

**TIMELY UPTAKE OF THE SECOND DOSE OF MEASLES VACCINE
AND ASSOCIATED FACTORS AMONG ELIGIBLE CHILDREN IN
SHINYANGA DISTRICT, TANZANIA**

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**MSc in (Tropical Disease Control) Dissertation
Muhimbili University of Health and Allied Sciences
October, 2021**

**Muhimbili University of Health and Allied Sciences
Department of Parasitology and Medical Entomology**



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By

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for examination of Dissertation entitled *Timely Uptake of the Second Dose of Measles Vaccine and Associated Factors among Eligible Children in Shinyanga district, Tanzania*, in fulfillment of the requirements for the degree of Master of Science (Tropical Disease Control) of Muhimbili University of Health and Allied Sciences.

Prof. Rose Mpembeni
(Supervisor)

Date: _____

Prof Donath Tarimo
(Supervisor)

Date: _____

DECLARATION AND COPYRIGHT

I, **Huda Jaffar Omary**, 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

Signature..... Date.....

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DEDICATION

To my parents for being there in every step of the way.

To my brother Sunday Kisoma who believed in my strength and trusted in the richness of learning.

To my husband for his countless support, love and understanding.

To my two beautiful daughters Intysar and Warda, may this work be their inspiration to attain the greatest milestones in their lives.

- This is for you; we did this together!

ABSTRACT

Background: Timely uptake of vaccine is a key determinant to prevent unnecessary childhood mortality from vaccine-preventable diseases. Despite the substantial efforts that have done in our country to improve vaccination coverage, the effort towards timeliness of vaccination remains a big challenge, especially in second dose measles vaccine. For that case, children continue to be susceptible to measles, increased risk of outbreak and failure to eliminate measles within the community. There is also a limited evidence on timely uptake of second dose measles vaccine within our country. Therefore, this study aimed to determine the timeliness of second dose measles vaccine and its associated factors among children in eligible children in Shinyanga district.

Objectives: To determine the timely uptake of second dose measles vaccine and its associated factors among eligible children in Shinyanga district, Tanzania.

Materials and Methods: A community based quantitative cross-sectional study was conducted in six wards of Shinyanga District among 570 children aged 20-24 months at the time of data collection. Three stage Simple random sampling was used to select wards, households and to recruit participants. Timely uptake of measles vaccine was assessed by checking the vaccination date on immunization card and it was categorized as timely uptake or untimely uptake of second dose measles vaccine. A child was considered vaccinated on time (timely vaccinated) if a child received the vaccination within 1 month of the recommended age of vaccination (18th months). Caregivers were interviewed using questionnaire to obtain information of the child, caregiver and the determinants of timely uptake of MCV2. The data were entered, cleaned and analyzed using SPSS version 23. Proportions and Prevalence ratios were used to estimate the timely uptake and the association of timely uptake. Modified Poisson regression were used to identify factors independently associate with the timely uptake of MCV2.

Results: Out of 570 children assessed, 400 (70.2%) were vaccinated on time with MCV2. Significant predictors of timely uptake of MCV2 were Child birth order (aPR 1.60; CI 1.22 – 2.13; $P < 0.001$), Delivering on the way to the hospital (aPR 1.12; CI 1.00 – 1.41; $P = 0.049$) Caregivers having high education (aPR 1.15; CI 1.01 – 1.31; $P = 0.034$), being unemployed (aPR 1.23; CI 1.05 – 1.43; $P = 0.009$), head of the household sex (aPR 1.15;

95% CI 1.02 – 1.31 P=0.025) and caregivers with high level of knowledge (aPR 1.34; CI 1.18 – 1.52; P< 0.001).

Conclusion and Recommendations: Timely uptake of MCV2 in Shinyanga district is below the WHO recommended timeliness. Childhood factors and maternal factors were significantly associated with the delay uptake of MCV2. The proportion of those receive MCV2 on time is not sufficient to prevent outbreaks, to reduce the risk of measles transmission and to attain the herd immunity. Hence, there is a need to take measures to improve timely uptake of MCV2 urgently among the susceptible children. Additionally, timeliness should be incorporated into the official routine vaccination statistics which will be helpful in appraising the reported coverage of measles vaccination in Tanzania.

ABBREVIATIONS

aPR	Adjusted Prevalence Ratio
cPR	Crude Prevalence Ratio
MCV	Measles Containing Vaccine
MCV1	First Dose Measles Containing Vaccine
MCV2	Second Dose Measles Containing Vaccine
PI	Principal Investigator
SPHSS	School of Public Health and Social Sciences
SPSS	Statistical Package for Social Sciences
TDHS	Tanzania Demographic and Health Survey
UNICEF	United Nations Children's Fund
VPDs	Vaccine Preventable Diseases
WHO	World Health Organization

DEFINITION OF TERMS

Immunization

It the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine

Timely vaccination/ vaccination timeliness

Proportion of children who received measles vaccination within the appropriate time, according to recommended standards it is within one month of the appropriate vaccination month (18 months)

Uptake of vaccination

Proportion of children who were vaccinated by a second dose of measles vaccine and who have the vaccination card documented by a specific date which the uptake the vaccine to facilitate calculation of the timely uptake of vaccination.

Caretaker: A caretaker is defined as either a mother or anybody who is considered to be attending the needs of a child.

TABLE OF CONTENTS

CERTIFICATION.....	i
DECLARATION AND COPYRIGHT	ii
ACKNOWLEDGEMENT.....	iii
DEDICATION	iv
ABSTRACT	v
ABBREVIATIONS.....	vii
DEFINITION OF TERMS.....	viii
LIST OF TABLES	xii
LIST OF FIGURES.....	xiii
CHAPTER ONE.....	1
1.0 INTRODUCTION	1
1.1 BACKGROUND	1
1.1.1 Introduction and Implementation strategies for Measles Control in Tanzania	2
1.2 Problem Statement.....	4
1.3 Conceptual Framework.....	5
1.4 Rationale	6
1.5 Research Questions.....	6
1.5.1 Broad Research Question.....	6
1.5.2 Specific Research Questions.....	6
1.6 Objectives	7
1.6.1 Broad Objectives.....	7
1.6.2 Specific Objectives	7
CHAPTER TWO.....	8
2.0 LITERATURE REVIEW	8
2.1 Public Health Importance of Measles Vaccine.....	8
2.2 Timeliness of the Second Round Measles Uptake	8
2.3 Factors associated with the timely uptake of MCV2.....	9
CHAPTER THREE.....	12
3.0 METHODOLOGY	12
3.1 Study area	12
3.2 Study design.....	12

3.3 Study population.....	13
3.4 Sample size calculation.....	13
3.5 Sampling procedures	13
3.6 Eligibility Criteria.....	16
3.6.1 Inclusion Criteria.....	16
3.6.2 Exclusion criteria	16
3.7 Study Variable	16
3.7.1 Dependent variable	16
3.7.2 Independent variables.....	16
3.8 Data Collection Method.....	16
3.8.1 Data Collection tool	16
3.8.2 Training and recruitment of research assistants	17
3.8.3 Pre testing of Questionnaire	17
3.9 Data Management and Analysis	17
3.9.1 Data Management	17
3.9.2 Data Analysis	17
3.10 Ethical consideration	18
CHAPTER FOUR.....	19
4.0 RESULTS.....	19
4.1 Introduction.....	19
4.2 Socio demographic characteristics of the children and the caregiver.....	19
4.2. Timely Uptake of Second dose Measles Vaccine.....	22
4.3 Association between Caregivers Knowledge and timely uptake of MCV2	22
4.4: Factors associated with the timely uptake of MCV2 among eligible Children in Shinyanga Urban District	23
CHAPTER FIVE.....	26
5.0 DISCUSSION	26
5.1 Introduction.....	26
5.2 Timely Uptake of Second Dose Measles Vaccine Among Eligible Children in Shinyanga District	26
5.3 Caregivers Knowledge on the Second dose Measles Vaccine	27
5.4 Factors and their association with timely uptake of second dose of measles vaccine	27

5.5 Strength and Limitation of the study	29
CHAPTER SIX	31
6.0 CONCLUSION AND RECOMMENDATIONS	31
6.1 Conclusion	31
6.2 Recommendations.....	31
REFERENCES	32
APPENDICES	35
Appendix 1: Questionnaire – English version	35
Appendix II: Questionnaire – Swahili Version	39
Appendix III: INFORMED CONSENT FORM (English Version)	43
Appendix IV: INFORMED CONSENT FORM (Swahili Version)	47

LIST OF TABLES

Table 1: Socio-demographic characteristics of the child20

Table 2: Socio-demographic characteristics of the Caregiver.....21

Table 3: Bivariate and multivariate Modified Poisson regression of predictors of timely Uptake of MCV2 **Error! Bookmark not defined.**

LIST OF FIGURES

Figure 1: Sampling strategy flow chart **Error! Bookmark not defined.**
Figure 2: Association between caregivers knowledge and timely uptake of MCV2 23

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND

Vaccination is one of the crucial component in the world towards significant reduction in childhood mortality and it is a core strategy to avert more than 1.2 million child deaths each year (Bangura *et al.*, 2020). Prior to the availability of measles vaccine, measles infected over 90% of children before they reached 15 years of age. It was also the cause of major epidemics approximately every 2–3 years and more than 15000 cases of blindness annually worldwide (Hayman, 2019). The introduction of measles vaccines began in 1960 and led to substantial reductions in measles incidence, morbidity, and mortality in both developed and developing countries(WHO, 2020).

