EVALUATION OF THE EFFECT OF PNEUMOCOCCAL CONJUGATE VACCINE 13 (PCV 13) AND ROTAVIRUS VACCINE ON UNDER FIVE CHILDREN HOSPITALISATION AND MORTALITY:

A CASE STUDY OF MASWA DISTRICT

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A CASE STUDY OF MASWA DISTRICT

By

Anthony Nathaniel Galishi

A Dissertation submitted to the School of Public Administration and Management in Partial/Fulfillment of the Requirements for the Degree of Master of Science in Health Monitoring and Evaluation (HME) of Mzumbe University

2018

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled "***Evaluation of the Effect of Pneumococcal Conjugate Vaccine 13 (PCV 13) and Rotavirus Vaccine on under Five Children Hospitalisation and Mortality: A Case Study of Maswa District''"*** in partial/fulfillment of the requirements for award of the degree of Master's of Health Monitoring and Evaluation of Mzumbe University.

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DECLARATION

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I, **Galishi Anthony Nathaniel**, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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DEDICATION

To my Late Father Mr. Nathaniel John Galishi (R.I.P), my Mother Ms. Marietha Mdodo Galishi, without whom I would not be who I am.

To my wife Dr. Lilliane, my daughters Careen and Carrah and my son Galishi, you guys have patience of a saint, love you till the end of time.

LIST OF ABREVIATIONS AND ACRONYMS

BCG	Bacillus Calmette Guerin
CHMT	Council Health Management Team
CSF	Cerebral Spinal Fluid
DIVO	District Immunization and Vaccine Officer
DMO	District Medical Officer
DRCHCO	District Reproductive and Child Health Coordinator
DTP	Diphtheria, Tetanus and Pertussis
DVDMT	District Vaccination Data Management Tool
DVS	District Vaccine Store
EPI	Expanded Program of Immunization
GAVI	Global Alliance for Vaccines and Immunization
I/M	Intramuscular
IEC	Information, Education Communication
IVD	Immunization and Vaccine Development
LPG	Liquefied Petroleum Gas
MDGs	Millennium Development Goals
Ml	Milliliter
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MoHSW	Ministry of Health and Social Welfare
PCV10	10 Valent Pneumococcal Conjugate Vaccine
PCV13	13 Valent Pneumococcal Conjugate Vaccine
PHC	Primary Health Care Committee
RCH	Reproductive and Child Health
SOP	Standard Operating Procedures
TDHS-MIS	Tanzania Demographic Health Survey- Malaria Indicator Survey
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

ABSTRACT

Pneumococcal and Rotavirus infection continues to cause high level of hospitalisation and mortality in under-fives. In January 2013, Maswa district introduced PCV13 and Rotavirus vaccines in its immunisation programme to prevent children against pneumococcal and Rotavirus infection. This evaluation study investigated the effect of PCV13 and Rotavirus vaccines in under-five hospitalisation and mortality in Maswa district.

The study adopted a case study design drawing a sample of 20 respondents who provided detailed information until the saturation level was met. Data were collected through in-depth interview, documentary review and observation. Some of the study participants were purposively selected due to their roles in IVD programme while others were conveniently selected at the facilities. Content analysis was used to analyse the data from in-depth interviews. Documentary data were analysed using SPSS computer software where descriptive statistics such as frequencies and percentages were deployed.

The IVD programme was implemented following the national guideline. There was a decreased under-five hospitalisation and mortality due to pneumonia and diarrhoea diseases in Maswa district following introduction of PCV13 and Rotavirus vaccines.

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DEFINITION OF TERMS

Immunization	The process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine.
Vaccine	A biological preparation that improves immunity to a particular disease.
Cold chain	Refers to the process used to maintain optimal conditions during the transport, storage, and handling of vaccines, starting at the manufacturer and ending with the administration of the vaccine to the client.
Vaccine Coverage	Is the percentage of immunized individuals among the target population.

CHAPTER ONE

PROBLEM SETTINGS

1.1 Background

It is estimated that 6.3 million live born children died under the age of 5 years globally in the year 2013, the number is lower as compared to 9.9 million deaths that occurred in the year 2000 (Li Liu, 2015), this indicates that there is improvement in under-five survival among countries. In the year 2015, Pneumonia and diarrhoea contributed about 25% of all under-five deaths worldwide where pneumonia claimed 16% and diarrhoea claimed 9% of the overall deaths globally (IVAC, 2016). This show despite the global achievement in reduction of under-five morbidity and mortality, these two diseases still contribute significantly on under-five morbidity and mortality (IVAC, 2016).

It is explained that most of pneumonia cases and deaths occur in low and middle income countries mostly in sub-Saharan Africa and Asia. Africa accounts for 30% while Asia accounts for 39% of the global burden of incidence and severe childhood pneumonia cases. This is contributed by poor nutrition, poor living conditions, exposure to indoor air pollution, premature birth and HIV infection where in these areas the burden of paediatric HIV disease is heavier as compared to other parts of the world (Zar, 2013). While pneumonia contributes highly on under-five hospitalization and mortality, it is estimated that there are approximately two billion cases of diarrhoea disease globally every year, and those who are more affected are children under two years old. The leading cause of diarrhoea disease in children in developing countries is the rotavirus infection that contributes about 41% of the total diarrhoea cases (Madhi, 2014).

In Tanzania Streptococcal pneumonia infection and diarrhoea are the leading causes of deaths in under-five children. Streptococcal infection contributes about 14% of

overall under-five children deaths while diarrhoea contributes about 17% of all deaths (MoHCDGEC, 2016). *Streptococcus pneumoniae* infection is a global respiratory bacterial pathogen that can cause severe diseases, apart from pneumonia it can also cause meningitis, bacteraemia and milder diseases such as otitis media, sinusitis and bronchitis that all contributes to childhood morbidity and mortality (WHO, 2016). Streptococcal pneumonia cases are estimated to be 222,256 and 15,206 deaths occur in under-five years children annually while Rotavirus infection is responsible for 30-50% of all children hospitalized with diarrhoea in Tanzania(MoHCDGEC, 2016).

In order to reduce morbidity and mortality due to vaccine preventable diseases in under-five children the World Health Organization (WHO) established Expanded Programme of Immunization (EPI) in 1974. The EPI was aimed at immunization against six vaccine preventable diseases, which are diphtheria, pertussis, tetanus, measles, poliomyelitis and tuberculosis (Drain, 2012). Since then, new vaccines have been introduced worldwide including Hepatitis B, Haemophilus influenza type b, Rubella, Rota-viral disease and Pneumococcal conjugate vaccines (PCV) and are integrated in the EPI (WHO, 2012).

The EPI in Tanzania was launched in 1975 with the primary aim of protecting children from Vaccine Preventable Diseases, with overall goal to contribute to the reduction of infant and childhood morbidity and mortality rates, guided by different national health priorities and other regional and global commitments for health (MoHSW, 2010). Since the year 2011, EPI is known as Immunization and Vaccine Development (IVD) programme, the scope of the programme was expanded above the focus on infant and under-five to maternal health, hence its renaming to IVD programme. Vaccines given through IVD programme in Tanzania are universal mandatory and free of charge (MoHCDGEC, 2016).

PCV and Rotavirus vaccine are newly invented vaccines that were integrated into the immunization programme. PCV prevent children against Pneumococcal infection while Rotavirus vaccine prevents children against rotavirus infection. Globally, 134

countries had introduced Pneumococcal vaccine by the end of the year 2016 where the estimated immunization coverage for these countries was 42% (WHO, 2017).

Maswa district council conducts routine immunization to children with all the recommended vaccines including PCV13and Rotavirus vaccines introduced in January 2013. The immunization of under-five aged children is conducted in 46 health facilities. The government owns 44 facilities and 2 facilities are owned by Faith Based Organizations (Maswa DC, 2016/17 CCHP). There are 78 centres for outreach services that are used to provide immunization services to the areas that are distant from health facilities. These outreach services are conducted once every month. The District Immunization and Vaccines Officer (DIVO) coordinates all the IVD programme activities under the District Medical officer's office (Maswa DC, 2016/17 CCHP).

1.2 Statement of the problem

Diarrhoea and pneumonia disease has been contributing highly in under-five hospitalization and mortality in Maswa district. In the year 2011 alone there were 9,968 admissions due to diarrhoea and 9,701 admissions due to pneumonia (HMIS Book 14), in the year 2016 there were 480 admissions due to diarrhoea disease and 5,244 admissions due to pneumonia (DHIS2).

PCV 13 and Rotavirus vaccine were introduced into IVD programme in January 2013 with the aim of reduction of under-five children morbidity and mortality due to Pneumococcal disease and Rotavirus diarrhoea disease. PCV 13 and Rotavirus vaccine have been provided to under-five children in Maswa district since January 2013 in all health facilities and through mobile and outreach services. (Maswa DC, 2016 IVD report).

Following introduction of PCV13 and Rotavirus vaccines, there was a decrease in under-five hospitalization and mortality due to diarrhoea and pneumonia in Maswa district even though it was not clear about the contribution of PCV13 and Rotavirus

vaccine in reduction of under-five hospitalization and mortality due to diarrhoea and pneumonia.

Therefore, this evaluation study was intended to assess the contribution of PCV13 and Rotavirus vaccines in reduction of under-five hospitalisation and mortality in Maswa district.

1.3 Evaluation Questions

1.3.1 General evaluation question

What is the contribution of PCV 13 and Rotavirus vaccine in reduction of under-five children hospitalisation and mortality due to pneumonia and diarrhoea in Maswa District?

1.3.2 Evaluation Specific questions

i. What is the trend of under-five hospitalisation due to pneumonia and diarrhoea before and after introduction of PCV13 and Rotavirus vaccines?
ii. What is the trend of under-five mortality due to pneumonia and diarrhoea before and after introduction of PCV13 and Rotavirus vaccines?
iii. How is the administration of PCV 13 and Rotavirus vaccines to under-five children implemented.
iv. To what extent the introduction of PCV13 and Rotavirus vaccines influenced under-five hospitalisation and mortality in Maswa district.

1.4 Evaluation objectives

1.4.1 General evaluation objective

To evaluate the contribution of PCV 13 and Rotavirus vaccine on under five children hospitalisation and mortality in Maswa District

1.4.2 Evaluation specific objectives

i. To determine the trend of under-five hospitalisation before and after introduction of PCV13 and Rotavirus vaccines.
ii. To determine the trend of under-five mortality before and after introduction of PCV13 and Rotavirus vaccines.
iii. To examine administration of PCV 13 and Rotavirus vaccines to under-five children implementation.
iv. To determine the extent to which introduction of PCV13 and Rotavirus vaccines influenced under-five hospitalization and mortality in Maswa district.

1.5 Significance of the evaluation

Evaluation of the effect of PCV13 and Rotavirus vaccines on under-five hospitalisation and mortality in Maswa district provided important evidence on the implementation of the IVD programme. Since the introduction of PCV13 and Rotavirus vaccines, notable changes in hospitalisation and mortality of under-fives at Maswa district hospital were observed.

The evaluation report findings provided information on how the introduction of PCV13 and Rotavirus vaccines decreased under-five hospitalisation and Mortality since their introduction in IVD programme in Maswa district. This information should be useful to policy makers, implementers and stakeholders for making rational decisions in investments to the programme in terms of financial, human resources and infrastructures during planning and implementation of new activities. The findings also demonstrated the value of the IVD programme and will help in maintaining good practice and ensure accountability.

The evaluation study also identified gaps and challenges encountered during implementation of IVD programme in Maswa district where stakeholders are informed in order to improve the programme implementation.

