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# Utilization of Measles Conjugated Vaccine 2 and Associated Factors Among Children Aged 24-35 Months in North Mecha District, West Gojjam Zone, North West Ethiopia

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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

# UTILIZATION OF MEASLES CONJUGATED VACCINE 2 AND ASSOCIATED FACTORS AMONG CHILDREN AGED 24-35 MONTHS IN NORTH MECHA DISTRICT, WEST GOJJAM ZONE, NORTH WEST ETHIOPIA

BY: - ASICHALEW ABIYU (BSc midwifery)

ATHESIS RESEARCH SUBMITTED TO DEPARTMENT OF HEALTH SERVICE MANAGEMENT AND HEALTH ECONOMICS, SCHOOL OF PUBLIC HEALTH, COLLEGE OF MEDICINE AND HEALTH SCIENCES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR DEGREE OF MASTERS IN GENERAL PUBLIC HEALTH.

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|---|---|
| Name and address of investigator | Asichalew Abiyu<br>Cellphone: +251918492816/0914285149<br>Email:-<br>asichuabiyu@yahoo.com or<br>abiyuasichu@gmail.com<br><br>MERAWI, ETHIOPIA |
| Name and address of primary advisor | Dabere Nigatu (MPH in Reproductive Health, Assistant Professor)<br>E-mail:<br>daberen@yahoo.com or<br>dabenigatu@gmail.com<br>Cell phone: +251-913-453579<br>Bahir Dar, Ethiopia |
| Name and address of co -advisor | Yared Mulu (MPH,ASSISTANT PROFESSOR)<br>Cell phone: +251-930317480<br>E-mail: - muluyared2@gmail.com |
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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| CBO | Community based organization |
| CHIS | Community health information system |
| CSA | Central Statistical Agency |
| EDHS | Ethiopian demographic health survey |
| EPI | Expanded program on immunization |
| FMOH | Federal ministry of health |
| HDA | Health development army |
| HEWs | Health Extension workers |
| HSTP | Health Sector Transformation Plan |
| IgM | Immune globulin m |
| MCV 1 | Measles conjugated vaccine 1 |
| MCV 2 | Measles conjugated vaccine 2 |
| OR | Out reach |
| RED | Reaching Every District |
| SPSS | Statistical Package for Social science |
| VPD | Vaccine preventable disease |

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## Abstract

***Background***: -Measles is a highly infectious disease caused by a virus. It remains an important cause of death among young children globally, despite the availability of a safe and effective vaccine. More than 95% of measles deaths occur in countries with low incomes and weak health infrastructures. According to mini EDHS 2019 Fifty nine percent of 12-23 months children received measles conjugated vaccine 1 and 9% of children age 24-35 months received the second dose of the measles vaccine.

***Objectives*:-** Assess proportions of measles conjugated vaccine 2 and associated factors among 24-35 months of age children in North Mecha district, west Gojjam zone, North West Ethiopia, 2020.

***Methods***: - Community based cross-sectional study design was conducted from July 2020 to January 2021. A total of 424 samples were selected and included by using multistage sampling techniques. Primary data was collected by trained data collectors using pre tested questionnaires by face to face interview. Data was coded and entered into SPSS version 23 software for analysis. Those variables found less than 0.2 p-values bi variable analysis were entered into multi variable Logistic regressions to identify statistically significant independent factors when the effect of other variables is adjusted. Adjusted odds ratio at 95% CI and p-value of less than 0.05 are presented.

**Results**: Four hundred twenty two mothers were interviewed, giving a response rate of 99.5% and from the total, 53.08% were vaccinated measles conjugated vaccine 2. Women who had educational statues college and above [AOR=9.45; 95% CI (1.25-10.28)], Children born in health institutions [AOR= 4.13 ;95%, CI: (1.092-15.618)], Women who were informed of measles conjugated vaccine 2 by health extension worker [AOR=3.71;95%, CI: (1.748-7.890)],women/caregiver Know about schedule of MCV 2 [AOR: 9.14, 95% CI: (4.42-18.88)] and Travel time to Nearest Vaccine site (in walk time) ≤30 minute [AOR: 6.7, 95% CI:(2.99-15.00)] were positively associated with utilization of measles conjugated vaccine 2.