Measles is a highly contagious disease for humans caused by a virus that belongs to the family paramyxovirus in the genus Morbillivirus. It is characterized by cough, coryza, and conjunctivitis, followed by a maculopapular rash (Cutts *et al.*, 2013). The most common complication of measles includes diarrhea, Pneumonia, encephalitis and death. Measles during pregnancy increases the risk of premature labor, miscarriage, and low-birth-weight infants (Xerri *et al.*, 2020). Individuals at risk for measles include children too young to be vaccinated, those who have not been vaccinated, those who have not received a second dose of measles vaccine (McKee, Ferrari and Shea, 2018).

Measles vaccine is a live attenuated vaccine which is not administered in the first months of life, due to the persistence of circulating maternal antibodies in the young infant. Passively acquired maternal antibodies bind to epitopes on the vaccine and block adequate activation of the immune system; therefore, this vaccine must be given several times after the maternal antibody has been cleared from an infant's circulation in order to achieve adequate immunity. (Public Health Agency of Canada, 2011).

The optimal age for vaccination (first and second doses) varies depending on the local epidemiological situation. In developing countries where measles is endemic, the recommended age of measles vaccination has been estimated at 9 months (Carazo *et al.*,

2020). At this age measles maternal antibody has usually fallen to low level and vaccination of infants may give a seroconversion rate of 80% (Counahan, 2009). In order to control and eliminate measles children must be given the second dose of measles vaccine so as to increase the immunity to up to 95% (Cutts et al., 2013).

Because measles is of high risk of contagion, high levels of immunity are needed to interrupt measles transmission. Its control requires more than 95% coverage of two doses of measles containing vaccine administered either in routine immunization or supplemental immunization activities. A second-dose strategy is essential for immunizing children who missed the first dose and protect up to 15 percent of children who do not seroconvert after primary immunization (WHO, 2016).

1.1.1 Introduction and Implementation strategies for Measles Control in Tanzania

Since 1975, the United Republic of Tanzania has been implementing immunization activities to protect children from vaccine preventable diseases, with the aim of reducing morbidity and mortality caused by vaccine preventable diseases. Currently, the country is implementing a number of immunization activities at various age groups such as children under five years, pregnant women and adolescent age. The program, currently known as Immunization and Vaccine Development (IVD), is involved in delivering safe vaccines and also involved in procurement of vaccines, supplies and equipment from the manufacturer/suppliers to the point of vaccine administration in a recommended condition.

First round of MCV1 started since 1975 and was administered to the children at 9 months while the MCV2 started in October 2014. The second dose was introduced in our country following the adoption of measles elimination strategy which was put forward by WHO African regions in 2011. WHO recommended countries to introduce MCV2 once they have achieved $\geq 80\%$ coverage of MCV1 at the national level for 3 consecutive years, which was then revised and countries were recommended to introduce MCV2 regardless of their MCV1 coverage (Masresha *et al.*, 2018).

Worldwide vaccination coverage has been used as important indication to monitor the immunization program performance. This indicator is insufficient as it does not measure delays in the acquisition of immunity caused by late or early vaccination (Mekonnen *et al.*,

2020). Vaccination timeliness is an effective indicator to measure efficiency of immunization program since untimely high vaccination coverage will lead to false assumptions of disease protection. Moreover, according to the World Health Organization (WHO) and researchers' recommendation, each vaccine doses should be given at defined ages, according to the schedule, and delay is associated with significant consequences(Marefiaw, Yenesew and Mihirete, 2019).

Not adhering to immunization schedules have potential serious consequences even though the children have been immunized (Fadnes *et al.*, 2011). First, children with delayed vaccination will be unprotected from the diseases at a time when they are most at risk. The substantial delays may contribute to diminished herd immunity by the unimmunized population when a large proportion is immunized. Also, previous studies have demonstrated the association of delayed vaccination with increased risk of pertussis, measles, and *Haemophilus influenza* type b infections and outbreaks. Apart from that, delays increase the risk of failing to achieve full immunization of the child hence increased risk of morbidity and mortality. (Raguindin *et al.*, 2021).

However, despite the tremendous efforts that has been by many countries to achieve high vaccination coverage, several measles outbreaks have continued to occur due to high untimely vaccination coverage. Timely uptake of measles vaccination is important and several studies demonstrates that several measles outbreaks have occurred even in countries with high vaccination coverage in Europe (Tang *et al.*, 2017).

Although currently in Tanzania the studies have focused on vaccination coverage and the factors associated with increasing the coverage very few studies have attempted to investigate timely uptake and factors associated with timely uptake of MCV2 vaccination, therefore to address this gap the aim of this study is to determine the timely uptake of MCV2 and the associated factors

1.2 Problem Statement

Progress towards vaccination coverage have been made since 1980 in the world this resulted in the prevention of an estimated 2 to 3 million deaths every year from vaccine-preventable diseases. Despite this overwhelming success, an estimated 1.5 million children are continued to die every year from VPDs; mainly in developing countries. In Tanzania, vaccination is one of the strategies under the government health policy to improve child health. Consequently, MCV2 is a mandatory vaccine that have been set goals to increase their coverage above 90%, and the coverage of MCV2 in our country has successfully increased to about 88% which is so close to target. But this figure hides the effectiveness of vaccine which is largely determined by the timely uptake.

Giving a vaccine dose at less than the minimum recommended age to start vaccine may lessen the antibody response due to sub-optimal seroconversion rate. On the other hand, lengthening the interval between doses of vaccines leads to higher antibody levels, but increased vulnerability to disease. Besides, delayed vaccination will end up with an altered sequence of vaccinations, which in turn causes non-specific effects of vaccines with negative consequences on childhood morbidity and mortality

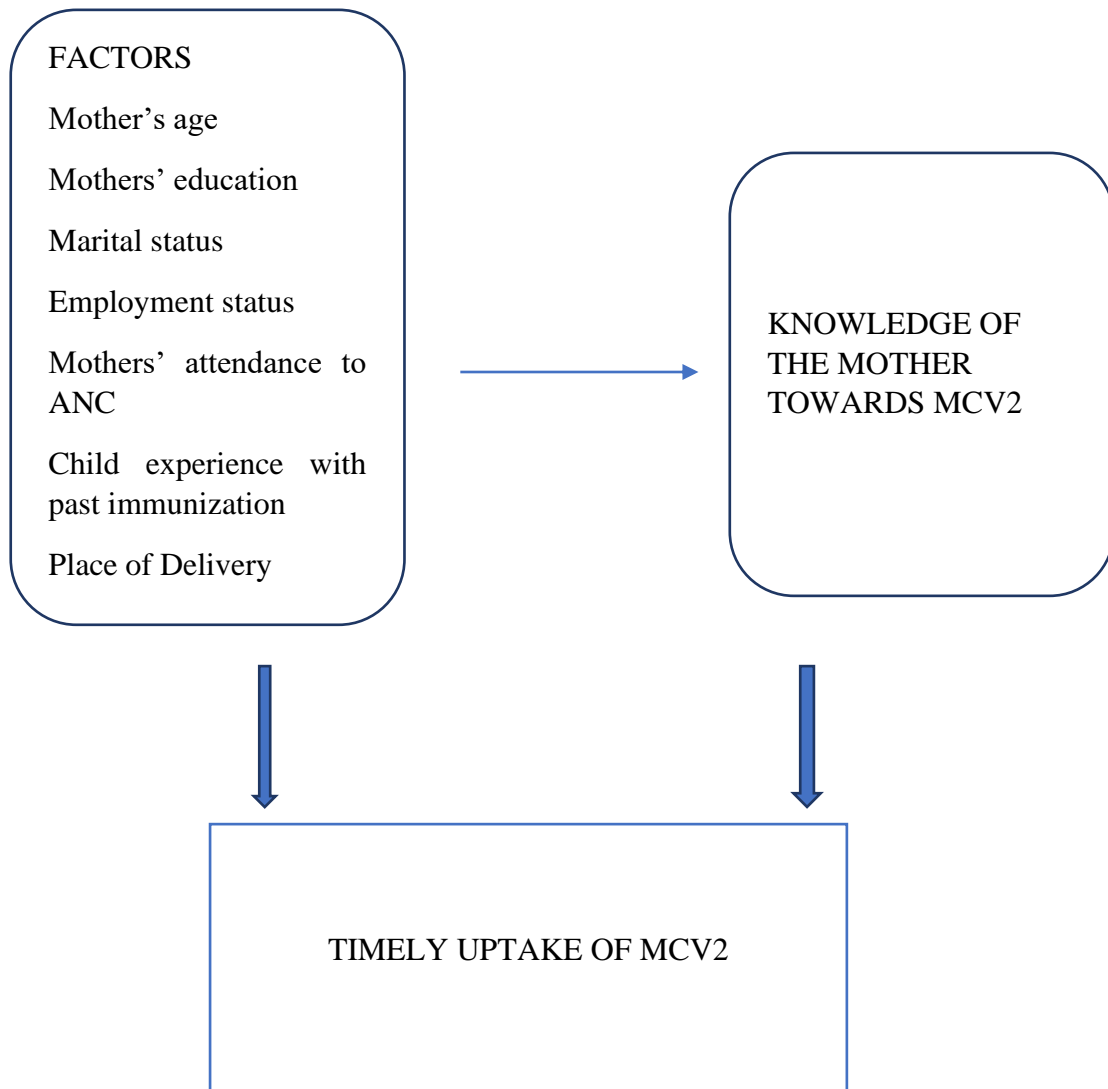
Thus, the recommended vaccination schedule is designed to protect infants and children early in life, when they are most vulnerable and before they are exposed to measles disease and reduces the risk of having measles from unvaccinated children as a result of herd immunity.

Globally, studies showed that few children received all recommended vaccine doses on time, even with high up-to-date coverage. Similarly, in Sub-Sahara African countries, researchers observed a substantial delay in timely vaccination receipt. However, in Tanzania, studies so far have focused solely on full vaccination coverage and studies that examined vaccination timeliness are very scarce. There is also limited information on factors associated with timely uptake of vaccinations in our country.