1.6 Description of the IVD programme

The Expanded Programme of Immunization (EPI) in Tanzania was launched in 1975 with the primary aim of protecting children from Vaccine Preventable Diseases, and therefore reduce infant and childhood morbidity and mortality, following WHO establishment of EPI in 1974 (MoHSW, 2010). In 2011, EPI was changed to Immunization and Vaccine Development (IVD) programme, after expansion of the scope of the programme above the focus on infant and under-five to maternal health.

The EPI programme is financed by the Government of Tanzania in collaboration with international partners including WHO, UNICEF and GAVI. Funding at district level is through district basket funds where the CHMT prioritizes the EPI funding.

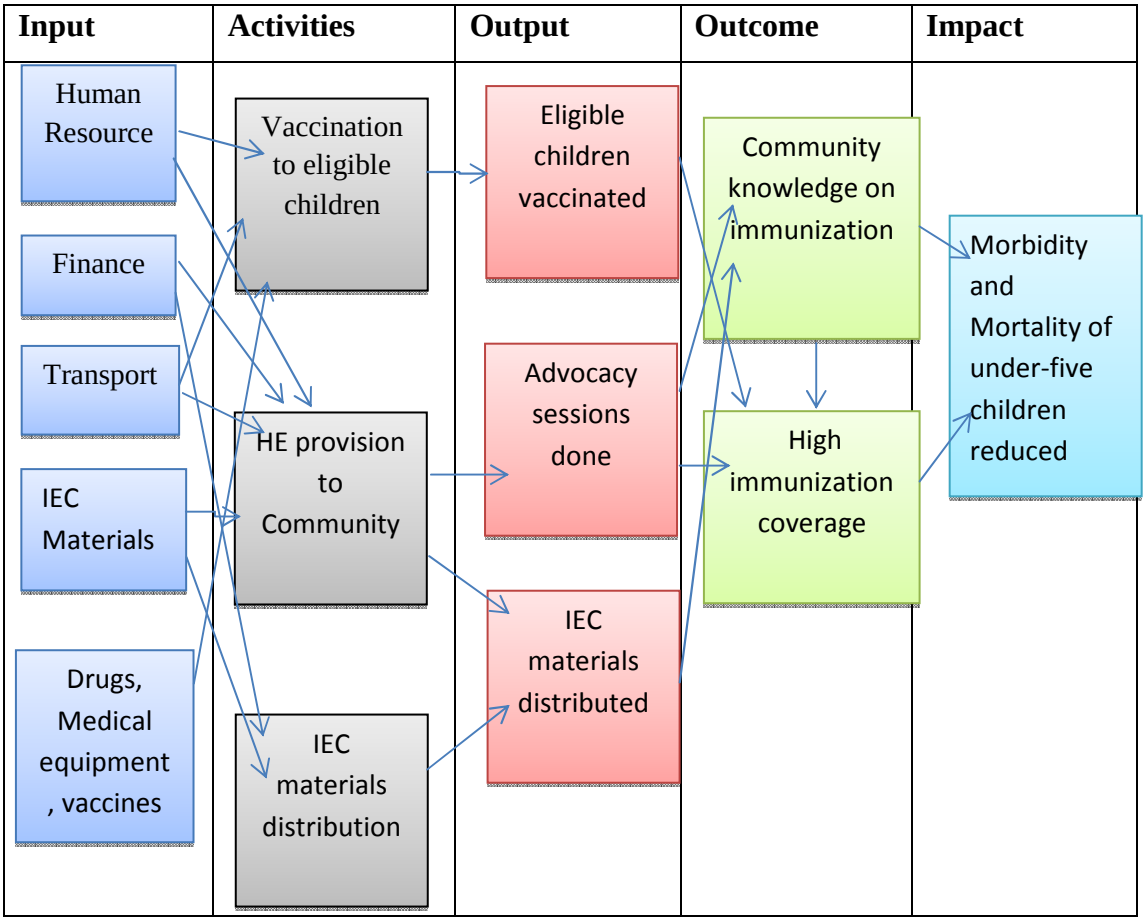
The IVD programme have several system components that have different objectives, all designed to make the programme work effectively;

The Service delivery component is aimed at increasing immunization coverage to equal or above 90% in the district. The other system component is Vaccines supply, quality and logistics aimed at increasing cold storage capacity of vaccines to 100%. Advocacy and communication is another system component aimed at ensuring correct information on immunization to community is available in the district. The other system component is Capacity building; this has the objective to enhance skills and knowledge on immunization services to 100% of health facility service providers.

Supportive Supervision: supportive supervision is conducted at national level to the regional and council level once per quarter. At regional level, supportive supervision is conducted quarterly to the district while at the district level; supportive supervision is conducted to the facilities monthly to ensure the provision of immunization services is done according to national guidelines. All the supervisions are conducted using an integrated checklist that contains the EPI component.

Monitoring and Evaluation; the programme uses HMIS (MTUHA) data collection tools for immunization and an electronic system (DVDMT) for monitoring the immunization activities. Immunization data is generated at the facility level, where data compilation and analysis is done. Immunization data are collected and summarized using the EPI monthly summary forms and HMIS books. The data are sent to the district then regional level. National level receives data from regions and during annual evaluation meetings (MoHSW, 2010). Figure 1.1.

Programme logic model



Source: MOHSOW, 2011.

1.6.1 Expected programme effects/objectives

The program has the main goal of reduction of infant and childhood mortality rates. The goal was set based on the fourth millennium and Development Goal (MDG4) that aimed at reduction in child mortality by two thirds by 2015 from its 1990 level. The programme expects to see all activities planned for children protection against vaccine preventable diseases in the district are conducted as planned and hence morbidity and mortality rates of under-five are reduced (MOHSW, 2011).

1.6.2 Major strategies

The national IVD programme document has stipulated the strategies on successful implementation of IVD programme from national to the lower level. The following are the main strategies in accordance to the Tanzania – EPI 2010-2015 Comprehensive multi-year plan (MOHSW, 2011):

- To adopt and implement WHO immunization schedule
- To strengthen outreach and mobile services
- To increase vaccination sessions at health facilities
- Ensure adequate cold chain storage at all levels
- Strengthen vaccine management and ensure availability of vaccines and related supplies
- To enhance advocacy, communication and social mobilization
- Awareness creation on immunization services to decision makers and community leaders
- Enhance knowledge and skills on immunization services among health managers and providers

1.6.3 Programme activities and resources

IVD programme in Maswa district is implemented through 46 health facilities that provide health services in the district. The service providers in these facilities are

responsible for vaccination services. District Immunization and Vaccines Officer (DIVO), who works under the DMO, coordinates the IVD activities. There are 78 centres for outreach services that are used to provide immunization services once every month to the areas that are far from health facilities. National immunization campaigns that are conducted twice a year are also used to provide PCV13 and Rotavirus vaccines to the children under-five years old in Maswa district.

1.6.4 Stakeholder analysis

Stakeholders analysis was carried out to pinpoint organizations or people with interest in the programme being implemented. The MoHCGEC develops and provides policy and guidelines that guide all the programmes implemented in health sector including the methods for implementing IVD programme which administers PCV13 and Rotavirus vaccines. It is the interest of MoHCGEC to see all under-five children are vaccinated against pneumococcal and rotavirus diarrhoea diseases.

International organisations are other important stakeholders in implementation of the programme. The international organisations provide technical support and funding to the programme with the interest to see pneumococcal and diarrhoea disease does not cause high morbidity and mortality to under-five children. This evaluation study assessed the implementation of IVD programme specifically on provision of PCV 13 and Rotavirus vaccines, thus the international organisations will use the report to advocate for a better and user friendly immunization services to the community.

Politicians and decision makers is the group of stakeholders that formulates laws and regulations, therefore the study evaluation report can be used by politicians and decision makers for decision making in implementing immunization programme in provision of PCV13 and Rotavirus vaccines.

CHMT is the team responsible to oversee all medical services provided in the council. In immunization programme, the CHMT has an obligation to reach 90% of the annual coverage for PCV 13 and Rotavirus vaccination to under-five children. The

evaluation report will be used by CHMT to improve implementation of the immunization programme on provision of PCV 13 and Rotavirus vaccines to under-five children. Service providers are implementers of the immunization programme, they provide PCV13 and Rotavirus vaccines at their facilities and outreach centres. The evaluation report will be useful to the service providers for improving the PCV13 and Rotavirus immunization services provision.

Under-five children are the target group for PCV13 and Rotavirus immunization services are also important stakeholders. The vaccines prevent them from pneumococcal and rotavirus infections. In this evaluation study, they were the primary data providers that informed the evaluation questions.

Teachers as the target group of the Workplace program are also important stakeholders. They are the consumers of the Workplace services. In this evaluation they are the primary data providers that will inform the evaluation questions.

This evaluation study identified the gaps in implementation of the IVD programme in administering PCV13 and Rotavirus vaccine therefore this will be used to improve the implementation of the programme. Table 1.1 below summarizes the main stakeholders for the IVD programme on PCV 13 and Rotavirus vaccine administration.

Table 1.1 Stakeholders analysis and engagement Matrix

stakeholder	Roles in the program	Interest or perspective in evaluation	Role in the evaluation	Means of communication	Level of importance
MoHCGEC	To develop policy and guidelines	To have all under-five children vaccinated against Pneumococcal disease and Rotavirus	Knowing the gap in the administration of PCV13 and Rotavirus vaccines	Emails	H
International organizations	To provide funds and technical support to programme implementers	To see pneumococcal disease and Rotavirus does not cause high morbidity and mortality to under-five children	Users of the final report for advocating better and friendly immunization services to under-fives.	Emails	H
Politicians and Decision makers	To formulate laws and regulations	To see under-five children free of pneumococcal and rotavirus diarrhoea diseases.	Users of final report for decision making	Meetings/ emails	H
CHMT	Programme implementation and supervision to lower levels	To reach 90% coverage of vaccination against pneumococcal disease and Rotavirus and ensure hospitalisation and mortality in under-five children reduced.	Provide the necessary documents such as reports, policies and plans. Provide support to the evaluation team. Users of the final report for improvement of the programme implementation.	Meetings/ Letters/ Emails/ Interviews	H
Service providers	Programme implementation	To reach all target groups on PCV 13 and Rotavirus provision	Provide support to the evaluation team. Users of the final report to improve the implementation of the programme.	Meetings/ Interviews	M
Influential people in the community	Community sensitization and mobilization towards immunization	To have the under-five children immunized	Users of the final report for advocating friendly immunization services and community sensitization.	Meetings	L
Under-five children in Maswa district	Beneficiaries	To have the community free from pneumococcal and rotavirus diarrhoea disease	Study population	Documentary review	L

Source: Researcher's Construct 2018

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section is intended to provide review of an extensive range of literature from different sources on pneumococcal conjugate vaccine 13 (PCV13) and rotavirus vaccine. It presents the general profile of these vaccines and their background at global level and Tanzanian context. The review helped in informing the evaluation on what is known and what is not known about the two vaccines, it also provided information about studies conducted in other places in the world and the methodologies used hence allowed for comparison and learning from these studies.

2.2 Pneumococcal Conjugate Vaccine

Pneumococcal conjugate vaccine consists of sugars (polysaccharides) from the capsule of the bacterium *Streptococcus pneumoniae* that are conjugated to a carrier protein. Unlike the pneumococcal polysaccharide vaccine, the pneumococcal conjugate vaccine protects children younger than 2 years of age. It protects against severe forms of pneumococcal disease, such as pneumonia, meningitis and bacteraemia. It will not protect against these conditions if they are caused by agents other than pneumococcus or by pneumococcal serotypes not present in the vaccine. Two conjugate vaccines are available since 2009, one 13-valent (PCV13) the other 10-valent (PCV10). The first pneumococcal conjugate vaccine, a 7-valent product, is no longer in use.