**Conclusion**: The MCV2 coverage in the District was low.

**Keywords**: - Measles conjugated vaccine 2, 24-35 month age children, associated factors, and North Mecha district.

# 1, INTRODUCTION

## 1.1 BACKGROUND

Measles is a highly infectious disease caused by a virus .Measles is one of the most infectious human diseases and can cause serious illness, lifelong complications and death. Prior to the availability of measles vaccine, measles infected over 90% of children before they reached 15 years of age. Ethiopia began implementing accelerated measles control since 1999 with the aim of reducing measles mortality and morbidity. Ethiopia and the rest of the African region have adapted measles elimination targets to be achieved and sustained by 2020 and beyond [1, 2].

Measles is a leading cause of childhood morbidity and mortality worldwide. Even though a safe and cost-effective vaccine is available. Despite the remarkable progress made in the control of diseases, measles continues to claim the live of large member of children every year, majorly in the world's poorest countries, particularly, in sub-Saharan Africa.[2].

World Health Organization (WHO) has targeted a global elimination of measles to reduce annual incidence rates (IRs) to less than five cases per million populations, which requires more than 90% coverage of at least one dose of Measles-Containing Vaccine (MCV1) by the end of 2015 and more than 95% coverage by 2020 in all countries [14].

Childhood vaccination is an instrument of saving millions of lives, but about 19.4 million children under the age of 1 year have not received basic vaccines [2, 3]. Immunization prevents 2–3 million deaths every year, and the uptake of new vaccines has been increasing from time to time [2, 3].

Measles vaccination in the routine immunization program was introduced in Ethiopia in 1980 with one dose of measles vaccine for children's at the age of 9 month. Ethiopia introduced measles second dose (MCV 2) in to the routine immunization system since February 2019 at the age of 15 month [4].

Immunization against measles is recommended for all susceptible children and adults for whom measles vaccination is not contraindicated. The attenuated, live measles vaccines that are internationally available are safe and effective, provide long-lasting protection, are inexpensive and may be used interchangeably within immunization programmes [5].

Reaching all children with 2 doses of measles vaccine should be the standard for all national immunization programmes [6]. On-time delivery of the first dose (that is, as soon as possible after the loss of protection by maternal antibody) remains the highest priority for programmes. Delivery of the second dose may occur either at a scheduled age through routine services or periodically through

mass campaigns (SIAs) targeted at defined age groups, depending on which strategy achieves the higher coverage. Ensuring that every child is reached with 2 doses of measles vaccine will require making an increased investment in systems to record and monitor the administration of both doses, including when they are delivered through mass campaigns [7].

Since population immunity needs to be >93–95% in all districts to prevent measles epidemics, reaching and maintaining high immunization coverage remains the cornerstone of effective measles control. The coverage targets depend on national goals for disease control. In countries aiming at reducing mortality from measles, immunization coverage should be ≥90% at the national level and ≥80% in each district. Countries aiming at measles elimination should achieve ≥95% coverage with both doses in every district [8].

In the past 14 years Ethiopia conducted, a series of follow up and catch up supplementary immunization activity (SIA) of measles in different parts of the country (primary targeting children of age 6/9-59 months and 6/9-79 months, respectively).In general, measles outbreaks markedly have reduced in the previous year in term of frequency and incidence, from 76/1,000,000 population in 2010 to 20/1,000,000 populations in 2017. [9].

## 1.2. STATEMENT OF THE PROBLEM

In Ethiopia, measles is a common cause of morbidity and mortality in children, and this demonstrates the need for achieving high quality immunization coverage. The current immunization strategy in Ethiopia is to provide a minimum of two opportunities for measles vaccination, two doses though the routine activity at 9 and 15 months, and though scheduled preventive SIAs. However, due to the low coverage and prevailing poor living conditions, measles outbreaks continue to occur frequently in different part of the country [10].

Measles infection was estimated to cause more than two million deaths and between 15,000 and 60,000 case of blindness annually worldwide. There were an estimated 140,000 deaths globally from measles in 2018 mostly children under the age of five [12].