To bridge the gap, the aim of this study is twofold, to determine the proportion of the children that have been vaccinated by MCV2 on the age-appropriate time and to determine the factors that are associated with the timely uptake of MCV2 in Shinyanga Urban District

1.3 Conceptual Framework

A conceptual framework on determination of timely uptake of MCV2 was adopted from (Sematimba, 2015) on predictors of vaccination completeness and it was however modified based on timely uptake vaccination literatures review (Mekonnen *et al.*, 2020) (Tang *et al.*, 2017). Despite the fact that there are number of factors associated with timely uptake of vaccination, in this study two important determinants of timely uptake will be considered which are sociodemographic of caregivers and knowledge.



1.4 Rationale

Despite the increase in coverage year by year, the efforts in ensuring children get the MCV2 on time is minimal. In order to ensure all vaccinated children are fully protected by the measles timely uptake is very important aspect or else there will be the false assumptions of disease protection and children continue to be susceptible to the disease. By acknowledging the importance of timely MCV2 vaccination this study aims at assessing the level of timely uptake among those children received MCV2 and the associated factors for the timely uptake.

The results from this study will be help to understand the prevalence of children who received MCV2 on time within the society and to raise awareness about the importance of vaccinating children on time. To program managers working with RCH services at national, regional and district levels this study will help them to develop strategies so as to ensure children are vaccinated within the recommended period. Also, this study will help the vaccine projects to develop the interventions and strategies which will be appropriate to ensure the timely uptake of second dose measles vaccine.

1.5 Research Questions

1.5.1 Broad Research Question

1. What is the magnitude of timely uptake of second dose measles vaccine and its associated factors among eligible children in Shinyanga District?

1.5.2 Specific Research Questions

1. What proportion of children who received the second dose of Measles containing vaccine in age-appropriate time among eligible children in Shinyanga Urban District?
2. What is the level of knowledge of mothers / caretakers on the relevance of timely uptake of second dose of Measles containing vaccine among eligible children in Shinyanga Urban District?
3. What are factors that are associated with the timely uptake of second dose of Measles containing vaccine among eligible in Shinyanga Urban District?

1.6 Objectives

1.6.1 Broad Objectives

1. To determine the magnitude of the timely uptake of the second dose of measles vaccine and its associated factors among eligible children in Shinyanga Urban District

1.6.2 Specific Objectives

1. To determine the proportion of children who had received the Second Dose of Measles Containing Vaccine at the age-appropriate time among eligible children in Shinyanga Urban District
2. To determine the level of knowledge for the mother/caretaker on the timely uptake of Second Dose of Measles Containing Vaccine during routine immunization services among eligible children in Shinyanga Urban District
3. To determine factors associated with the timely uptake of Second Dose of Measles Containing Vaccine among eligible children in Shinyanga Urban District

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Public Health Importance of Measles Vaccine

Childhood immunization is one of the most cost-effective public health interventions available in 21st Century for preventing childhood morbidity and mortality. Childhood immunization estimates to avert 2.5 million annual child deaths. Immunization coverage has improved dramatically in almost all countries in Africa in recent decades. As a result, millions of children now have access to lifesaving vaccines. Following the introduction of measles vaccine deaths from measles, declined by 86% between 2000 and 2014 in the African Region. Despite these achievements, measles has been eliminated or nearly eliminated in most regions of the world but remain endemic in Africa as in 2014 an estimated 48,000 measles deaths occurred in the African Region representing 42% of global deaths due to the disease. Measles remains the biggest challenge in Africa despite the increase in the immunization coverage in different countries (Envision, 2016).

2.2 Timeliness of the Second Round Measles Uptake

Timely administration of vaccines is very important aspect for attaining the full benefits of vaccinations several studies shows that untimely high vaccination coverage will lead to false assumptions of disease protection, hence children continue to become susceptible to infection and the risk of disease transmission in the community increases (Marefiaw, Yenesew and Mihirete, 2019). (Le *et al.*, 2013) illustrate that failure to vaccinate children on time limits the herd immunity, increases the period during which children are susceptible to infection and be a significant cause of large measles epidemic in the USA in 1989–1991.

The appropriate time for the vaccination is still a problem in different parts of the world. A cross-sectional survey on vaccination coverage among children 24–35 months of age conducted by (Hu *et al.*, 2018) to determine the measles vaccination coverage and determinants of delayed vaccination reported the overall coverage of 96.9% for the first dose of measles vaccine and 93.9% for the second dose of measles vaccine but the age-appropriate coverage of the first and the second dose of measles vaccine is 76.6 and 68.2%,

respectively. Children delivered at home, younger mothers, low maternal education background, mothers with a fixed job, and low household income were associated with the delayed vaccination for the second dose of measles vaccine.

In Sub Saharan regions, studies regarding the age-appropriate vaccinations that children receive at the recommended specific ages are very limited. A community-based cross-sectional study conducted to assess age-appropriate vaccinations coverage and its associated factors from March to April 2018 by (Marefiaw, Yenesew and Mihirete, 2019) in Ethiopia reports the Age-appropriate vaccination coverage of 39.1% for pentavalent 1, 36.3% for pentavalent 2, 30.3% for pentavalent 3 and 26.4% for measles vaccine doses. Among the factors influenced the low uptake of measles vaccine include health workers' appointment before the appropriate age to prevent open dose vial, insufficient number of children to open the measles vial. Other reasons include mothers/caregivers being too busy on appointment day, forgotten vaccination appointment, inconvenient time or day of vaccination.

A cross-sectional study with a multistage cluster survey design done in Rural southern Tanzania by (Le *et al.*, 2013) to determine the timeliness and completeness of vaccination and risk factors for low and late vaccine uptake in young children living shows that Coverage for BCG, DTP-1, DTP-3 and MCV was 94%, 96%, 90% and 86%, respectively. Delayed vaccination (>1 month after the recommended age) occurred in 398/1205 (33%) children for BCG, 404/1189 (34%) for DTP-1, 683/990 (69%) for DTP-3 and 296/643 (46%) for MCV. Low and delayed uptake of MCV vaccination was associated with maternal low maternal education.

2.3 Factors associated with the timely uptake of MCV2

Several literatures have identified maternal factors as one of the major predictors of timely vaccination in different settings. In many African countries' caregiver education, family size, migrant status and birth order of children have all been the major predictor of timely uptake of vaccination (Girmay and Dadi, 2019). Other studies have shown that low social status of women negatively affects timely vaccination uptake because of their limited decision-making power over resources and lack of autonomy hence it is important to

understanding the maternal determinants so as to improve and refine immunization program strategies

(Hu *et al.*, 2018) in the study on determining Measles vaccination coverage, determinants of delayed vaccination and reasons for non-vaccination among children aged 24–35 months in Zhejiang province, China, highlighted the factors significantly associated with delayed uptake of measles vaccine includes Children being delivered at home, children who had younger mothers, low maternal education background, low household income, children of mothers with a fixed job because they lack time to spend on the childhood immunization or have time constraints due to the inflexible working hours.

A cross sectional cluster survey conducted by (Hu *et al.*, 2014) on assessing the Completeness and timeliness of vaccination and determinants for low and late uptake among young children in eastern China reported the coverage for MCV1 was 92.70%. Timely vaccination occurred in 679/1146 (59.25%) for MCV1. Timeliness of vaccination was significantly associated with mother' age; the younger mother would possibly have a better utilization of medical care such as antenatal care and post-natal visits, which may lead to an increased coverage rate and the probability of timeliness of vaccination, maternal education level; which possibly may influence mother's awareness and capacity to seek and take advantage of public health service including vaccination, siblings; which reveals that parental attention can be diverted by the presence of multiple children. and distance of the house to immunization clinic.

Cross sectional study conducted by (Mekonnen *et al.*, 2020) on assessing timely completion of vaccination and its determinants among children in northwest, Ethiopia reports that of the children included for analysis 64.3% were fully vaccinated while only 31.9% were fully vaccinated on-time. For MCV2 67.8 % of children were vaccinated on time, 13.6% and 18.6 % of the children were early and late vaccinated respectively. Among the factors significantly associated with the uptake the vaccine on time include caregiver who had secondary education and above, child whose mother attended four or more ante natal care visits and whose mother had two or more post-natal care visits while factors significantly associated with failure to vaccinate on time include being busy with other engagements to show up in vaccination schedules and forgetfulness.

A prospective study from Uganda conducted by (Fadnes *et al.*, 2011) on assessing if vaccination coverage a good indicator of age-appropriate vaccination Mother's education was associated with timely vaccination, whereby the coverage of all recommended vaccine was 75% but the Timely vaccination according to the recommendations of the Ugandan EPI was 56% for the measles vaccine. Maternal education was significantly associated with timely vaccination; the more education the better timeliness and the coverage. on contrary to other studies, this study did not find any associations between socioeconomic status and timely vaccination.

(Le Polain de Waroux *et al.*, 2013)Conducted a study on Timeliness and completeness of vaccination and risk factors for low and late vaccine uptake in young children living in rural southern Tanzania. In this study the Coverage for MCV-1 was 86%. Delayed vaccination (>1 month after the recommended age) occurred in 296/643 (46%) of the children. Delayed uptake was significantly associated with low maternal education. Mother's educational level more specifically reflects mother's knowledge about vaccination and capacity to seek and take advantage of public health services.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study area

This study was conducted in Shinyanga Urban District, one of the eight districts of Shinyanga Region. Shinyanga district is bordered to the north by Mwanza Region and to the south by Shinyanga Rural District, to the east by Kishapu District and to the west by Kahama district. The Shinyanga Urban District is administratively divided into 17 wards and according to the 2012 Tanzania National Census, the population of the Shinyanga Urban District was 1,534,808.