WHO's strategic Advisory Group of Experts recommended on inclusion of rotavirus vaccines to prevent children from rotavirus infection in all countries' immunization programmes (PATH, 2012). Rotavirus is a virus which causes inflammation of the stomach and intestines, if the patient is not treated can suffer from severe dehydration

and death. Children at the age of six months to two years are at the highest risk of rotavirus infection.

The goal for development of Rotavirus vaccine was to prevent global mortality and prevention of high morbidity in developed countries. A live attenuated tissue-culture grown rotavirus given orally was a conservative choice for a vaccine. It was believed that an oral vaccine would mimic natural immunity (Vesikari, 2012).

PCV consists of sugars (polysaccharides) obtained from the covering of the bacterium Streptococcus pneumoniae that are conjugated to a transporter protein. The 10-valent vaccine (PCV10) prevents invasive disease caused by 10 Streptococcus pneumoniae strains while 13-valent vaccine (PCV13) prevents invasive disease caused by 13 Streptococcus pneumoniae strains (MoHCDGEC, 2016).

Information on vaccine effectiveness and safety is obtained from clinical trials in controlled settings but programme and field conditions may differ in vaccine management and administration and therefore affect vaccine effectiveness and the immunization system. Monitoring of disease trends and effectiveness of vaccines can provide evidence necessary to evaluate the effect of vaccine on disease burden (Yen, 2014).

2.3 Pneumonia and diarrhoea trend in Africa

In 2015, 5.9 million children died before reaching their fifth birthday. Of these 5.9 million deaths, pneumonia was responsible for 16% and diarrhoea was responsible for 9%, making these diseases two of the leading killers of children worldwide. Together these diseases claimed the lives of nearly 1.5 million children under the age of 5 in a single year. While pneumonia can swiftly take a young life, diarrheal diseases can compromise health more broadly by leading to a vicious cycle of malnutrition, stunted growth, cognitive impairment, and poor immune response.3 In addition, treatments for either illness can cause serious financial difficulties, contributing to the cycle of poverty. Pneumonia and diarrhoea mortality in young children continues to

be disproportionally concentrated in a few countries, year after year. Seventy-two percent of the global burdens of pneumonia and diarrhoea child deaths occur in just 15 countries, even though they are home to only 55% of the world's under-5 population.

Integrated and mutually beneficial interventions that begin at birth can protect from, prevent, and treat pneumonia and diarrhea. These include clean air and water, vaccines, adequate nutrition and supplements, and exclusive breastfeeding in the first six months of life. It is critical to promote a set of health practices. One intervention is enough—to prevent pneumonia and diarrhea, especially for children without reliable access to health care and treatment.4 Treatments that are vital to the successful management of these childhood diseases can include appropriate use of antibiotics, oxygen, oral rehydration salts (ORS) and zinc supplements amongst others.

The collective will to tackle these common childhood illnesses is embodied by the SDGs. The goal to create a world with good health and well-being is intertwined with those to reduce inequality, provide clean water and sanitation, maintain affordable and clean energy, and eliminate poverty and hunger. Providing all families—rich or poor—with access to the tools they need to keep children healthy can help keep children in school and parents at work, leading to more productive households, communities, and countries. Tackling pneumonia and diarrhoea is critical to living up to the promise of making the world a safer, healthier, and more equitable place. Integrated prevention, protection, and treatment, as outlined in the Global Action Plan for Pneumonia and Diarrhoea(GAPPD),4 is proving to be an important strategy to tackle the goals outlined in the plan. However, to reach these goals by 2025, given the current pace of uptake of GAPPD interventions, further action and innovations are needed.

2.4 Empirical literature review

PCV have shown effects to decrease under-five hospitalization due to pneumococcal infection and overall under-five mortality rates. In a study conducted in Nicaragua (Sylvia Becker-Dreps, 2014), it was found that there were lower rates of hospitalization and ambulatory visits due to pneumonia for children eligible for immunization and a significant decrease in all-cause infant mortality rate (about 33% decrease) in two years following PCV13 introduction. Nicaragua introduced PCV 13 for immunization of infants using the 3 +0 dosing schedule given at 2, 4 and 6 months of age in 2010.

At the end of the year 2012, 97% of infants in the study area (Leon department) had received all three doses of PCV13. The study collected visit diagnoses from public health facilities in Leon department between the years 2008 and 2012. Rates of pneumonia ambulatory visits, pneumonia hospitalizations and overall infant mortality during the pre-vaccine period (2008-2010) and vaccine period (2011-2012) were compared. A significant decrease in rates of hospitalization and ambulatory visits due to pneumonia and all-cause infant mortality was observed during the vaccine period as compared to pre-vaccine period.

Similar results have been observed in other studies where introduction of PCV caused decrease in infant hospitalization and mortality. In Sweden, PCV was introduced in 2007 in some county councils; later in 2009 PCV was included in the national immunization programme. The impact of PCV introduction was studied on the incidence of all-cause pneumonia hospitalization in under 2 years-old children using population-based data from the National Inpatient Registry between the years 1998 and 2012. It was found that, following PCV immunization, there was a lower risk of all-cause pneumonia hospitalization in under 2 years-old children as compared to pre-vaccine period(Berglund, 2014).Another study conducted in Gambia showed modest reduction in hospitalized cases due to pneumonia and a significant impact on severe childhood pneumonia following PCV introduction(Mackenzie, 2017).

There has been significant decline in hospitalization and deaths due to rotavirus and all-cause diarrhoea in some countries where children have access to rotavirus vaccine. Also, it is evidenced that immunization by rotavirus vaccines may protect adults and unvaccinated children through herd immunity (PATH, 2012).

South Africa introduced rotavirus vaccine in its National Immunization programme in August 2009. Rotavirus surveillance study was conducted at sentinel hospital since 2009 to measure the effect of rotavirus vaccine against hospitalization due to diarrhea. It was found that there was a 60% reduction in rotavirus diarrhoea admissions in the year 2010 compared to the year 2009 and by the year 2011 there was a 64% decrease in hospitalization due to diarrhoea as compared to the year 2009. It was also observed that, all-cause diarrhoea hospital admissions among infants declined by 34% in the year 2010 and a 31% decrease by the year 2011 compared to the year 2009 (Madhi, 2014).

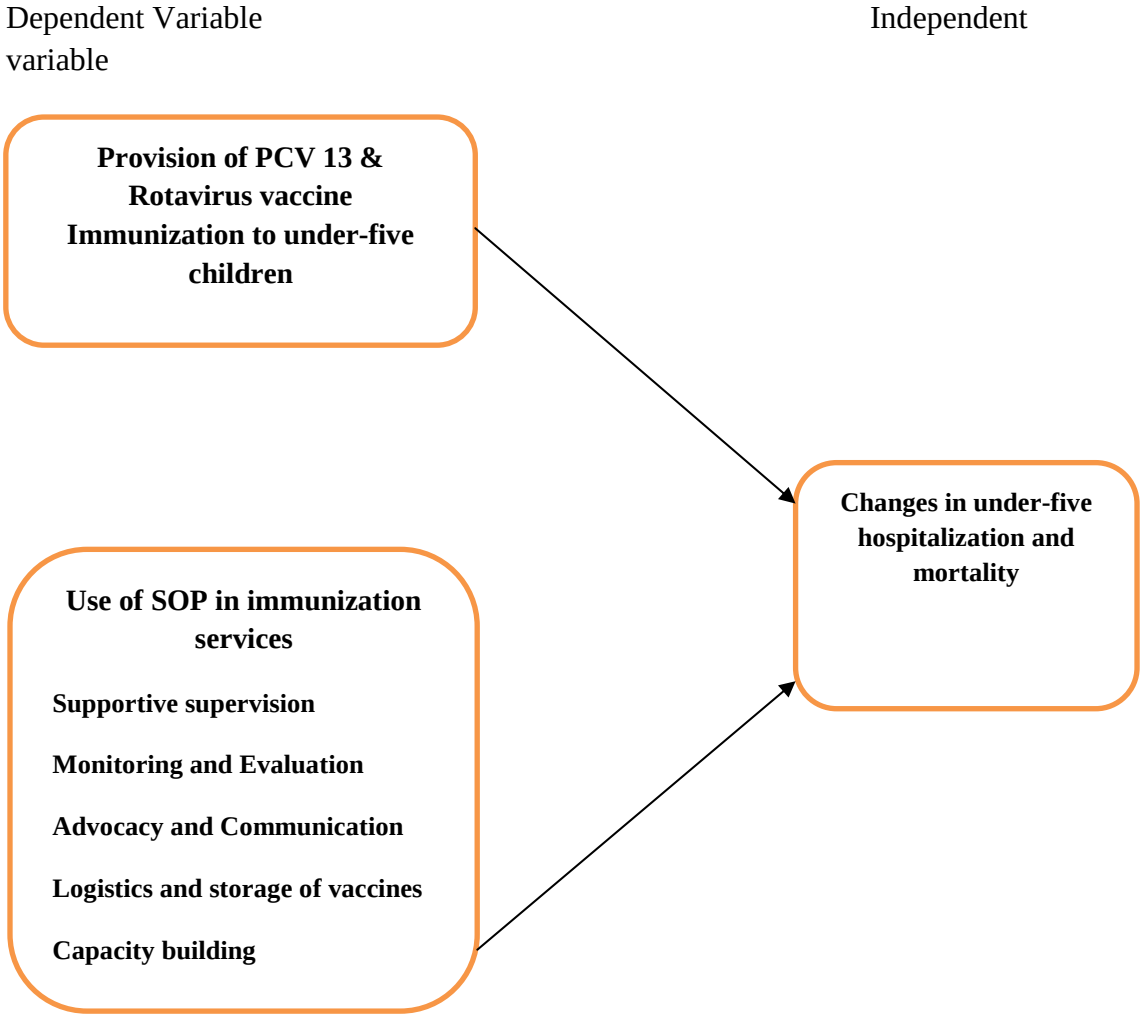
Similar results were corroborated in studies on rotavirus vaccine in Australia and other countries in Europe and the Americas, where they showed a decrease in diarrhoea related mortality to about 22-50%, there was about 17-55% decrease in diarrhoea related hospital admissions and 49-91% decrease in rotavirus specific hospital admissions among under five years. It was also found that there were potential indirect benefits for unvaccinated older children and young adults with 6-51% decrease in diarrhoea related hospital admissions and 20-92% in rotavirus-specific hospital admissions (Yen, 2014).

Since it is hard to isolate the bacteria and viruses responsible for pneumococcal and Rotavirus diseases in infected children, hence it is difficult to assess the direct effect of these vaccines on the specific diseases. This evaluation study will assess the effect of PCV 13 and Rotavirus vaccine on under-five children hospitalisation and mortality in Maswa District for the period of 2011-2016 through examining the trends of under-five hospitalisation and mortality prior and after introduction of the two vaccines into IVD programme and the implementation of IVD programme in Maswa district.

Information on vaccine effectiveness and safety is obtained from clinical trials in controlled settings but programme and field conditions may differ in vaccine management and administration and therefore affect vaccine effectiveness and the immunization system. Monitoring of disease trends and effectiveness of vaccines can provide evidence necessary to evaluate the effect of vaccine on disease burden (Yen, 2014).

Different studies have shown the effectiveness of the vaccines in reduction of different diseases morbidity and mortality in some areas around the world. In Maswa District, there was a decrease in under-five hospitalisation from the year 2011 to 2016 due to pneumonia and diarrhoea but it was not known what was the effect of Pneumococcal conjugate vaccine (PCV13) and Rotavirus vaccine on under-five hospitalisation and mortality. Hence, this study was conducted to evaluate the contribution of Pneumococcal conjugate vaccine 13 (PCV13) and Rotavirus vaccines in reduction of under-five hospitalisation and mortality in Maswa District.

