterations to the protocol, where appropriate.	✓
7	Research protocol (see outline in Annex 1)	✓
8	Questionnaires and interview guides (with back-translated versions where applicable)	✓
9	Case report forms (CRFs), abstraction forms and other data collection tools	✓
10	Participant/subject Information Statement(s) (where applicable)	✓
11	Informed consent form(s) including photographic and electronic media consent statements.	✓
12	Advertisements relevant to the study (where applicable)	
13	Source of funding and detailed budget breakdown including material and incentives to participants if applicable	✓
14	Notification form for adverse effects/oversight	✓
15	Proof of payment	
16	Proof of insurance cover for research subjects in clinical trials where applicable	
17	Any other special requirements should be stated, if applicable	N/A



*R*

Appendix G: UWC Ethics Committee approval



UNIVERSITY of the  
WESTERN CAPE



29 November 2021

Ms M Mutandwa  
School of Public Health  
Faculty of Community and Health Sciences

**Ethics Reference Number:** **BM21/10/6**

**Project Title:** Assessing factors associated with uptake of childhood immunization services among children aged 12 to 23 months in Eswatini.

**Approval Period:** **19 November 2021 – 19 November 2024**

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project and the requested amendment to the project.

Any further amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

**Please remember to submit a progress report annually by 30 November for the duration of the project.**

For permission to conduct research using student and/or staff data or to distribute research surveys/questionnaires please apply via:  
<https://sites.google.com/uwc.ac.za/permissionsresearch/home>

*The permission letter must then be submitted to BMREC for record keeping purposes.*

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias  
Research Ethics Committee Officer  
University of the Western Cape

BMREC Registration Number: BMREC-120416-030

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