The three predominant tribes of the Shinyanga region are the Sukuma, Nyamwezi and Sambwa and the traditional food crops are Maize and Rice whereas the cash crop is Cotton. The main economic activities of the region are farming and livestock keeping. Despite of the recent mushrooming of activities within the mining industry, agriculture has continued to dominate the livelihood and economic performance of Shinyanga region. The sector contributes about 75 percent to the district economy and employs more than 90 percent of the working population.

The municipality has 11 healthcare facilities, according to 2012 National census the infant mortality rate was 46.2%, child mortality rate was 21.6% and the under 5 mortality rate was 66.7% (Kuchibanda and Mayo, 2015). This district was chosen because it is one of the three regions with the lowest immunization coverage (55.5%) the other two are Katavi (54.1%) and Tabora (58.9%)

3.2 Study design

Community based cross-sectional study was conducted using quantitative research methods among mothers /caregivers with eligible children in Shinyanga Urban district.

3.3 Study population

The study population were children aged 20 to 24 months who have received the second dose measles vaccine living in Shinyanga Urban District. This age group was chosen because MCV2 is administered at 18 months since birth and because timely uptake of measles vaccine was assessed, only children who have received the vaccine were included.

3.4 Sample size calculation

The kish Leslie formula (1965) for cross sectional studies were used to calculate required sample size to estimate the proportion of second round measles uptake.

$$N = \frac{Z^2 P (1-P)}{D^2}$$

Whereby

N = minimum sample size required.

Z = standard normal deviate 1.96 for 95% confidence level

P= proportion of timely uptake measles vaccine among Children= 46% (Le Polain de Waroux *et al.*, 2013)

D = desired level of absolute precision (margin of error) 3%.

DF= design effect assumed to be 1.348 (*Tanzania Health Survey*, 2015)

Therefore,

$$N = 1.96^2 \times 0.46 (1 - 0.46) / 0.05^2 = 381$$

$$\text{Design effect} = 1.348$$

$$381 \times 1.348 = 514$$

Assuming a response rate of 90%, then $514/0.9$

The required sample size will be = 571

The required sample size = 571 pair of eligible children with mothers'/ care givers

3.5 Sampling procedures

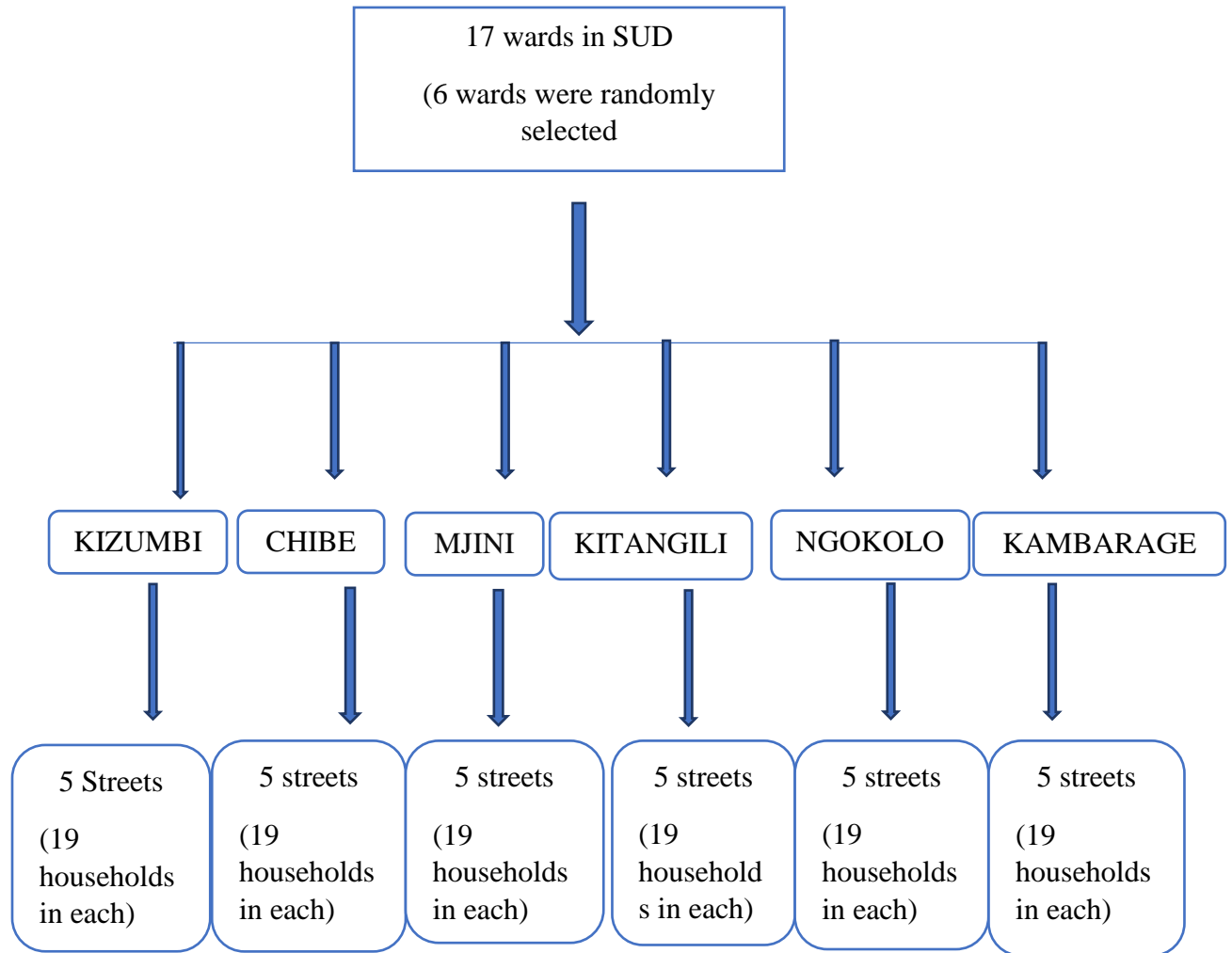
A three-stage cluster random sampling technique were used in this study

Stage one: At the district level, Shinyanga has 17 wards, from these 17 wards 6 wards were chosen by simple random sampling using lottery method

Stage two: From each of 6 selected wards a list of all streets was obtained for each ward, and five streets from each ward were selected by lottery method. Hence 30 streets were selected.

Stage three: This involved the selection of one 50 cell leader from each selected village. A total of 30 fifty cell leaders were selected. Since a list of households from each of the selected street could not be obtained from the street leaders to enable creating of a sampling frame. Therefore, starting point were obtained by dropping a pen from a fifty-cell leader's house and following the direction it pointed. After obtaining the household with eligible children the subsequent hose was obtained after every two houses was obtained. The households with no eligible children were skipped and next household was recruited and the households with more than one eligible child, Researcher was required to select the youngest child.

Sampling technique

**Figure 1: sampling strategy flow chart**

3.6 Eligibility Criteria

3.6.1 Inclusion Criteria

1. Children aged 20 to 24 months who have received MCV2 were included in the study

3.6.2 Exclusion criteria

1. Children aged 20 months to 24 months who received MCV2 but whose mothers had hearing problems and history of psychiatric disorders that may interfere with their memory and judgement were not be eligible to participate in the study.
2. Eligible children with no vaccination card were excluded from the study

3.7 Study Variable

3.7.1 Dependent variable

- Timely uptake of second round measles containing vaccine which was categorized as eligible children who had timely uptake of MCV2 or eligible children who had untimely uptake of MCV2

3.7.2 Independent variables

- Factors such as Mother's age, Mother's education, Marital status, Employment status, Mother's attendance to ANC, Place of Delivery, Head of the House, Parity, Number of children in a household, age of the child, sex of the child, birth order of the child and Mother's knowledge

3.8 Data Collection Method

3.8.1 Data Collection tool

An interviewer-administered structured questionnaire was used to obtain the required information. The instrument was constructed from a review of available literature on immunization, WHO questionnaire, and TDHS (2015-2016) for immunization coverage. The questionnaire was first developed in English Language and then translated into Kiswahili language and translated back to English.

3.8.2 Training and recruitment of research assistants

Five research assistants were recruited to assist the PI in data collection. Research assistants were trained by PI for one day. Assistants were trained on the objectives of the study, study participants, selection criteria, obtaining consent from the study participants and assuring the participants confidentiality so as to have a common understanding on the questionnaire.

3.8.3 Pre testing of Questionnaire

The questionnaire was tested to 5% of the study population (29 children aged 18 months to 24 months) in one ward in Shinyanga Urban district that was not included in the selected study area. The purpose of pre testing was ensure the validity and clarity of the research tool in collecting the required information. The necessary amendments were made accordingly, including on ambiguities of the questions, wording, logic sequence, and skipping order.

3.9 Data Management and Analysis

3.9.1 Data Management

During data collection, research assistants were supervised closely by the principal investigator and the Questionnaires were checked daily by PI for completeness and correctness. The questionnaires with fault were identified and research assistants were supposed to rectify the faults accordingly before living the household. Meetings was conducted every evening to discuss any emerging challenges and solutions were sought to ensure the success of data collection process. Data were entered using SPSS version 23, cleaned for errors due to inconsistent before analysis

3.9.2 Data Analysis

Data were analyzed by using SPSS version 23. Descriptive analysis of child characteristics and caregiver socio demographics were performed. Continuous variables were presented as means and standard deviation or median and Interquartile range. Categorical variables were summarized by generating frequencies to obtain proportions. Difference between

proportions were examined by using Chi square test so as to check for statistical significance. The bivariate analysis was conducted to examine the association between associated factors and the outcome variable. All the variables which had P value less than 0.2 during bivariate analysis were included in multivariate for analysis of factors associated with timely uptake of MCV2 while controlling for confounders. Since the outcome was very common above 20%. Prevalence ratios were presented as measures of association from modified Poisson regression models fitted at both bivariate and multivariate analysis.