Figure 2.1: Conceptual framework



Source: Researcher's construct 2018

CHAPTER THREE

EVALUATION METHODS

3.1 Introduction

This chapter gives detailed explanation on the technique that was used in this evaluation study. It describes about the study area, evaluation period, evaluation approach, evaluation design, focus of evaluation, population studied, unit of analysis, sampling techniques that was used in the evaluation study, inclusion and exclusion criteria, source of data, methods used for data collection, data management and analysis and ethical issues.

3.2 Evaluation approach

The evaluation study used Formative approach to examine the effect of PCV13 and Rotavirus vaccines in hospitalisation and mortality of under-fives in Maswa district. Formative evaluation is usually a key to achievement, clarification and replication of the outcomes of implementation programmes. It can pinpoint earlier in implementation stage whether expected results are being achieved so that strategies for implementation can be reviewed as required. It helps to tackle limitations to effective implementation hence enabling integration of research findings into practice and improvement of patient care (Cheryl &Stetler, 2006). Formative evaluation produces information that is fed back during the program implementation to help improve it (Weiss, 1998). This evaluation study allowed the evaluator to examine for implementation of continuing IVD programme through formative evaluation approach thus the evaluator was able to determine the extent to which the implementation of IVD program influenced under-five hospitalization and mortality in Maswa district.

3.3 Evaluation design

Considering Evaluation of the effect of pneumococcal conjugate vaccine 13 (PVC 13) and rotavirus vaccine on under five children hospitalisation and mortality: Case study design that investigated phenomenon and its content on the effect of pneumococcal conjugate vaccine 13 (PVC 13) and rotavirus vaccine on under five children hospitalisation and mortality. The researcher preferred to use a case study design because this research intended to address “how” and “why” questions, while taking into consideration how a phenomenon is influenced by the context within which it is situated. It also enabled the researcher to gather data from a variety of sources and reporting the data to illuminate the case. The study integrated the different components of the project in a coherent and logical way and effectively address the evaluation purpose. Case study design also helped to study the unit in detail. It helped the researcher to explore opinions and views of effect of pneumococcal conjugate vaccine 13 (PVC 13) and rotavirus vaccine on under five children hospitalisation and mortality study of Maswa district council. A case study helped intensive description and analysis of a single situation. It also helped to describe unit in detail, in context and holistically. Case Study brought deeper insight and better understanding of the problem indeed it saved the limited time and funds.

Case study also allowed the researcher to retain the holistic and meaningful characteristics of real life events. The study provided easy access of data collection at a single point in time, it is easier, reliable and worthwhile economically where resource constraints such as time, labour and funds dictated the operation and outcomes. The advantages which researcher has obtained in using case study include the use of various methods for collecting primary data including interviews, direct observation and documentary reviews, therefore the study allowed the researcher to triangulate data and findings. Case study further helped the researcher to retain the holistic and meaningful characteristics of real life events.

The study further provided easy access of data collection at a single point in time, it was easier, reliable and worthwhile economically where resource constraints such as time, labour and funds dictated the operation and outcomes.

3.4 Evaluation Period

The development of study proposal for evaluation of the effect of PCV13 and Rotavirus vaccines in under-five hospitalisation and mortality started in November 2016; the data collection was conducted between February and May 2018. Data analysis and report writing was done and completed in the month of August 2018.

3.5 Study area

The study was conducted in Maswa district; Maswa district was purposively selected because it was one of the districts implementing provision of pneumococcal conjugate vaccine 13 (PVC 13) and rotavirus vaccine to under five children. Therefore, Maswa district helped to provide a fair number of health workers which helped the researcher to collect relevant information on the effect of pneumococcal conjugate vaccine 13 (PVC 13) and rotavirus vaccine on under five children hospitalisation and mortality.

Maswa is one of five districts of Simiyu region. According to 2012 population and housing census, Maswa district has a population of 344,125 People; males are 167,402 and female are 176,723 (NBS 2012). The district has an area of 3667 square kilometers, comprises of 78 villages, 36 wards and 3 divisions. There are 46 health facilities in the district comprised of a hospital, 3 health centers and 42 dispensaries. The district is bordered to the North by Magu and Itilima districts, to the East by Meatu district, to the West by Kwimba district and to the South by Kishapu district.

3.6 Populations and sampling

3.6.1 Target population

The target population for this evaluation study was all under-five children in Maswa district and the service providers that provide immunisation services in Maswa district. The study population was all under-five children admitted in hospital in Maswa district for the period of 2011-2016 and Maswa district service providers who provide immunisation services. The EPI managers were part of the study population due their roles played in the IVD programme implementation.

3.7 Study units and sampling units

3.7.1 Study unit

The study unit was the individual health care provider that provides immunisation services, these included managers who were respondents to under-five children admitted in Maswa district health facilities for the period of 2011-2016 years.

3.7.2 Sampling unit

Sampling units were the district (Maswa district), health facilities and paediatric wards.

3.8 Sampling size and sampling procedures

3.8.1 Sampling procedures

Since the IVD programme is implemented across the whole country, the study area was purposively selected because it was one of the districts implement in provision of pneumococcal conjugate vaccine 13 (PVC 13) and rotavirus vaccine to under five children. The selection of facilities was done purposively to select one hospital and three health centres since Maswa district hospital and the three health centres are the only facilities that conduct admission of patients.

The same procedure was used to select informants by their positions in implementation of IVD programme; these are DMO, DIVO and DRCHCO. In sampling healthcare providers, convenience sampling procedure was used where any healthcare provider who provides immunisation services that agrees to participate in the evaluation study was selected to participate.

3.8.2 Sample size

Sample size is the total number of observations or subjects chosen in a research study. The sample size should be adequate in order to demonstrate the magnitude of the effect measured is scientifically as well as statistically significant (Villarta, 2014).The sample size for qualitative part was 20 consisting of participants who provided detailed and comprehensive information until saturation point was reached.

3.9 Inclusion and exclusion criteria

The inclusion criteria were under-five children admitted at a health facility in Maswa district between the years 2011-2016. Also health care provider who provides immunisation services in Maswa district that was willing to participate in the study.

The exclusion criteria were five years old and above children and those who were not admitted in the hospital were excluded. Health care providers that do not provide immunisation services and those who provide immunisation services but were not willing to participate in the study were also excluded.

3.9.1 Variables

3.9.1.1 Dependent variables

The dependent variable measured is the changes in the levels of hospitalisation and mortality of under-five children in Maswa district. The changes in levels of hospitalisation and mortality of under-five children in Maswa district were evaluated

based on the influence of health facility PCV13 and Rotavirus vaccine immunisation services provision factors.

3.9.1.2 Independent variables

The independent variables used are selected health facility immunisation service provision factors: the use of standard operating procedures when providing PCV13 and Rotavirus immunisation to under-five children, handling of PCV13 and Rotavirus vaccine in the service provision areas and immunisation coverage of the under-five children.

3.10 Types and sources of data

The data collected during this evaluation study were both quantitative and qualitative. Qualitative data were obtained using in-depth interview; quantitative data were collected using documentary reviews and observation. The use of observation method was a supplementary method to the responses attained using in-depth interviews.

3.10.1 Development of data collection tools

Data collection tools which are observation checklist and in-depth interview guide were developed prior to data collection exercise. The interview guide was translated into Swahili language for easy administration during filed work. The tools were pretested in the field before data collection work was done and there after necessary amendments to the tools were done to remove ambiguities and errors.

3.10.2 Data collection

Since the study employed mixed method, interview, observation and documentary review were used to collect data. Documentary review was used to collect data on trends of hospitalisation and mortality of under-fives in Maswa district before and after introduction of PCV13 and Rotavirus vaccines. An in depth interview and observation methods were used to collect data on the implementation process of IVD

program and PCV13 and Rotavirus vaccine provision in under-five children in Maswa district. Observation was done at the immunisation sites to examine how the immunisation process was conducted including how the vaccines were stored, the use of standard operating procedures including following the schedule for child immunization of PCV13 and Rotavirus vaccines, the route of administration of PCV 13 and rotavirus vaccines and the dose of vaccines given per child. The researcher used face to face interview to collect information from DMO, DRCHCO and DVO, this group gave insights into implementation process of IVD program and PCV13 and Rotavirus vaccine provision in under-five children in Maswa district.

3.11 Validity and reliability

3.11.1 Reliability

This evaluation study was designed to be reliable for repeated similar studies, where similar results would be produced if the researcher repeated conducting the study. Reliability of this study was ensured by pilot testing the research tools to ten respondents who are providing immunisation services in health facilities in Maswa district. The obtained responses were evaluated for similarities; any divergence observed was addressed by adjusting the question items in the research instruments. Reliability is the quality of consistency or measurement (Yin, 2013). Reliability is concerned with the quality of measurement. It is the consistency or repeatability of measures (Trochim, 2006).

3.11.2 Validity

To ensure validity of the data collection tools, they were first pilot-tested to ensure the respondents would comprehend the questions and be able to respond to questions giving the logic anticipated by the researcher. The pilot study made it possible to refine all the data collection tools.

3.12 Data management and analysis

3.12.1 Data management

Data management contains all aspects of data collection, quality control, data entry, cleaning techniques, data variables and data analysis planning. The objective was to create a reliable data base containing high quality of data.

3.12.2 Data entry and cleaning techniques

Quantitative data were obtained from DHIS2 system from the year 2012 to 2016 while for the year 2011, they were collected from the HMIS book 14. After data collected from the field, the researcher coded data from text into numerals and entered into MS excel by double entrants and later cleaned to remove errors in terms of accuracy, consistence, and responses. Each possible answer was assigned number to ease the determination of correctness of data during the whole process of data entry and cleaning. Then, analysis of the clean data was done by Statistical Package for Social Science (SPSS) according to research objectives. During data management the collected data were sorted to identify any errors available before they were analysed.

Qualitative data were also cleaned before entry into Atlas.ti for errors for analysis. Qualitative data from interview were transcribed immediately in order to keep the originality of the data collected while compared to the field notes, and then analyzed further using Atlas.ti software.

3.13 Ethical Issues

This evaluation study was conducted after the submission of the proposal to Mzumbe University and approved by the research team. After approval a letter from Mzumbe University was obtained and taken to Maswa District Medical Officer for permission to conduct the study in the area. The study considered voluntary participation of the respondents with informed consent to all participants before being involved in the

study. Confidentiality and privacy was observed throughout the study where participants were assured that the information obtained during the study will only be used for the purposes of this evaluation study and not otherwise and would only be limited to the researcher and supervisors in order to keep the information given by respondents confidential. Paper based and audio taped data were stored with care that no unauthorized persons would access them.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents findings obtained from the study. The chapter contains trend of under-five hospitalisation due to pneumonia and diarrhoea before and after introduction of PCV13 and Rotavirus vaccines, the trend of under-five mortality due to pneumonia and diarrhoea before and after introduction of PCV13 and Rotavirus vaccines, the administration of PCV 13 and Rotavirus vaccines to under-five children implementation and extent to which the introduction of PCV13 and Rotavirus vaccines influenced under-five hospitalisation and mortality in Maswa district.