Ethiopia has documented an increase in reported measles cases from 3,332 in 2002 (the year of the first sub-national catch-up measles SIAs) to 17,745 in 2015 [16]. This increase in cases is attributed to improved sensitivity of surveillance, but also due to outbreaks of confirmed measles occurring in different parts of the country [16].

In the area of expanded immunization program, the global measles deaths declined by three-fourth from 2000 to 2014 [13], but measles is still considered as a public health emergency that requires immediate notification and rapid public health response [13].

In 2015, MCV1 coverage had reached 85% globally, and the measles deaths declined by 79% as compared to 2000 [4]. However, the 2015 measles vaccination goal was not met and measles incidence rates remained relatively unchanged between 2013 and 2014 [15].

Ethiopia accounted for 3.4% of the estimated 20.8 million infants globally who did not receive MCV1 through routine immunization services in 2015 [15], and 9% of the global measles mortality is attributed to Ethiopia [16].

In Ethiopia, childhood immunization coverage is improved through the combine effect of Reaching Every District (RED) approach, health extension program and implementation of Enhanced Routine Immunization Activities (ERIAs) [17, 19]. It is expected that measles immunization coverage should have an inverse relation with the incidence rate of measles [19].However, despite a considerable improvement of childhood MCV1 in Ethiopia, measles outbreaks are occurring continuously in most parts of the country. As the MCV1 coverage increased from 59% in 2005 to 84% in 2014 [18], the incidence rate of confirmed measles cases per 100,000 population increased from 0.6 in 2005 to 11.2 in 2014 [18]. This continuous occurrence of measles outbreak irrespective of measles vaccination could be attributed to spatial heterogeneity of measles vaccination [18].

Understanding the neighborhood variation in measles vaccination is crucial for evidence-based decision-making in measles prevention and control program and detecting spatial heterogeneity is useful to identify gaps in the performance of measles immunization programme that could not be identified through the routine monitoring of vaccination coverage [13].

A retrospective descriptive surveillance study done in (2005–2014) Addis Ababa city's a total of 4203 suspected measles cases were identified. Among the total measles cases; 380 (22%) were received at least one dose of measles containing vaccine (MCV) while 415 (24%) cases were not vaccinated and the vaccination status of 923 (54%) cases were not known [16].

A study conducted in Woliso hospital's catchment area a total of 1819 case patients were recorded and 36 deaths were recorded at the hospital in Woliso hospital from January 1, 2013, to April 9, 2017 [24]

Measles virus was detected in all zones of the state, reaching its peak in the hot-dry season. To reduce the incidence of measles, it is highly recommended to improve routine immunization, and conduct a wide age group campaign. Additional research to evaluate the knowledge, attitudes and practices of the general population and health care professionals about measles infection and vaccination is important [13].

In Amhara region there are 14,324 suspected measles cases (2006 - 2016) from those 10,212 are Confirmed measles. The median age of confirmed measles cases was 9 years. From the above of confirmed measles cases 2,820 (28%) are under 5 years of age [16].

A study conducted in Amhara Regional State a total of 6579 samples were tested for measles IgM among 7296 samples collected in Amhara Regional State over 11 years (2004–2014). Of the tested samples, 2412 (36.7 %) were found positive, while 3965 and 202 samples were found to be negative and equivocal (compatible) respectively. Patients with age ≥10 years were the most affected.[13].

## 1.3 JUSTIFICATION OF THE STUDY

Determining the utilizations and identifying factors associated with utilizations of MCV 2 are relevance for designing policies, initiating or modifying intervention programs. So No study has shown the overall national MCV 2 coverage after the new vaccines have been introduced into the EPI schedule. Therefore, the objective of this study were to measure the MCV 2 coverage and associated factors among children aged 24–35 months in Ethiopia in order to help planners assess the progress of the national MCV 2 coverage.

## 1.4. SIGNIFICANCE OF THE STUDY

The results of this study have implications for policy makers, health care providers, educators and researchers; to improve or strengthen policies in improving the utilizations of MCV 2 and reducing related factors. Moreover it is hoped that information obtained from this study were add to the existing body of knowledge about the utilizations of MCV 2. Consequently, the findings might help to enhance awareness about utilization MCV 2 and health promotion programs. The finding of this study is important to give intervention on utilizations of MCV 2.it also generates hypothesis for further utilizations of MCV2.