3.10 Ethical consideration

The proposal was submitted for ethical review and clearance to Muhimbili University of Health and Allied Sciences (MUHAS) institutional Review Committee Senate of Research and Publication before the study was conducted. The permission was sought from Regional; District, ward and street authorities. Informed consent was sought from the participant and if agreed and signed, the participant was enrolled in the study. Moreover, the participant had the right to refuse responding the question and to withdraw the consent at any time. All information were kept confidential and were not disclosed except for the purpose of the study.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This chapter presents findings of a study on timely uptake of Second dose Measles Vaccine and its associated factors among eligible children in Shinyanga District. The findings have 4 parts the first part describes the socio demographic characteristics of the respondents and 3the selected children, the second part includes results on proportion of the timely uptake of measles vaccine among eligible children in Shinyanga district. The next part involves results of caregiver's knowledge and the factors influencing knowledge and the last section includes caregiver's factors and their association with timely uptake of MCV2.

4.2 Socio demographic characteristics of the children and the caregiver

Table 1 illustrates the findings based on socio-demographic characteristics of the child. Out of 570 respondents, majority of them, 498(87.4%) were mothers and the median age of the children were 22months ranging from 20-24 month. Slightly more than half of the children were girls 314(55.1%) and a little more than half of the children were born in health centers 341(59.8%) and while about one third of them were the firstborns 187(32.8%).

Table 1: Socio-demographic characteristics of the child

Variable	Frequency (n)	Percentage (%)
Age of the child (months)		
20	152	26.7
21	123	21.6
22	98	17.2
23	87	15.3
24	110	19.3
Sex		
Male	256	44.9
Female	314	55.1
Child birth order		
First	187	32.8
Second	167	29.3
Third	137	24.0
Fourth and above	79	13.9
Care taker		
Parent	498	87.4
Guardian	72	12.6
Place of birth		
Hospital	202	35.4
Health center	341	59.8
Home	22	3.9
On the way	5	0.9

Table 2 shows the socio demographics of the caregiver whereby, high proportion of the caregivers were aged 20-35 448(78.6%) with the median age IQR 27(23-32), More than two thirds 395(69.3%) of them claimed that the head of the household were male and more than three quarter of them have been living in Shinyanga district for more than 1 year 82(14.4%). Three hundred and sixty-nine respondents (64.7%) were living together with their partners and less than half of the respondents had a secondary education 239(41.4%) while about 235(41.2%) claimed to be unemployed. Of 570 recruited respondents, 318(55.8%) reported to have 1-2 number of children and more than two third of them 405(71.1%) claimed that they had 4 or above number of clinic visits when they were pregnant.

Table 2: Socio-demographic characteristics of the Caregiver

Variable	Frequency (n)	Percent (%)
Age group of caregivers (years)		
< 20	32	5.6
20 – 35	448	78.6
>35	90	15.8
Median age in years (IQR)	27 (23, 32)	
Sex of head of the household		
Male	395	69.3
Female	175	30.7
Duration of living in Shinyanga		
< 1 year	115	20.2
≥ 1 year	455	79.8
Marital status of caregivers		
Living together	369	64.7
Never married or living together	116	20.4
Separated	70	12.3
Widow	15	2.6
Highest Education level		
No formal to Primary	118	20.7
Secondary School	236	41.4
Higher Education	216	37.9
Working status		
Employed	122	21.4
Self employed	213	37.4
Unemployed	235	41.2

4.2. Timely Uptake of Second dose Measles Vaccine

Vaccination card of all respondents were reviewed to verify the MCV2 vaccination date. Based on vaccination card, more than two thirds of all respondents 400(70.2%) (95%CI 66.2-73.9) received MCV2 on time. Since this study were assessing the timely uptake of MCV2, all caregivers who had eligible children with no vaccination card were not included in this study and all caregivers with eligible children with or without vaccination card but did not receive MCV2 were also not included in the study

4.3 Association between Caregivers Knowledge and timely uptake of MCV2

There was a significant association between caregivers' knowledge on MCV2 and timely uptake of MCV2, such that proportion children who received MCV2 on time 85.3 (CI 81.4-89.6) is higher among those caregivers with high levels of knowledge and compared those with low to moderate levels of knowledge. Also, proportion of children who did not receive MCV2 on time 32.8 (CI 28.7-35.9) is higher to those caregivers with low to moderate levels of knowledge compared to those with high levels of knowledge to children who

received MCV2 on time care givers with low to moderate levels of knowledge ($p < 0.001$).

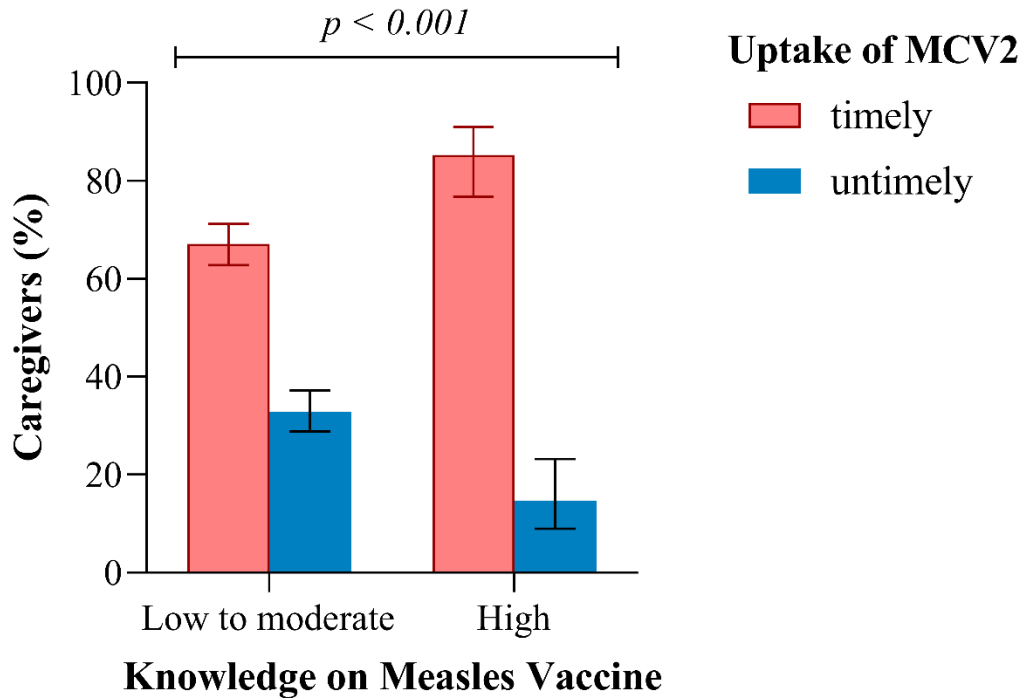


Figure 2: Association between caregivers' knowledge and timely uptake of MCV2

4.4: Factors associated with the timely uptake of MCV2 among eligible Children in Shinyanga Urban District

Factors which were found to be significant predictors of timely uptake on bivariate analysis but not in multivariate analysis were:- Caregivers who had fewer number of children (1-2) (cPR 1.74; 95% CI 1.35 – 2.23; $P < 0.001$) and the children who were living in households with fewer under-five children (1-2) (cPR 1.88; 95% CI 1.24 – 2.86; $P = 0.003$). Children born to caregivers with age between 20-35 (cPR 1.38; 95% CI 1.13 – 1.69; $P = 0.002$). Children born to caregivers with secondary education level (cPR 1.26 95% CI 1.10 – 1.45 $P = 0.001$) and children whose caregivers were employed (cPR 1.46; 95% CI 1.24 – 1.70; $P < 0.001$). (Table 4)

In multivariate analysis we found that Children who were born on the first order were two times more likely to be vaccinated with MCV2 on time compared to those who were born

on fourth and above order (aPR 1.57; 95% CI 1.20 -2.07; P = 0.001). Those who were born on the second were more likely to be vaccinated on time compared to those who were born on the fourth and above order (aPR 1.49; 95% CI 1.22 – 1.97; P= 0.006) and while those who were born on the third order were more likely to be vaccinated on time compared to those who were born on forth order or above (aPR 1.40; 95% CI 1.06 – 1.85; P=0.019)

Caregivers who gave birth on the way to the health center were more likely to vaccinate their child on time compared to those who gave birth in the hospital (cPR 1.30; 95% CI 1.20 – 1.53; P=0.002). Caregivers with high education level were more likely to get to take their child to get MCV2 on time compared to those with primary or no formal education (cPR 1.22 95% CI 1.07 – 1.40 P =0.003). children of unemployed caregivers were more likely to get MCV2 on time compared to the children of self-employed caregivers (cPR 1.28; 95% CI 1.12 – 1.47; P<0.001).