4.2 The trend of under-five hospitalisation due to pneumonia and diarrhoea before and after introduction of PCV13 and Rotavirus vaccines

The assumption on this variable was; provision of PCV13 and Rotavirus vaccines to under-five children can bring changes in levels of under-five hospitalisation in Maswa district. Prior to the introduction of PCV13 and Rotavirus vaccines, in the year 2011, 18.04% of the total under-five admissions were due to diarrhoea and 17.56% of the total under-five admissions were due to pneumonia. In the following year 2012, 17.87% of the total under-five admissions were due to diarrhoea while 17.05% were caused by pneumonia. In the year 2013 when PCV13 and Rotavirus vaccines were introduced, 18.12% of all under-five admissions were due to diarrhoea while 18.79% were due to pneumonia. In the year 2014, diarrhoea contributed 18.95% of all under-five admissions while 15.83% of all under-five admissions were due to pneumonia. A dramatic decrease in under-five admission due to diarrhoea occurred in the year 2015 where only 1.45% of all under-five admissions were due to diarrhoea and 14.55% of all admissions were due to pneumonia.

In the year 2016, 1.41% of under-five admissions were due to diarrhoea and 12.43% were due to pneumonia, table 4.1 show the changes in levels of under-five hospitalisation due to diarrhoea and pneumonia for the year 2011 and 2012 when the PCV13 and Rotavirus vaccines were not yet introduced. The changes in under-five hospitalisation after introduction of PCV13 and Rotavirus vaccines can be observed where there is progressive decrease in hospitalization percentage from the year 2014 to 2016.

Table 4.1: Trend of under-five hospitalization before and after introduction of PCV13 and Rotavirus vaccines

Hospitalization before introduction of pcv-13 and rotavirus					
Year	Diarrhea	% hospitzation	Pneumonia	%	Total
2011	9968	18.04392	9701	17.56059591	19269
2012	9990	17.86864	9532	17.04943836	19122
Hospitalization after introduction of PCV13 and Rotavirus vaccines					
2013	6750	18.11594203	7002	18.79227	13752
2014	7550	18.94557226	6310	15.83398	13860
2015	549	1.445231263	5529	14.55498	6078
2016	480	1.406057766	4244	12.43189	4724

Source: DHIS & HMIS book number 7 &14, 2011-2012

4.3 The trend of under-five mortality due to pneumonia and diarrhoea before and after introduction of PCV13 and Rotavirus vaccines

In the year 2011 when PCV13 and Rotavirus vaccines were not yet introduced the under-five deaths due to diarrhoea were 17.58% of all under-five deaths while 13.74% were caused by pneumonia. In 2012, 17.93% of under-five deaths were caused by diarrhoea while pneumonia caused 15.17% of all under-five deaths. The following year, 2013 diarrhoea caused 16.76% of all under-five deaths while pneumonia contributed 13.97% of all under-five deaths. In 2014, deaths due to diarrhoea were 14.88% of all under-five deaths while 12.50% of all deaths were due to pneumonia. 13.75% of all under-five deaths in 2015 were due to diarrhoea while deaths due to pneumonia were 11.25% of all under-five deaths. In 2016, diarrhoea contributed 13.19% of all under-five deaths and pneumonia caused 11.11% of all under-five deaths.

In the years 2011 and 2012 before the PCV13 and Rotavirus vaccines were introduced, the level of mortality due to diarrhoea diseases are observed to have no significant difference, similarly, mortality levels due to pneumonia in these two years had no substantial difference as can be seen table 4.2.

Table 4.2: The trend of under-five level of mortality before and after introduction of PCV13 and Rotavirus vaccines

Mortality before introduction of pcv-13 and rotavirus					
	Diarrhea	% deaths	Pneumonia	% deaths	Total
2011	32	17.58242	25	13.73626374	57
2012	26	17.93103	22	15.17241379	48
Mortality after introduction of PCV-13 and Rotavirus vaccines					
2013	30	16.75977654	25	13.96648	55
2014	25	14.88095238	21	12.5	46
2015	22	13.75	18	11.25	40
2016	19	13.19444444	16	11.11111	35

Source: DHIS & HMIS book number 7 &14, 2011-2012

4.4 The implementation of PCV 13 and Rotavirus vaccines to under-five

The results were based on responses from the selected respondents and observation of the implementation process of the IVD programme from the studied health facilities. The findings are based on following the SOP in implementation of the IVD programme. The areas that were studied include conduction of supportive supervision to the facilities that provide immunisation services, monitoring and evaluation of the immunisation activities, advocacy and communication to the community, annual immunisation coverage, logistics and storage of the vaccines and capacity building to health providers that conduct immunization services.

Supportive Supervision

In order to ensure the immunisation services provision is done in accordance with the national guidelines supportive supervision is conducted at facility level by the RHMT quarterly and by CHMT on monthly bases.

During interviews it was found that the schedules for monthly supportive supervision for immunization activities are available but they are not always conducted as scheduled due to various challenges including lack of transport to the facilities and supervisors having busy schedules to conduct other activities as explained by the DMO;

> *''We have a routine supportive supervision as CHMT although we do face some challenges but we have a supervision schedule. Most of the time we do conduct the supervision but due to lack of transport and having other activities at the same time makes it harder for us to follow the supervision schedule and therefore there are months when supervision is not done''.*

The DRCHCO was in agreement with the DMO about the challenges that CHMT faces in conducting supportive supervision, where she showed that supervision is not conducted in some months due to lack of transport. The heath service providers reported to be visited intermittently with some months that supervision is not conducted.

> *''Sometimes they come to visit us at the facilities and observe what we do and they help by reminding us on what we are supposed to do while providing immunization and other services, but they do not visit us every month and we do not know why''.*

Through documentary review of the supervision registers and visitors books, it was found that supervision was conducted in all visited health facilities only 60% of the time between the year 2011 and 2016.

Monitoring and Evaluation

The programme uses HMIS (MTUHA) data collection tools for immunization and a mixed processing electronic system (DVDMT) for monitoring the immunization activities. Immunization data is generated at the facility level, where data compilation and analysis is done.

Immunisation data are collected and summarized using the EPI monthly summary forms and HMIS book 7. The data are sent to the district then regional level. Health providers reported to use HMIS (MTUHA) data collection tools every time they provide immunisation services be it at the facility or outreach services. The DIVO reported that before fifth of every month immunisation data are collected at the district level, something that was agreed by most of the interviewee at the facilities.

> *''We use HMIS (MTUHA) book 7 for immunisation data collection. The books are always available at the facility. At the beginning of every month, the summary of the previous month report is compiled from the HMIS book 7and sent to the district''*

It was observed in all visited facilities that HMIS books 7 for collection of immunisation data at facility level were available and in use in all facilities.

Advocacy and communication

Advocacy and communication to the community is crucial while conducting immunisation services in order to give correct information on immunisation in order to sensitize parents to take their children for the services. This also helps to avoid negative rumours and poor participation by the community members in immunisation services (MOHSW, 2011).It was reported that reported that religious leaders, influential people, political leaders and elders are used to deliver immunisation messages and sensitize the community to send their children for immunisation services as reported by the DIVO.

> *''We normally use religious leaders, political figures, elders and other influential people in the community to help send the message to the people on importance of immunisation to the children and ask them to bring their children for immunisation''*

This was also supported by another service provider who reported that, mobilisation and community sensitisation was done through leaders and other influential people, also they make announcements through media and in primary schools when information could be delivered easily to the parents.

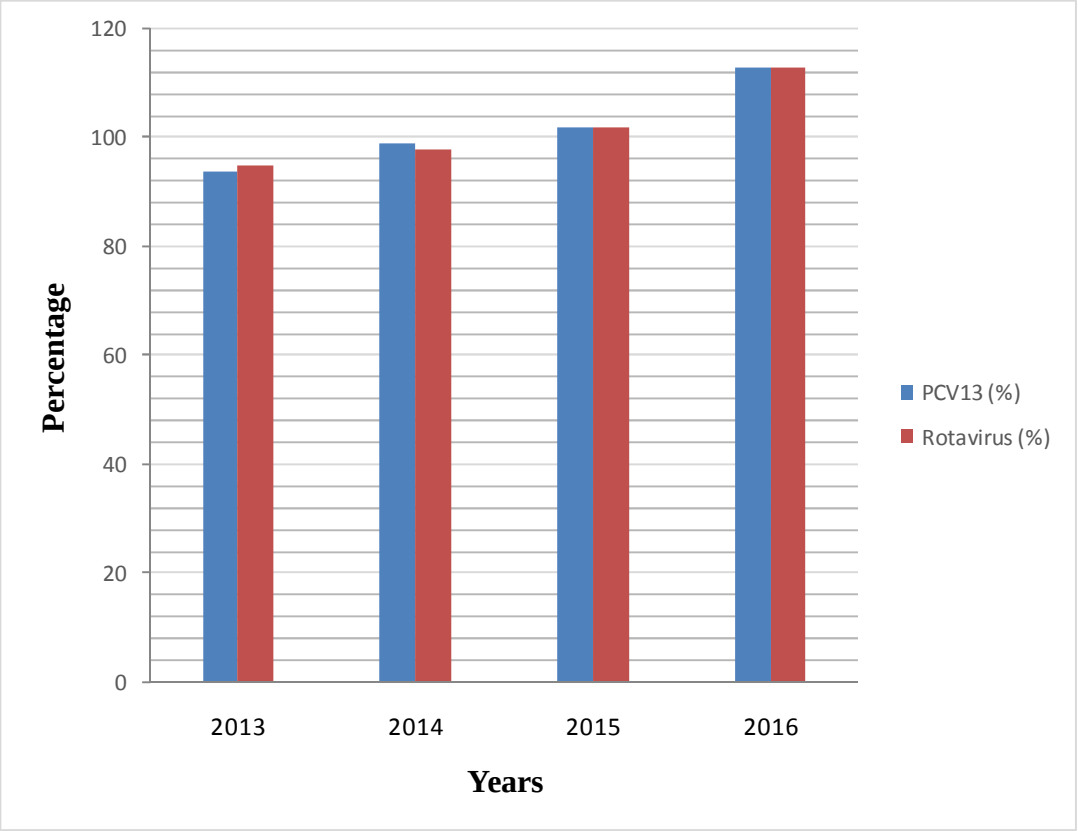
> *‘‘We normally conduct community sensitisation through different leaders and other influential people and through media and we make announcements in primary schools where pupils are asked to send immunisation message to their homes’’.*

It was observed that quarterly meetings for Primary Health Care Committee (PHC) that includes political leaders, government officials and heads of departments at the district level headed by the District commissioner were conducted. Through these meetings, various messages on immunisation messages were communicated and these leaders were urged to communicate the correct messages to the community members to enhance community participation in immunisation services. This was proven by the availability of minutes for the meetings from the DMO’s office.

Annual Immunisation Coverage

Annual immunisation coverage per district should be equal or above 90% (MOHSW, 2011). Immunisation coverage data were obtained through documentary review where in the year 2013, PCV13 had an annual coverage of 94% and Rotavirus vaccine had an annual coverage of 95%. In the year 2014, the vaccine annual coverage went higher to 99% for PCV13 and 98% for Rotavirus vaccine. In the year 2015, the PCV13 and Rotavirus vaccines both had an annual coverage of 102% while in the year 2016 the annual coverage was 113% for both vaccines. These results were summarised in Table 1 below.

Figure 4.1: Immunisation coverage for PCV13 and Rotavirus vaccines



Source: Field data

The figure above illustrates the annual coverage for the two vaccines since their introduction in 2013 - 2016; there was a gradual increase in annual immunisation coverage as can be observed.

Logistics and storage of vaccines

The vaccines and related supplies are obtained from the regional level and the council distributes them to the facilities. It was reported by 9 out of 10 respondents who were interviewed on availability of PCV13 and Rotavirus vaccines at the facility level that these vaccines are always available at facilities since their introduction in 2013, only one respondent reported to have had inadequate supply in the year 2013 due to transport problems.

> *‘‘There is no vaccine deficiency especially for PCV13 and Rotavirus vaccines are always available in our facilities and they are stored under the required temperature. In addition, during our supportive supervision at the facilities we ensure that storage of vaccines is proper and if there are any challenges we always tackle them’’ reported the DMO.*

The provider from one of the facilities providing immunisation services when asked about the procedures they use in storage and provision of immunisation services, she responded;

> *‘‘The vaccines are stored in the refrigerator which uses gas and we always ensure that the gas does not run out and the temperature is always between 2 and 8 degrees. The temperature is monitored using thermometer that is put inside the refrigerator.’’*

Through observation of immunisation services at service provision sites, it was observed that the PCV13 and Rotavirus vaccines were available and stored as per guideline. The vaccines were given following the national schedule for PCV13 and Rotavirus vaccines provision in all the observed sites.

It was observed in all the 10 facilities visited that there were available refrigerators that were used to store the vaccines.4of these facilities had refrigerators run by electricity while 6 out 10of the facilities had refrigerators run by LPG gas. All of the visited facilities were observed to have well-functioning refrigerators although 1 out 10 facilities had run out of LPG gas on that day although the refrigerator still had optimum temperature for vaccine storage.

Capacity building

Service providers and managers on immunization services should be capacitated in order to enhance skill and knowledge on immunisation services (MOHSW, 2011). The service providers were reported to receive trainings on immunisation from all facilities that provide immunisation services. The DMO explained that they ensure the facilities have well trained personnel on immunisation services.

> *‘‘We do ensure that our facilities have well trained personnel on immunisation activities and every time we have trainings our service providers are updated on vaccines and therefore every facility have a trained personnel, and every time there are new vaccines introduced trainings are conducted’’*

The District Medical Officer responses were supported by the DRCHCO on the training of service providers on immunisation services. She added that mentorship and coaching is conducted at the facility level by the CHMT during supportive supervision especially to the new employees and she commented that refresher trainings are conducted to service providers that are already trained on immunisation services although she reported that these trainings happen rarely, this causes the number of trained personnel to be inadequate.

> *‘‘Normally the new employees are trained on immunisation services provision also mentorship and coaching of service providers is conducted during supportive supervision at the facilities by the CHMT, and updates on immunisation services are given whenever the chance for refresher training occurs although it does happen so frequently’’.*

2 out of 12 service providers who were interviewed at the facility while providing immunisation services reported not to have attended any special training on immunisation services but were trained on job at the facility, while 10 out of 12 reported to attend immunisation service training. It was found from the district trainings database that every facility had at least one service provider that attended special training on provision of immunisation services. This number was reported by the service providers not to be adequate for effective immunisation services provision at the facility level especially when the facility conducts outreach services where they may need to stop immunisation service provision at the facility on the day of outreach services.

4.5 Extent at which Introduction of PCV13 and Rotavirus vaccines has influenced under-five hospitalisation and mortality in Maswa district

4.5.1. Extent at which Introduction of PCV13 and Rotavirus vaccines has influenced under-five hospitalisation

The assumption on this variable was; provision of PCV13 and Rotavirus vaccines to under-five children can bring changes in levels of under-five hospitalisation in Maswa district. Prior to the introduction of PCV13 and Rotavirus vaccines, in the year 2011, 18.04% of the total under-five admissions were due to diarrhoea and 17.56% of the total under-five admissions were due to pneumonia. In the following year 2012, 17.87% of the total under-five admissions were due to diarrhoea while 17.05% were caused by pneumonia. In the year 2013 when PCV13 and Rotavirus vaccines were introduced, 18.12% of all under-five admissions were due to diarrhoea while 18.79% were due to pneumonia. In the year 2014, diarrhoea contributed 18.95% of all under-five admissions while 15.83% of all under-five admissions were due to pneumonia. A dramatic decrease in under-five admission due to diarrhoea occurred in the year 2015 where only 1.45% of all under-five admissions were due to diarrhoea and 14.55% of all admissions were due to pneumonia. In the year 2016 1.41% of under-five admissions were due to diarrhoea and 12.43% were due to pneumonia, table 4.3 show the changes in levels of under-five hospitalisation due to diarrhoea and pneumonia for the year 2011 and 2012 when the PCV13 and Rotavirus vaccines were not yet introduced. The changes in under-five hospitalisation after introduction of PCV13 and Rotavirus vaccines can be observed where there is progressive decrease in hospitalisation percentage from the year 2014 to 2016.

Table 4.3: Status of under-five hospitalisation before and after introduction of PCV13 and Rotavirus vaccines

Hospitalization before introduction of pcv-13 and rotavirus					
Year	Diarrhea	% hospitalization	Pneumonia	%	Total
2011	9968	18.04392	9701	17.56059591	19269
2012	9990	17.86864	9532	17.04943836	19122
Hospitalization after introduction of PCV13 and Rotavirus vaccines					
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2015	549	1.445231263	5529	14.55498	6078
2016	480	1.406057766	4244	12.43189	4724

Source: DHIS & HMIS book number 7 &14, 2011-2012

4.5.2 Extent at which Introduction of PCV13 and Rotavirus vaccines has influenced to under-five mortality in Maswa district

In the year 2011 when PCV13 and Rotavirus vaccines were not yet introduced the under-five deaths due to diarrhoea were 17.58% of all under-five deaths while 13.74% were caused by pneumonia. In 2012, 17.93% of under-five deaths were caused by diarrhoea while pneumonia caused 15.17% of all under-five deaths. The following year, 2013 diarrhoea caused 16.76% of all under-five deaths while pneumonia contributed 13.97% of all under-five deaths. In 2014, deaths due to diarrhoea were 14.88% of all under-five deaths while 12.50% of all deaths were due to pneumonia. 13.75% of all under-five deaths in 2015 were due to diarrhoea while deaths due to pneumonia were 11.25% of all under-five deaths. In 2016, diarrhoea contributed 13.19% of all under-five deaths and pneumonia caused 11.11% of all under-five deaths. In the years 2011 and 2012 before the PCV13 and Rotavirus vaccines were introduced, the level of mortality due to diarrhoea diseases are observed to have no notable difference, similarly, mortality levels due to pneumonia in these two years had no substantial difference as can be seen table 4.4.

Table 4.4 The trend of under-five level of mortality before and after introduction of PCV13 and Rotavirus vaccines

Mortality before introduction of pcv-13 and rotavirus					
	Diarrhea	% deaths	Pneumonia	% deaths	Total
2011	32	17.58242	25	13.73626374	57
2012	26	17.93103	22	15.17241379	48
Mortality after introduction of PCV-13 and Rotavirus vaccines					
2013	30	16.75977654	25	13.96648	55
2014	25	14.88095238	21	12.5	46
2015	22	13.75	18	11.25	40
2016	19	13.19444444	16	11.11111	35

Source DHIS & HMIS book number 7 &14, 2011-2012

CHAPTER FIVE

DISCUSSIONS OF THE FINDINGS

5.1 Introduction

This chapter discusses the results of the evaluation study by explaining the findings from each of the evaluation objective. The findings are discussed based on the evaluation study results provided in chapter four. The main findings cover the trend of under-five hospitalisation before and after introduction of PCV13 and Rotavirus vaccines. The trend of under-five mortality before and after introduction of PCV13 and Rotavirus vaccines, the implementation of IVD programme in Maswa district. In addition, the findings explain extent to which the introduction of PCV13 and Rotavirus vaccines influenced under-five hospitalisation and mortality in Maswa district. In assessing the effect of PCV13 and Rotavirus vaccines on under-five hospitalisation and mortality, the author formed a number of evaluation questions that aligned with the evaluation objectives.

5.2 The trend of under-five hospitalisation before and after introduction of PCV13 and Rotavirus vaccines

As shown in chapter four, the study findings indicate changes in trends of under-five children hospitalisation in diarrhoea and pneumonia in Maswa district from the year 2011 to 2016. Prior to introduction of PCV13 and Rotavirus vaccines during the years 2011 to 2012,the level of under-five admission due to diarrhoea was between 17.87% and 18.04% of all under-five admissions, while pneumonia admissions were between 17.05% and 17.56% of all under-five admissions during the two years. During the year 2013 when the vaccines were introduced the under-five admissions remained at 18.12% due to diarrhoea and 18.78 were due to pneumonia which shows a minimal raise in the level of admissions due to these two diseases. In the year 2014, the under-five admission due to diarrhoea remained stable at 18.95% while

admissions due to pneumonia fell to 15.85% of all under-five admissions. There was a notable decrease during the years 2015 and 2016 of under-five level of admissions due to diarrhoea where 1.45% of all under-five admissions in 2015 were due to diarrhoea and in the year 2016 diarrhoea contributed only 1.41% to all under-five admissions. Admissions due to pneumonia also decreased, in the year 2015, 14.55% of all under-five admissions were due to pneumonia while in the year 2016 admissions due to pneumonia dropped to 12.43% of all under-five admissions. The findings are similar to the study by Sylvia Becker-Dreps(2014), it was found that there were lower rates of hospitalisation and ambulatory visits due to pneumonia for children eligible for immunisation and a significant decrease in all-cause infant mortality rate (about 33% decrease) in two years following PCV13 introduction. Nicaragua introduced PCV 13 for immunisation of infants using the 3 +0 dosing schedule given at 2, 4 and 6 months of age in 2010. At the end of the year 2012, 97% of infants in the study area (Leon department) had received all three doses of PCV13. Also in the current study the researcher found reduced levels of under-five children hospitalisation in diarrhoea and pneumonia in Maswa district.

During the two years before introduction of PCV13 and Rotavirus vaccines the levels of under-five admissions due to pneumonia and diarrhoea diseases was observed to have no changes while during the years following these vaccines introduction, progressive decrease in the level of admissions in under-fives due to pneumonia and diarrhoea diseases was noted. Similar results have been observed in other studies where introduction of PCV caused decrease in infant hospitalisation and mortality. In Sweden, PCV was introduced in 2007 in some county councils; later in 2009, PCV was included in the national immunisation programme. The impact of PCV introduction was studied on the incidence of all-cause pneumonia hospitalisation in under 2 years-old children using population-based data from the National Inpatient Registry between the years 1998 and 2012. It was found that, following PCV immunisation, there was a lower risk of all-cause pneumonia hospitalisation in under 2 years-old children as compared to pre-vaccine period (Berglund, 2014).

Another study conducted in Gambia showed modest reduction in hospitalised cases due to pneumonia and a significant impact on severe childhood pneumonia following PCV introduction (Mackenzie, 2017).

5.3 Trend of under-five mortality before and after introduction of PCV13 and Rotavirus vaccines

During the years prior to introduction of these two vaccines, deaths due to diarrhoea in under-fives were 17.58% in 2011 and 17.93% in 2012 while pneumonia caused 13.74% in 2011 and 15.17% of all under-five deaths in the year 2012 which showed no substantial difference in deaths due to pneumonia and diarrhoea in these two years. Similar results have been observed in other studies where introduction of PCV caused decrease in infant hospitalisation and mortality. In Sweden, PCV was introduced in 2007 in some county councils; later in 2009, PCV was included in the national immunisation programme. The impact of PCV introduction was studied on the incidence of all-cause pneumonia hospitalisation in under 2 years-old children using population-based data from the National Inpatient Registry between the years 1998 and 2012. It was found that, following PCV immunisation, there was a lower risk of all-cause pneumonia hospitalisation in under 2 years-old children as compared to pre-vaccine period (Berglund, 2014). Another study conducted in Gambia showed modest reduction in hospitalised cases due to pneumonia and a significant impact on severe childhood pneumonia following PCV introduction (Mackenzie, 2017).