Those caregivers who male were head of the household were two times more likely to take their child to get MCV2 on time compared to their counterparts who women were the head of the household (cPR 1.52; 95% CI 1.02 – 1.31 P=0.025). The caregivers who had high were more likely to vaccinate their children on time compared to those with low or moderate knowledge on MCV2 (aPR 0.85; 95% CI 0.76 – 0.95; P<0.001)

Table 3: Bivariate and multivariate Modified Poisson regression of predictors of timely Uptake of MCV2 (N=570)

Variable	Category	N	Bivariate Analysis	Multivariate Analysis
			cPR, 95% CI, p-value	aPR, 95% CI, p-value
Child's age (months)	20-22	373	1.01, (0.91 – 1.14), 0.811	1.07, (0.96 – 1.19), 0.201
	23-24	197	Ref	
Childs Sex	Male	256	1.03, (0.93 – 1.15), 0.536	1.03, (0.93 – 1.14), 0.559
	Female	314	Ref	
Child Birth order	First	187	2.00, (1.53 – 2.61), <0.001	1.60, (1.22 – 2.13), 0.001
	Second	167	1.78, (1.35 – 2.34), <0.001	1.51, (1.13 – 2.01), 0.005
	Third	137	1.52, (1.14 – 2.03), 0.005	1.41, (1.07 – 1.87), 0.017
	Fourth & above	79	Ref	
Number of children	1-2	318	1.74, (1.35 – 2.23), <0.001	1.12, (0.82 – 1.54), 0.472
	3-4	179	1.31, (1.00 – 1.72), 0.054	0.99, (0.74 – 1.35), 0.997
	≥5	73	Ref	
Number of <5 children	1-2	347	1.88, (1.24 – 2.86), 0.003	1.31, (0.86 – 1.96), 0.218
	3-4	192	1.40, (0.91 – 2.16), 0.213	1.18, (0.78 – 1.79), 0.428
	≥5	31	Ref	
Age of caregiver (years)	<20	32	1.29, (0.95 – 1.75), 0.101	0.86, (0.63 – 1.19), 0.375
	20-35	448	1.38, (1.13 – 1.69), 0.002	0.93, (0.73 – 1.18), 0.551
	35<	90	Ref	
Place of delivery	Health center	341	1.11, (1.00 – 1.24), 0.058	0.92, (0.83 – 1.02), 0.100
	On the way	5	1.50, (1.39 – 1.61), 0.001	1.12, (1.00 – 1.41), 0.049
	Home	22	1.16 (0.91 – 1.47), 0.235	1.07, (0.83 – 1.37), 1.070
	hospital	202	Ref	
Education	High education	216	1.51, (1.32 – 1.72), <0.001	1.15, (1.01 – 1.31), 0.034
	Secondary	236	1.26, (1.10 – 1.45), 0.001	1.06, (0.93 – 1.20), 0.400
	No to primary	118	Ref	
Working status	Employed	122	1.46, (1.24 – 1.70), 0.009	1.23, (0.99 – 1.43), 0.089
	Unemployed	235	1.52, (1.32 – 1.75), 0.001	1.28, (1.12 – 1.47), <0.001
	Self employed	213	Ref	
Head of Household sex knowledge	Male	395	1.25, (1.09 – 1.42), 0.025	1.15, (1.02 – 1.31), 0.025
	female	175	Ref	
	High	95	1.27, (1.14 – 1.41), 0.001	1.34, (1.18 – 1.52), 0.001
	Low to moderate	475	Ref	

Key: cPR: Crude Prevalence Ratio, aPR: Adjusted Prevalence Ratio

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

Immunization is one of the most effective public health interventions for lowering the burden of disease among children and averting millions of deaths globally. Currently health system focuses mostly on the coverage of vaccines while leaving behind timely vaccination which has become a significant public health problem in resource-poor countries like Tanzania. Tanzania is one of the countries in Africa with high vaccination coverage rates for almost all vaccines being offered to above national target of 90% and MCV2 (coverage 88%) which have been introduced recently is almost approaching the national target (World Health Organization, 2019). But vaccination coverage is insufficient indicator as it does not measure delays in the acquisition of immunity caused by late or early vaccination. When a certain portion of children fail to receive vaccination in a timely manner, there is a possibility of propagating the transmission of the diseases within society and also the delays immunization may contribute to diminished herd immunity hence place the community to the risk of outbreaks of diseases.

This study identified several significant factors, including child birth order, place of delivery, maternal education, working status of caregivers, head of household sex as significant determinants of timely uptake MCV2 in Shinyanga District.

5.2 Timely Uptake of Second Dose Measles Vaccine Among Eligible Children in Shinyanga District

The findings of this study indicate that a more than two-third of children were vaccinated on time. Similarities have been reported elsewhere by (Hu *et al.*, 2018) from Zhejiang province, China where by age-appropriate uptake of MCV2 was 68.2%. Author opinioned that coverage of measles vaccine has been improved while the timeliness is lagging behind hence there is a need for the policy-makers to pay more attention to the determinants of delayed vaccination when planning efforts to ensure the high age-appropriate coverage of

measles vaccination. In Tanzania there is lack of information on timely uptake of MCV2, but findings of studies conducted in rural southern Tanzania by (Le *et al.*, 2013) showed that about 46% of the children did not get measles vaccine on time. This shows that timely uptake of vaccination is still problem which need highly focus so as to eradicate measles.

5.3 Caregivers Knowledge on the Second dose Measles Vaccine

The findings of this survey show that, having high knowledge about MCV2 increases the likelihood of getting MCV2 on time. Timely uptake of MCV2 was also significantly associated with the knowledge of right schedules and dose of MCV2, symptoms, transmission and prevention of measles and the effects of not getting MCV2 on time and the importance of MCV2. This finding is consistent with the study of (Kara, Polat and Bedir, 2018) which highlighted the role of caregivers knowledge on immunization with the timely vaccination.

5.4 Factors and their association with timely uptake of second dose of measles vaccine

At the childhood level the variable child birth order was significantly associated with the timely uptake of MCV2. This study showed that, as the birth order increases the children have a higher likelihood of being lately vaccinated. This finding is consistent with findings from Bangladesh (Sheikh *et al.*, 2018) which shows that the later born children had a higher risk of failure of MCV timely uptake and a study from China (Hu *et al.*, 2014) where by being the later born child was a significant demographic factor for delayed DPT1 because parental attention can be diverted by the presence of multiple children. In this study this could be explained by the reason that parents with the first child could have enough spare time for taking their child to immunization and child up bringing compared to their counterparts the later born whereby the parental attention is diverted due to having too many responsibilities.

In caregivers' socio demographics, Place of birth was a significant determinant to timely uptake of MCV2. Mothers who delivered on the way to the hospital reported higher likelihood of vaccinating their children on time compared to their counterparts who

delivered from hospital. This study is contrary to the study done in China (Hu *et al.*, 2014) where by delivery at hospital was associated with timeliness for HepB1. The study is also inconsistent to the previous study of Bangladesh (Sheikh *et al.*, 2018) which found that children who were born at home were more likely to receive the pentavalent/OPV vaccines compared to other groups. In our study, this finding may be explained by caregivers who gave birth in other places other than home and health facilities are more worried about the health of their children because they were not born in the safe places compared to their counterparts.

The likelihood of children to get On-time MCV2 was higher among those whose caregivers had high educational level. This study is consistent with the study from Ethiopia (Mekonnen *et al.*, 2020) which shows that On-time full vaccination coverage was higher among children of caregivers with high educational level. A cross sectional study conducted in Jordan by (Salameh, Malak and Adas, 2021) to determine factors associated with vaccination delays showed that education was a strong factor influencing timely adherence to a complete vaccination schedule. In this study the results may be explained by the reason that mothers who attended high education level can easily understand scientific information than those with low education. Also, the low education level can hinder the caregiver to easily communicate with health workers which might affect the ability of caregivers to seek public health services such as child vaccination. Also, high caregiver's education is associated with ability of the read information on the vaccination card like the vaccination date.

However, we found that unemployed caregivers were more likely to vaccinate their child on time compared to self-employed and employed caregivers. This study is inconsistent with the previous study (Salameh, Malak and Adas, 2021) which revealed that delays were higher among unemployed caregivers, because employed mothers could have better time management and better knowledge regarding vaccinations. Our study is also inconsistent with the study from Bangladesh (Sheikh *et al.*, 2018), whereby children of unemployed mothers failed to receive timely vaccinations for BCG/measles. In our setting this difference could be explained that unemployed mothers could have more spare time which

allows them to take their child to the vaccine compared to mothers who are employed or self-employed.

The likelihood of children to get MCV2 on time was higher among those households headed by men. Our findings are consistent with the study done in Ethiopia (Tamirat and Sisay, 2019) whereby, the full immunization of children with female household heads was lower compared to children who had male household heads which is due to high workload and family responsibilities. On contrary, findings from Sub-Saharan Africa (Fenta *et al.*, 2021) revealed that the odds of timely full immunization were higher among female household head.

Study by (Hu *et al.*, 2018) identified several factors for timely uptake of MCV2 which were significant in his study but were not significant in this study. Factors such as high numbers of siblings which make families facing more resource and time constraints to support many children hence childhood immunization might not be prioritized while competing other family demands make children susceptible to delays in vaccination. Children with young mothers are also likely to have delayed vaccination than those with older mothers who have enough experience with immunization and understand better the benefits of immunization. In our study the insignificant of these factors might be attributed to the fact that most of the caregivers were unemployed hence they have enough time to take care of all the children she has in her household.

5.5 Strength and Limitation of the study

The strength of this study was that it was done in the community where it is possible to find out the real picture of what is going on in the community rather than the hospital-based studies where one could only study people with health care seeking behavior. Also, in order to address the recall bias, we restricted our survey to children who had the vaccination card and then categorized each child's vaccination status into timely or untimely.

The results of this study should be interpreted taking in to account the following limitations. First, study participants were limited to those caregivers who had vaccination

cards; therefore, the vaccination timeliness might have been overestimated or underestimated in this study population compared with the general population. However, we believed that our study involved a large sample size so as to minimize this bias.

Furthermore, the study was a cross sectional study, hence, it was hard to generate cause-effect relationship of timely uptake of MCV2 and determinants due to the study's design. However, most of the significant factors in our study have also been reported in other studies hence indicating there is a consistency of the findings, which is a crucial aspect of conclusion of causation

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

More than two thirds of the children aged 20-24 months in Shinyanga district were vaccinated on time with MCV2. Child birth order, Place of delivery, Education level, working status and Caregivers Knowledge were significantly associated with timely uptake of MCV2. To our expectations the timely uptake of MCV2 was supposed to be the highest since the study was conducted in urban area where there is an easy access to health services and better transportation available helping women to reach to the health centers easily. But, despite these positive findings, the timely uptake is not sufficient to prevent outbreaks within the community and the present study revealed a necessity for improving the timely uptake of second round measles vaccine in Shinyanga district. Measures to improve timely uptake of MCV2 should be carried out urgently among the susceptible children.

6.2 Recommendations

The study provides insights into the factors associated with timely uptake of second dose measles vaccination, hence the recommendations that will help improve timely uptake of this vaccine are

1. Health care workers should provide sufficient information to caregivers on the MCV2 second dose and the importance of timely uptake of childhood vaccination, return dates for vaccination and vaccination schedules
2. Additionally, timeliness should be incorporated into the official routine vaccination statistics which will be helpful in appraising the reported coverage of measles vaccination in Tanzania
3. Further research should be conducted to bridge the gaps in knowledge and practices of healthcare workers regarding Second dose measles vaccination.

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APPENDICES

Appendix 1: Questionnaire – English version

Survey of Assessing timely uptake of Second Round Measles vaccine among Eligible Children in Shinyanga District

Questionnaire number _____

Name of Ward _____

Name of street _____

Questionnaire number _____

Date of interview _____

PART A: DEMOGRAPHICS OF SELECTED CHILD

(For the question number 2,3 and 4 write in the space provided and for the rest of the questions put a tick on the most appropriate answer)

S/N	Question	Answer
1.	Sex	1. Male 2. Female
2.	Date of the birth	_____
3.	MCV2 vaccination Date	_____
4	MCV2 Recommended date (18 months since birth)	_____
5.	Timeliness status of vaccine (ONE MONTH since the recommended date)	1. Within recommended period 2. One month Earlier and later than the recommended period
6.	What is the birth order of the selected child?	1. 1 st 2. 2 nd 3. 3 and above
7.	What is the relationship of the respondent to the child?	1. Biological Parent 2. Not a Biological Parent

PART B: DEMOGRAPHICS OF THE MOTHER/ CAREGIVER

Please put a tick on the most accurate answer.

S/N	QUESTIONS	ANSWERS
1.	How long have you been living continuously in Shinyanga urban district?	1. Less than a year 2. More than a year 3. Visitor
2	How old were you at your last birthday?	age in completed years.....
3	What is your marital status?	1. Living together 2. Never married and never lived together 3. Separated 4. widowed
4	Have you ever attended to school?	1. Yes 2. No
5	What is your highest level of Education?	1. No formal to primary 2. Secondary o level 3. Higher education
6.	What is your occupation?	1. Employed 2. Self employed 3. Unemployed
7.	How many under 5 children live in your house?	1. 1- 2 2. 3-4 3. 5 and more
8.	How many children do you have?	1. 1-2 2. 3-4 3. 5 and more
9.	How many times did you attend the clinic when you were pregnant?	1. 1 2. 2 3. 3 4. More than 4
10.	What is the sex of the head of the house	1. Male 2. Female

11.	Where did you give birth?	<ol style="list-style-type: none"> 1. Hospital 2. Health facility 3. Home 4. On the way
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PART C: INFORMATION ABOUT MOTHERS KNOWLEDGE ON MCV2

Please put a tick on the most accurate answer

Q/N	Question	Answers
1.	Have you ever heard that there is vaccination against measles?	<ol style="list-style-type: none"> 1. Yes 2. No 3. Not sure
2.	If yes, where did you get to know about measles vaccines	<ol style="list-style-type: none"> 1. From health facility 2. From the media 3. From the friend
3.	How many doses of measles vaccine are available?	<ol style="list-style-type: none"> 1. 1 2. 2 3. 3 4. More than 3 5. I don't know
4.	At what age are the vaccines administered?	<ol style="list-style-type: none"> 1. 9 and 12 months 2. 9 and 18 months 3. 6 and 12 months 4. 6 and 18 months
5.	Did a health provider inform you about the second dose of measles during the last immunization visit?	<ol style="list-style-type: none"> 1. Yes 2. No 3. Not sure 4. I don't remember
6.	What is the cause of measles?	<ol style="list-style-type: none"> 1. Virus 2. Bacteria 3. Fungi 4. I don't know

4.	How is measles transmitted	<ol style="list-style-type: none"> 1. Food borne 2. Air borne 3. Witch craft 4. Inherited 5. I don't know
5.	What are the signs and symptoms of measles?	<ol style="list-style-type: none"> 1. Flu and rashes 2. Flu and blood in urine 3. Rashes and stomach ache 4. Vomiting and blood in urine 5. I don't know
6.	Which of the following ways do you think will protect from getting measles	<ol style="list-style-type: none"> 1. Washing hands frequently 2. Avoid walking bare foot 3. Taking traditional medicine 4. Immunized 5. I don't know
11	Do you believe there are some effects of not getting vaccination on the appropriate time?	<ol style="list-style-type: none"> 1. Yes 2. No 3. Not sure
	Is there any way of preventing transmission of measles apart from vaccination?	<ol style="list-style-type: none"> 1. Yes 2. No 3. I don't know

Apendix II: Questionnaire – Swahili Version

Dodoso la utafiti wa huduma za chanjo ya pili ya ugonjwa wa Measles kwa watoto wa umri wa miezi 20-24 wilaya ya Shinyanga Mjini

Namba ya Dodoso _____

Jina la kata _____

Jina la Mtaa _____

Namba ya mshiriki _____

Tarehe ya mahojiano _____

SEHEMU A: TAARIFA ZA MTOTO HUSIKA

(Tafadhali kwa swali namba 2,3 na 4jaza nafasi ilioachwa wazi na kwa maswali yaliyobaki chagua jibu moja sahihi Zaidi)

S/N	SWALI	JIBU
1.	Jinsia	1. Me 2. Ke
2.	Tarehe ya kuzaliwa	_____
3.	Tarehe alipochoma chanjo ya pili ya ugonjwa wa surua	_____
4.	Tarehe alioandikiwa kuchoma chanjo ya pili ya ugonjwa wa surua	_____
5.	Wakati sahihi wa chanjo iliyotolewa (MWEZI MMOJA kutoka tarehe alipoandikiwa kuchoma chanjo ya pili ya ugonjwa wa surua	1. Ndani ya mwezi moja kutoka tarehe ya chanjo 2. Mwezi mmoja kabla au baada ya tarehe ya chanjo
6.	Mtoto husika ni wangapi kuzaliwa	1. Kwanza 2. Pili 3. Tatu au zaidi
7.	Ni upi uhusiano wako na mtoto huyo	1. Mzazi 2. Mlezi

SEHEMU B: TAARIFA ZA MSHIRIKI

Tafadhali kwa swali namba 2 jaza jibu sahihi, kwa maswali yaloyobaki chagua jibu moja sahihi

S/N	SWALI	JIBU
1.	Je ni kwa muda gani umekuwa ukiishi wilaya ya Shinyanga mjini?	<ol style="list-style-type: none"> 1. Chini ya mwaka mmoja 2. Zaidi ya mwaka mmoja
2.	Je una umri gani kwa sasa?	Miaka_____
3.	Je ni ipi hali yako ya ndoa kwa sasa?	<ol style="list-style-type: none"> 1. Mnaishi pamoja 2. Haujawahi kuolewa na kuishi pamoja 3. Mmeachana 4. Mjane
4.	Je Umewahi kusoma shule?	<ol style="list-style-type: none"> 1. Ndio 2. hapana
5.	Ni kipi kiwango cha juu cha elimu ulichofikia?	<ol style="list-style-type: none"> 1. Hujasoma au elimu ya msingi 2. Sekondari kawaida 3. Elimu ya juu
6.	Unafanya kazi gani?	<ol style="list-style-type: none"> 1. Umeajiriwa 2. Umejijiri 3. Hujaajiriwa
7.	Ndani ya nyumba yako kuna watoto wangapi wa umri chini ya miaka 5?	<ol style="list-style-type: none"> 1. 1- 2 2. 3-4 3. 5 4. Zaidi ya watoto 5
8.	Je unawatoto wangapi?	<ol style="list-style-type: none"> 1. 1-2 2. 3-4 3. 5 4. Zaidi ya 5
9.	Ni ipi jinsia ya mkuu wa kaya	<ol style="list-style-type: none"> 1. Me 2. Ke

10.	Kipindi una ujauzito ulihudhuria kliniki mara ngapi	<ol style="list-style-type: none"> 1. 1 2. 2 3. 3 4. Zaidi ya mara 4
11.	Je ulijifungulia wapi kwa mtoto anaye husika na huu utafiti?	<ol style="list-style-type: none"> 1. Hospitali 2. Kituo cha afya 3. Nyumbani 4. Njiani

SEHEMU C: TAARIFA KUHUSU UELEWA JUU YA CHANJO

(tafadhali weka alama ya tiki kwenye chaguo moja sahihi Zaidi)

S/N	SWALI	JIBU
1.	Unafahamu kuwa kuna chanjo dhidi ya ugonjwa wa surua?	<ol style="list-style-type: none"> 1. Ndio 2. Hapana 3. Sijui
2.	Kama ndio, uliifahamu wapi?	<ol style="list-style-type: none"> 1. Kwenye kituo cha afya 2. Kwenye habari 3. Kutoka kwa rafiki
3.	Unafahamu kuna dozi ngapi za chanjo ya huu ugonjwa?	<ol style="list-style-type: none"> 1. 1 2. 2 3. 3 4. Zaidi ya 3 5. sijui
4.	Chanjo hizo hutolewa kwa muda gani	<ol style="list-style-type: none"> 1. Miezi 9 na 12 2. Miezi 9 na 18 3. Miezi 6 na 12 4. Miezi 6 na 18 5. Sijui
5.	Je mtoa huduma za afya alishawahi kukupa taarifa kuhusu chanjo ya pili ya ugonjwa wa surua?	<ol style="list-style-type: none"> 1. Ndio 2. Hapana 3. Sijui