During the year 2013, when PCV13 and Rotavirus vaccines were introduced, level of mortality in under-five due to diarrhoea decreased to 16.76% of all under-five deaths while pneumonia caused 13.97% of all under-five deaths. The level of mortality due to diarrhoea fell to 14.88% of all under-five deaths in 2014 while level of mortality due to pneumonia fell to 12.50%. The level of mortality due to diarrhoea continued to decrease in 2015 where it was 13.75% of all under-five deaths and deaths due to Pneumonia were 11.25% of all under-five deaths.

In the year 2016, the level of mortality due to diarrhoea remained at 13.19% of all under-five deaths and that due to pneumonia remained at 11.11% of all under-five deaths. Similar results were corroborated in studies on rotavirus vaccine in Australia and other countries in Europe and the Americas, where they showed a decrease in diarrhoea related mortality to about 22-50%, there was about 17-55% decrease in diarrhoea related hospital admissions and 49-91% decrease in rotavirus specific hospital admissions among under five years. It was also found that there were potential indirect benefits for unvaccinated older children and young adults with 6-51% decrease in diarrhoea related hospital admissions and 20-92% in rotavirus-specific hospital admissions (Yen, 2014).

This shows that there were changes in levels of under-five mortality due to pneumonia and diarrhoea after introduction of PCV13 and Rotavirus vaccines. The significant progressive decrease in mortality due to diarrhoea and pneumonia diseases occurred between the years 2013 and 2015, from the year 2015 to 2016 the level of mortality due to these diseases remained stable. Since it is hard to isolate the bacteria and viruses responsible for pneumococcal and Rotavirus diseases in infected children, hence it is difficult to assess the direct effect of these vaccines on the specific diseases. South Africa introduced rotavirus vaccine in its National Immunisation programme in August 2009. Rotavirus surveillance study was conducted at sentinel hospital since 2009 to measure the effect of rotavirus vaccine against hospitalisation due to diarrhea. It was found that there was a 60% reduction in rotavirus diarrhoea admissions in the year 2010 compared to the year 2009 and by the year 2011, there was a 64% decrease in hospitalisation due to diarrhoea as compared to the year 2009. It was also observed that, all-cause diarrhoea hospital admissions among infants declined by 34% in the year 2010 and a 31% decrease by the year 2011 compared to the year 2009 (Madhi, 2014).

5.4 Implementation of PCV 13 and Rotavirus vaccines administration to under-five children.

The findings showed that supportive supervision to the facilities is conducted by the CHMT in order to ensure the immunisation services are given based on national guidelines. The schedules for supervision were found that was scheduled once every month, but the findings showed that it was not done every month. For the period of 2011 to 2016, it was conducted only at 60% of the schedule. The factors that were explained to hinder supportive supervision were lack of transport and CHMT having other activities at the same time hence failed to reach the facilities for supportive supervision.

Monitoring and Evaluation of immunisation activities was done using the tools for data collection and data storage that included HMIS (MTUHA) Book no 7, tally sheets, EPI monthly summary books and the electronic system known as District Vaccination Data Management Tool (DVDMT).

Immunisation data was found to be generated at the facility level, where data compilation and analysis was done. Immunization data were collected and summarized using the EPI monthly summary forms and HMIS book 7. The data were sent to the district then regional level.

Advocacy and communication to the community was done through religious leaders, influential people, political leaders and elders to deliver messages on immunisation in order to increase community participation in immunisation services. Mass Media were reported to be used for advocacy and communication. The Primary Health Care Committee was also used for advocacy and communication immunisation services information to the community.

Immunisation coverage was found to be increasing since the introduction of PCV13 and Rotavirus vaccines. The coverage rose from 94% for PCV13 in 2013 and 95% for Rotavirus vaccine to 113% in the year 2016 for both PCV13 and Rotavirus vaccine.

This implied that many under-five children were reached which led to overpass the target for the years 2015 and 2016, which shows there was good community participation in immunisation services.

In logistics and vaccines storage area, it was found that PCV13 and Rotavirus vaccine were available in all facilities and there were stored as per national guidelines. Minimal challenges were reported where only one facility had shortage of PCV13 and Rotavirus vaccines in during the year 2013 and 1 refrigerator was found to run out of LPG gas.

In capacity building area for service providers on immunisation services provision, it was found that every facility had at least 1 trained personnel on immunisation services provision. Mentoring and coaching was done at the facility level by the CHMT. Trainings to new employees including refresher trainings to the trained personnel were done but still the number of trained providers was found not too adequate for effective immunisation service provision.

5.5 Evaluation dissemination plan

The findings from this evaluation study are to be disseminated to Maswa district CHMT through CHMT meetings and a copy of the document is to be handed to DMO office for further reference. The dissemination to MOHCDGEC, donors and political leaders is to be done via email. The dissemination to the community members, influential people in community and service providers is also to be done through meetings.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND IMPLICATIONS

6.1 Introduction

This chapter explains in summary on the problem statement and evaluation objectives. It further summarises about the evaluation study findings. The summary is followed by conclusions, policy implications, limitations and evaluation recommendations.

6.2 Summary

Diarrhoea and pneumonia disease has been contributing highly in under-five hospitalisation and mortality in Maswa district. In the year 2011 alone there were 9,968 admissions due to diarrhoea and 9,701 admissions due to pneumonia (HMIS Book 7). In the year 2016 there were 480 admissions due to diarrhoea disease and 5,244 admissions due to pneumonia (DHIS2). PCV 13 and Rotavirus vaccine were introduced into IVD programme in January 2013 with the aim of reduction of under-five children morbidity and mortality due to Pneumococcal disease and Rotavirus diarrhoea disease. PCV 13 and Rotavirus vaccine have been provided to under-five children in Maswa district since January 2013 in all health facilities and through mobile and outreach services. (Maswa DC, 2016 IVD report).

This evaluation was intended to assess the implementation of IVD programme in Maswa district with the introduction of PCV13 and Rotavirus vaccines. Specifically, this evaluation study focused at explaining the effect of these vaccines on Hospitalisation and mortality in under-fives. The level of under-five hospitalisation before and after introduction of PCV13 and Rotavirus vaccines examined and explained clearly in chapters 4 and 5. It was found that, the level of under-five hospitalisation due to diarrhoea and pneumonia before introduction of PCV13 and

Rotavirus vaccines had no substantial change but there was a notable decrease in the level of admissions of under-fives due to these diseases after introduction of PCV13 and Rotavirus vaccines. The level of under-five mortality before and after introduction of PCV13 and Rotavirus vaccines was also examined and elaborated in chapters 4 and 5, where the level of under-five mortality due to diarrhoea and pneumonia disease showed a substantial decrease in the years after introduction of PCV13 and Rotavirus vaccines. Implementation of IVD programme in Maswa district was assessed at length using interviews and observation at the facilities and was found that the IVD programme was implemented following national guidelines although some challenges were identified during the implementation process as explained in chapters 4 and 5. The extent to which implementation of IVD programme influenced under-five hospitalization and mortality in Maswa district.

6.3 Conclusion

The evaluation of the effect of PCV13 and Rotavirus vaccine on under-five children hospitalisation and mortality in Maswa District for the period of 2011 to 2016 revealed that the IVD programme is implemented following the national guideline despite some challenges that had minimal effect on proper implementation of the programme. The introduction of PCV13 and rotavirus vaccines was found to have an effect of decreasing under-five hospitalisation and mortality due to pneumonia and diarrhoea diseases in Maswa district hospital.

6.4 Policy implications

The findings from this evaluation study and their related recommendations will be used for planning, decision-making and resource allocation from the facility to the higher levels. It also has implication to health care workers, parents, the whole community and the field of monitoring and evaluations and other stakeholders in the field of prevention and treatment of vaccine preventable diseases.

6.5 Limitations

Some limitations of this study was difficulty in finding data on mortality and hospitalisation of under-five children in Maswa district before the year 2012 since there was no electronic system of data storage and the HMIS books were scattered in different areas in health facilities. There was an also budget and time constraint hence the study was only conducted in Maswa District. Since survey would involve a larger population in Tanzania, hence assessment on effect of PCV13 and Rotavirus would be done at national level thus large scale information on the effect of these vaccines would be obtained.

6.6 Evaluation recommendations

The author recommends the following for better implementation of IVD programme in Maswa district: More resources should be allocated especially in areas of transport for supportive supervision of immunisation activities and transport of LPG gas to the facilities. More trainings should be conducted to service providers to enable them to conduct immunisation services effectively.

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APPENDICES

Appendix 1: interview guide

Interview Guide FOR DMO, DRCHCO and DIVO

Hello, how are you?

Thank you for agreeing to talk to me today, my name is Anthony Nathaniel Galishi, A Msc Health Monitoring and Evaluation student from Mzumbe University. I am conducting an evaluation of the effects of two vaccines (PCV13 and Rota) on under five children hospitalisation and mortality in Maswa district. Any information that will be acquired in the evaluation process will only be used for the purpose of the study and not otherwise. I assure you that, no information acquired will be disclosed to unintended persons. Feel free to ask questions during our discussion for clarification.

Can we start now?

1. What is availability of vaccines in Maswa district?
2. How do you ensure the children are immunized as per national guideline?
3. Do you conduct supportive supervision to the facilities that provide immunization services?
   - Probe; How often?
   - any challenges in conducting supportive supervision?
4. How are the vaccines stored in facilities in your district?
5. Is there adequate and functional cold chain system for vaccine storage in your district?
6. Was there a stock out of PCV and Rotavirus vaccines at any time between 2013 -2016?
7. Is there adequate HRH for immunization services provision?
8. Do you conduct capacity building to the providers on immunization services provision? If yes, how often?
9. How do you conduct advocacy and sensitization to the community in maswa district?
10. How is monitoring and evaluation of immunization activities done in your district?

Thank you so much for your time, wish you a good day.

Appendix II: Interview guide (Swahili version)

Interview Guide for DMO, DRCHCO and DIVO

Habari yako?

Asante kwa kukubali kuzungumza na mimi siku ya leo, Naitwa Anthony Nathaniel Galishi, mwanafunzi wa shahada ya uzamili ya sayansi katika ufuatiliaji na tathmini ya masuala ya afya kutoka chuo kikuu Mzumbe. Ninafanya utafiti juu ya athari ya chanjo mbili za PCV na Rota kwa vifo na kulazwa kwa watoto chini ya miaka mitano katika wilaya ya Maswa. Taarifa zozote zitakazopatikana katika utafiti huu zitatumika tu katika malengo ya utafiti na si vinginevyo. Nakuhakikishia kuwa taarifa zitakazopatikana hazitatolewa kwa watu wasio walengwa. Jisikie huru kuuliza maswali wakati wa mazungumzo yetu ili kupata ufafanuzi.

Tunaweza kuanza sasa?

1. Unaweza kuelezea kuhusu upatikanaji wa chanjo katika wilaya ya Maswa?
2. Je, mnahakikishaje watoto wanapatiwa chanjo kwa kufuata muongozo wa kitaifa?
3. Je, mnafanya usimamizi shirikishi katika vituo vinavyotoa huduma ya chanjo?
   - Mara ngapi?
   - Je,kuna changamoto zozote mnazopata katika kufanya usimamizi shirikishi?
4. Chanjo zinahifadhiwa namna gani katika vituo vya kutolea huduma katika wilaya yenu?
5. Je, kuna vifaa vya kutosha vinavyofanya kazi vya mnyororo baridi kwa ajili ya kuhifadhia chanjo katika wilaya yenu?
6. Kulikuwa na ukosefu wa chanjo ya PCV na Rota wakati wowote kati ya mwaka 2013 na 2016?
7. Je, kuna watumishi wa kutosha kwa ajili wa utoaji wa huduma ya chanjo katika wilaya yako?
8. Je, mnawapatia mafunzo watumishi juu ya utoaji huduma za chanjo?
   -mara ngapi?
9. Mnafanyaje uhamasishaji juu ya chanjo katika jamii ya wilaya ya Maswa?
10. Je, tathmini na ufuatiliaji wa huduma za chanjo zinafanyikaje katika wilaya yenu?

Asante sana kwa kutoa muda wako, nakutakia siku njema.

Appendix III

Interview guide for Service providers

Hello,

how are you?

Thank you for agreeing to talk to me today, my name is Anthony Nathaniel Galishi, A Msc Health Monitoring and Evaluation student from Mzumbe University. I am conducting an evaluation of the effects of two vaccines (PCV13 and Rota) on under five children hospitalization and mortality in Maswa district hospital. Any information that will be acquired in the evaluation process will only be used for the purpose of the study and not otherwise. I assure you that, no information acquired will be disclosed to unintended persons. Feel free to ask questions during our discussion for clarification.

Can we start now?

1. Can you explain about availability of vaccines at your facility, especially PCV13 and Rotavirus?
2. Was there a stock out of PCV and Rotavirus vaccines at any time between 2013 -2016?
3. How are the vaccines stored at your facility?
4. Is there adequate HRH for immunization services provision at your facility?
5. How do you conduct advocacy and sensitization to the community?
6. Is supportive supervision conducted at your facility?
   - Probe; How often?
7. Is capacity building conducted to the providers on immunization services provision? If yes, how often?
8. How is monitoring and evaluation of immunization activities done at your facility?

Thank you so much for your time, wish you a good day.

Appendix IV

Interview guide for Service providers (Swahili Version)

Habari yako?

Asante kwa kukubali kuzungumza na mimi siku ya leo, Naitwa Anthony Nathaniel Galishi, mwanafunzi wa shahada ya uzamili ya sayansi katika ufuatiliaji na tathmini ya masuala ya afya kutoka chuo kikuu Mzumbe. Ninafanya utafiti juu ya athari ya chanjo mbili za PCV na Rotavirus kwa vifo na kulazwa kwa watoto chini ya miaka mitano katika wilaya ya Maswa. Taarifa zozote zitakazopatikana katika utafiti huu zitatumika tu katika malengo ya utafiti na si vinginevyo. Nakuhakikishia kuwa taarifa zitakazopatikana hazitatolewa kwa watu wasio walengwa. Jisikie huru kuuliza maswali wakati wa mazungumzo yetu ili kupata ufafanuzi.

Tunaweza kuanza sasa?

1. Unaweza kuelezea kuhusu upatikanaji wa chanjo katika kituo chenu hasa chanjo ya PCV na rotavirus?
2. Kulikuwa na ukosefu wa chanjo ya PCV na Rota wakati wowote kati ya mwaka 2013 na 2016?
3. Chanjo zinahifadhiwa namna gani katika kituo chenu?
4. Je, kuna watumishi wa kutosha kwa ajili wa utoaji wa huduma ya chanjo katika kituo chenu?
5. Je, mnahamasisha kwa namna gani juu ya chanjo katika jamii?
6. Je, usimamizi shirikishi hufanyika katika kituo chenu?
   -mara ngapi?
7. Je, watumishi hupewa mafunzo juu ya utoaji huduma za chanjo?kama ni ndio mara ngapi?
8. Je, tathmini na ufuatiliaji wa huduma za chanjo zinafanyikaje katika kituo chenu?

Asante sana kwa kutoa muda wako, nakutakia siku njema.

Appendix IV

Interview guide for Service providers (Swahili Version)

Habari yako?

Asante kwa kukubali kuzungumza na mimi siku ya leo, Naitwa Anthony Nathaniel Galishi, mwanafunzi wa shahada ya uzamili ya sayansi katika ufuatiliaji na tathmini ya masuala ya afya kutoka chuo kikuu Mzumbe. Ninafanya utafiti juu ya athari ya chanjo mbili za PCV na Rotavirus kwa vifo na kulazwa kwa watoto chini ya miaka mitano katika wilaya ya Maswa. Taarifa zozote zitakazopatikana katika utafiti huu zitatumika tu katika malengo ya utafiti na si vinginevyo. Nakuhakikishia kuwa taarifa zitakazopatikana hazitatolewa kwa watu wasio walengwa. Jisikie huru kuuliza maswali wakati wa mazungumzo yetu ili kupata ufafanuzi.

Tunaweza kuanza sasa?

1. Unaweza kuelezea kuhusu upatikanaji wa chanjo katika kituo chenu hasa chanjo ya PCV na rotavirus?
2. Kulikuwa na ukosefu wa chanjo ya PCV na Rota wakati wowote kati ya mwaka 2013 na 2016?
3. Chanjo zinahifadhiwa namna gani katika kituo chenu?
4. Je, kuna watumishi wa kutosha kwa ajili wa utoaji wa huduma ya chanjo katika kituo chenu?
5. Je, mnahamasisha kwa namna gani juu ya chanjo katika jamii?
6. Je, usimamizi shirikishi hufanyika katika kituo chenu?
   -mara ngapi?
7. Je, watumishi hupewa mafunzo juu ya utoaji huduma za chanjo?kama ni ndio mara ngapi?
8. Je, tathmini na ufuatiliaji wa huduma za chanjo zinafanyikaje katika kituo chenu?

Asante sana kwa kutoa muda wako, nakutakia siku njema.

Appendix V

Facility Observation Checklist

	Remarks
Availability of cold chain equipment, functional?	
Availability of vaccines	
Availability of M&E Tools	
Availability of SS register/ how often conducted (2011-2016)	
Availability of training database/how many providers trained per facility	
Any other observations	

Table 6.7. Evaluation study Work plan

NO	ACTIVITY	PERIOD OF IMPLEMENTATION				RESPONSIBLE PERSON
		1st semester	2nd semester	3rd semester	4th semester	
1.	Preliminary evaluation proposal development					Student
2.	Finalization of evaluation proposal development					Student/supervisor
3.	Submission of draft proposal for approval					Student/supervisor/ faculty
4.	Seeking consent for evaluation conduction from intended council					Student
5.	Beginning Field project/data collection					Student
6.	Data analysis					Student/supervisor
7	First draft of evaluation report submission					Student/supervisor
8.	Second draft of evaluation report submission					Student/supervisor
9.	Final submission of evaluation report					Student/supervisor/ faculty

Source: Researcher's Construct

Table 7. Evaluation study budget

No.	Activity	Item description	Unit cost (Tshs.)	Quantity	Days	Total cost (Tshs.)
1.	Data collection	stationaries	400,000/-	1	60	400,000/-
2.	Submission of the first draft of report	Fare subsistence	50,000/- 80,000/-	1 1	2 14	100,000/- 1,120,000/-
3.	Submission of second draft of report	Fare subsistence	50,000/- 80,000/-	1 1	2 14	100,000/- 1,120,000/-
4.	Submission of the final report and presentation report to the panel	Fare Subsistence	50,000/- 80,000/-	1 1	2 14	100,000/- 1,120,000/-
Total cost						**4,060,000/-**

Source: Researcher's construct

Trends of admissions in Maswa district

Diagnosis	2011 Total under-five admissions	2012 Total under-five admissions	2013 Total under-five admissions	2014 Total under-five admissions	2015 Total under-five admissions	2016 Total under-five admissions
Acute Diarrhoea (<14 Days)	8756	8871	5927	7021	533	418
Acute Ear Infection	708	578	333	377	375	323
Acute Flaccid Paralysis	11	7	5	12	4	0
Animal Bite (Suspected Rabies)	2	6	0	0	29	5
Animal Bites(No Suspected Rabies)	5	8	2	0	3	9
Anthrax	1	0	0	0	0	0
Birth Asphyxia	45	23	10	31	51	17
Bronchial Asthma	210	198	149	257	310	148
Burn	219	120	73	229	235	146
Cardiac Failure	2	1	3	1	12	1
Cerebral Palsy	1	0	0	0	0	0
Chronic Ear Infection	312	281	121	157	216	156
Congenital Disorders	7	14	2	19	2	25
Diabetes Mellitus	2	6	3	1	34	10
DiarrhoeaChronic (>= 14 Days)	1212	1119	823	529	16	62
Dysentery	406	387	447	470	302	245
Epilepsy	23	42	31	30	56	29
Eye Diseases, Non-Infectious	289	327	276	381	499	324
Eye Infection	600	829	957	910	889	778
Eye Infections	0	0	0	0	1	4
Fractures	78	67	49	76	87	42
Gastrointestinal Diseases, Other Non-Infectious	89	95	0	77	1	9
Infant of Diabetic Mother	0	1	0	0	0	0
Kwashiorkor	291	279	161	302	182	120
Leprosy	3	0	35	1	0	2
Low Birth Weight And Prematurity Complication	91	85	30	58	88	37
Malaria Severe BS +Ve	1980	2010	904	171	1794	1318
Malaria Severe Clinical	290	218	193	67	10	0

Malaria Severe mRDT +ve	0	0	453	1027	0	0
Marasmic Kwashiorkor	299	186	131	292	246	146
Marasmus	412	298	103	390	212	135
Meningitis	11	8	1	1	0	0
Mild/Moderate Anaemia	2391	2531	1148	1677	2605	1859
Moderate Malnutrition	179	156	75	267	185	407
Neonatal Septicaemia, Infections	23	16	8	11	21	13
Neonatal Tetanus	1	0	0	0	0	1
Neoplasms/Cancer	3	5	1	2	49	11
Nephrotic Syndrome	1	0	0	1	0	0
Neuroses	0	0	0	0	5	0
Non-Infectious Ear Diseases	1	0	0	0	0	1
Non-Infectious Liver Diseases	0	0	0	4	28	1
Nutritional Disorders, Other	23	12	29	44	10	19
Osteomyelitis	45	27	40	34	43	8
Other Cardiovascular Diseases	52	34	14	36	47	61
Other Diagnosis	2802	2910	1213	1591	1696	1610
Peptic Ulcers	0	0	2	0	0	1
Plague	0	0	0	10	0	0
Pneumonia, Non-Severe	6103	6231	5903	3707	4867	3752
Pneumonia, Severe	3198	2901	1099	1603	1662	1492
Poisoning	11	14	10	19	19	16
Psychoses	0	0	1	0	0	1
Rabies	12	7	11	18	20	3
Relapsing Fever (Louse Borne Typhus)	0	0	0	6	0	0
Renal Failure	1	0	0	0	0	2
Respiratory System disorders other	17	12	7	13	0	0
Rheumatic Fever	0	0	0	8	0	0
Rheumatoid And Joint Diseases	26	19	11	46	69	12
Road Traffic Accidents	96	76	44	67	131	61
STI Genital Discharge Syndrome (GDS)	0	0	3	9	6	65
STI Genital Ulcer Diseases (GUD)	0	0	3	12	23	20

Schistosomiasis	78	81	151	79	65	110
Severe Anaemia	1904	2301	790	1937	2030	1050
Sexually Transmitted Infection, Other	1	0	0	0	1	0
Sickle Cell Disease	67	69	51	136	69	47
Skin Diseases, Non-Infectious	532	487	396	539	1008	377
Skin Infections	2	5	1	0	1	3
Soil Transmitted Helminths	4	6	0	5	4	0
Symptomatic HIV Infection	172	156	122	124	26	34
Thyroid Diseases	0	0	25	0	5	1
Tuberculosis	72	68	55	64	60	36
Typhoid	67	56	97	17	5	3
Upper Respiratory Infections	14023	13832	7164	6251	7378	11349
Urinary Tract Infections	6981	7832	4564	5627	7662	7203
Total admissions (all diagnoses)	55243	55908	34260	36851	35987	34138

Source: DHS2