6.	Je ni mdudu gani anasababisha ugonjwa wa surua	<ol style="list-style-type: none"> 1. Kirusi 2. Bakteria 3. Fangas 4. Sijui
7.	Je ugonjwa wa surau unasambazwa kwa njia gani	<ol style="list-style-type: none"> 1. Njia ya chakula 2. Njia ya hewa 3. Njia ya uchawi 4. Unarithishwa 5. Sijui
9.	Je ni zipi dalili za ugonjwa wa surua?	<ol style="list-style-type: none"> 1. Mafua makali na vipele kama mchanga 2. Mafua makali na kukojoa damu 3. Vipele kama mchanga na tumbo kuuma 4. Kuharisha na kukojoa damu 5. Sijui
10.	Je ni zipi njia za kuzuia usipate ugonjwa wa surua?	<ol style="list-style-type: none"> 1. Kuosha mikono mara kwa mara 2. Kuepuka kutembea bila viatu 3. Kutumia dawa za asili 4. Kuchoma chanjo 5. Sijui
11.	Je unadhani kuna madhara yoyte mtoto hupata asipochoma chanjo kwa muda unaotakiwa	<ol style="list-style-type: none"> 1. Ndio 2. Hapana 3. Sijui
12.	Je unadhani kuna njia nyingine zinaweza kutumika kuzuia ugonjwa wa surua tofauti na kuchoma chanjo	<ol style="list-style-type: none"> 1. Ndio 2. Hapana 3. Sijui

Appendix III: INFORMED CONSENT FORM (English Version)**MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES****DIRECTORATE OF RESEARCH & PUBLICATIONS.
CONSENT TO PARTICIPATE IN A RESEARCH**

ID-NUMBER _____

Consent to participate in this study

Greetings, my name is Huda Omary a student from Muhimbili University of Health and Allied Sciences, Dar es Salaam. I am conducting a study to determine the timely uptake of second round Measles containing vaccination and associated factors among 20-24 months children in Shinyanga urban District, Tanzania. It is possible that this consent form has information that you do not understand please don't hesitate to stop the conversation with me to explain the part that is not understood.

Purpose of the study

This study has the purpose of collecting information on factors influencing the timely uptake of second round measles vaccination services among 20-24 months' children in Shinyanga urban district. You are being asked to participate in this study because you have particular knowledge and experiences that may be important to the study.

What participation involves

If you agree to participate in this study, you will be required to answer series of questions that have been prepared for the study through interviewing in order to obtain the intended information regarding factors influencing the timely uptake of second round measles vaccination services among 20-24 months children

Confidentiality

I assure you that all the information collected from you will be kept confidential. Only people working in this research will have access to the information. We will be compiling a report which will contain responses from several mothers of children aged 20-24 months without any reference to any individual. We will not put your name or other identifying information on the records of the information you provide.

Risks

You will be asked questions about factors that are associated with the timely uptake of vaccination services for your child. Some questions could potentially make you feel uncomfortable. You may refuse to answer any particular question and stop the interview at any time. We do not expect any harm to happen to you because of participation in this study

Right to withdraw and alternatives

Taking part in this study is completely your choice. If you choose not to participate in the study or if you decide to stop participating in the study you will not get any harm. You can stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Benefits

The information you provide will help to increase our understanding on factors influencing the timely uptake of second round measles vaccination among 20-24 months children in Shinyanga urban district communicate the findings to policy makers in the district for improvement of vaccination services in the district.

Responsibility of Investigator

In the case where the child will be found to have received the vaccination on the inappropriate time the caretaker will be counselled on the advantages of immunization and be advised to visit the health facility for immunization services on time when she will have the opportunity to get another child or to take another child

In case of injury

We do not anticipate that any harm will occur to you or your family as a result of participation in this study.

Contacts

If you have questions about this study, please don't hesitate to contact:

Huda J Omary,
The Principal Investigator
Muhimbili University of Health and Allied Sciences (MUHAS),
P.O. Box 65001, Dar es Salaam (Tel. no.0765444954).

If you ever have questions about your rights as a participant, you may contact:

Prof R. Mpembeni
The supervisor of this study
Mobile number 0784 394 636

OR

Director of Research and Publications
Muhimbili University of Health and Allied Sciences
P. O. Box 65001, Dar es Salaam

Consent

I have been invited to participate in a study on second dose measles vaccine. I have read / someone has read for me the basic information on this study. I have had the opportunity to ask questions related to this study and I have been answered enough to my satisfaction. By my own free will, I agree to participate in this study.

Name of participant _____

Signature of participant _____

Date _____

Researcher's Statement

I certify that the participant has been given the opportunity to ask questions and all the questions he or she has asked have been answered correctly according to my understanding. I certify that the participant has given consent to voluntary participate without coercion or deceit.

Name of researcher _____

Signature of researcher _____

Date _____

Appendix IV: INFORMED CONSENT FORM (Swahili Version)

CHUO KIKUU CHA AFYA NA SAYANSI YA TIBA CHA MUHIMBILI



KURUGENZI YA UTAFITI NA UCHAPISHAJI

FOMU YA RIDHAA YA KUSHIRIKI KWENYE KATIKA UTAFITI

Namba ya utambulisho _____

Ridhaa ya kushiriki

Hujambo? Ninaitwa Huda Omary Ninafanya utafiti juu ya sababu Zinazoathiri upataji wa chanjo ya pili ya ugonjwa wa surua kwa wakati kwa watoto umri wa miezi 20 hadi 24 katika wilaya ya Shinyanga mjini. Inawezekana fomu hii ya idhini ikawa na maneno ambayo huyaelewi, tafadhali usisite kunisimamisha kusudi nielezee pale ambapo hapajaeleweka. Kama utakuwa na maswali waweza kuniuliza mimi au kumuuliza mtafiti mwingine aliyeambatana nami.

Madhumuni ya utafiti

Utafiti huu unakusudia kuchunguza sababu zinazoathiri upataji wa chanjo ya pili ya ugonjwa wa surua kwa wakati kwa watoto umri wa miezi 20 hadi 24 katika wilaya ya Shinyanga mjini. Unaombwa kushiriki kwenye utafiti huu kwa sababu unaoujuzi ama unafahamu matukio au taarifa ambazo ni za muhimu.

Nini kinahitajika ili kushiriki

Ili kushiriki katika utafiti huu inabidi kukubali na kujiunga kwa kujibu maswali kutoka kwenye dodoso wa kwa ajili ya utafiti huu.

Usiri

Ninakuhakikishia kuwa taarifa zitakazokusanywa kutoka kwako kupitia dodoso hili zitakua siri na hakuna mtu yeyote ambaye hafanyi kazi kwenye utafiti huu atakayeambiwa ulichosema. Itaandaliwa taarifa ya utafiti huu ambao hautamtaja mshiriki yeyote. Jina lako wala utambulisho mwingine wowote hautawekwa kwenye taarifa unazozitoa. Taarifa zako zitaingizwa kwa kutumia namba za utambulisho

Hatari

Hakuna hatari yeyote itakayotokea kwako kutokana na ushiriki wako kwenye utafiti huu

Haki ya kujittoa au vinginevyo

Ushiriki katika utafiti huu ni hiari. Kutokushiriki au kujittoa kutoka kwenye utafiti hakutakua na adhabu yeyote na hutapoteza stahili zako endapo utaona ni vyema kufanya hivyo.

Faida

Kama utakubali kushiriki kwenye utafiti huu itakua ni fanasa kwa vile utafiti huu una lengo la kuboresha huduma za chanjo kwa kubaini sababu zinazoathiri upatikanaji wa chanjo ya pili ya ugonjwa wa surua kwa wakati kwa watoto wa miezi 20-24 wilayani Shinyanga mjini

Waajibu wa mtafiti

Endapo mtoto atakutwa hajapata chanjo kwa wakati sahihi mzazi/mlezi atashauriwa kuhusu umuhimu wa kumpa chanjo mtoto kwa wakati endapo atapata nafasi ya kupata mtoto mwengine

Endapo utapata madhara au la

Hatutegemei kupata madhara yoyote kutokana na ushiriki wako katika utafiti huu.

Nani wa kuwasiliana naye

Kama kuna swali kuhusiana na utafiti huu itakubidi kuwasiliana na

Huda Omary,

Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili,

S.L.P. 65001 DSM. Simu (Tel: 0765444954).

Kama una maswali Zaidi unaweza kuwasiliana na

Prof R. Mpembeni

Msimamizi wa Utafiti

Mobile number 0784 394 636

AU

Mkurugenzi wa Utafiti na Uchapishaji

Chuo Kikuu cha Afya na Sayansi Shirikishi cha Muhimbili

P. O. Box 65001, Dar es Salaam.

Dar es Salaam

Tanzania

Hati ya idhini

Nimealikwa kushiriki katika utafiti juu ya chanjo ya pili ya ugonjwa wa surua.

Nimesoma/kusomewa maelezo ya msingi juu ya utafiti huu. Nimepata fursa ya kuuliza maswali kuhusiana na utafiti huu na nimejibiwa kiasi cha kuniridhisha. Kwa hiari yangu mwenyewe nakubali kushiriki katika utafiti huu.

Jina la Mshiriki _____

Sahihi ya Mshiriki _____

Tarehe _____

Maelezo ya mtafiti au muomba idhini

Nathibitisha kuwa mshiriki amepewa fursa ya kuuliza maswali na maswali yote aliyouliza yamejibiwa kwa ufasaha kwa mujibu wa ufahamu wangu. Nathibitisha kuwa mshiriki ametoa idhini ya kushiriki kwa hiari yake mwenyewe bila shuruti wala kurubuniwa.

Jina la mtafiti/ muomba idhini _____

Sahihi ya mtafiti/ muomba idhini _____

Tarehe _____