# 2. LITERATURE REVIEW

2.1 Utilizations of measles conjugated vaccine 2

A study conducted in Swiss the study cohort, 62.6% of 13-month-old children were up-to date for the first measles immunization (recommended at 12 months of age). Approximately 59% of 25-month-old children were up-to-date for the second measles immunization (recommended at 15–24 months of age). Most doses were delivered during months in a child's life when well-child visits are recommended (e.g. 12 months of age). For second measles vaccine dose, accelerations in vaccine delivery occurred at time points for well-child visits during the months 19 and 25 of age but with lower final uptake than for the first measles vaccine dose. Until their second birthday, children in our cohort spent on average 177 days and 89days susceptible to measles due to policy recommendations and additional delays, respectively. In a group of children aged 6 months to 2 years reflecting the age distribution in our cohort, effective vaccine coverage was only 48.6% [14].

A community-based cross-sectional study was conducted in NIGERIA (2019) only 56 children (32.6%) of the 172 children over 9 months of age had immunization cards available for inspection. Of these, 23 (59.6%) were MCV 1 immunized [36].

A report annually to the WHO and UNICEF in Twenty three Africa countries (Eritrea, Gambia, Ghana, Burundi, Zambia Kenya, Senegal, Tanzania, Malawi, Zimbabwe …..) has estimates of MCV2 coverage available in 2015. Of these, only 2 countries have coverage of ≥ 95% for both MCV1 and MCV2 while 5 countries have coverage of > 80% for both doses. Dropout rates of >20% MCV1 – MCV2 exist in 12 countries. Post-MCV2 introduction evaluations done in 11 countries from 2012 to 2015 showed that inadequate health worker training, insufficient sensitization and awareness generation among parents and suboptimal dose recording practices were common programmatic weaknesses that contributed to the low MCV2 coverage in these countries [39].

A study conducted in Northwest Ethiopia, full-vaccination coverage for the children aged 12–23 months was 58.4%, while 17% and 24.6% were partially vaccinated and not vaccinated at all respectively [31].

Descriptive evaluative study was conducted in Afar region from Feb 15-May 30/ 2017; the prevalence of measles was 55% in Afar region. Measles vaccination coverage (MCV 1) was more than 85% in most of district of the region. But Recurrent here & there measles outbreak was reported. This might be hypothesized that low herd immunity in the community. Expanded programme on immunization is one of systems involved in measles surveillance in Afar region [23].

A community based Cross sectional study was conducted in Tehulederie district North East Ethiopia from February 1 to 15, 2015. All the villages were staffed with two Health Extension workers with ratio of 1:2591and 1:5180 population in rural and urban residences respectively. Five hundred fifty seven (87.2%) of the respondents were geographically accessible to the service and 96.8% of them accepted the service. 83.1% of children were MCV 1 immunized [26].

As on the above Measles is one of the leading causes of death among children globally, particularly in developing countries. An estimated over 100,000 measles death occurred globally in 2017. Measles is a very contagious and terrible disease but it can be easily prevented and controlled by vaccination [26].

Gavi and other several health partners have provided the necessary support to ensure MCV2. WHO Country Office team has also provided technical and financial support to the Ministry of Health of Ethiopia starting from planning to preparation and implementation of the MCV2. About 3,348,363 children will receive measles vaccine second dose during their second year of life annually throughout the country [27].

The study conducted on secondary data analysis from the 2016 Ethiopia Demographic and Health Survey (EDHS). Information about 1,909 babies aged 12–23months was extracted from children dataset. Both bivariate and multivariable logistic regression models were utilized to assess the status and factors associated with full immunization. Adjusted odds ratio (AOR) with a 95% confidence interval (CI) was computed. Variables with less than 0.05 p-values in the multivariable logistic regression model were considered as statistically and significantly associated with the outcome variable. Hence, The MCV 1 coverage was 38.3%. Rural residence, employed, female household head, wealth index [middle and richness, primary school maternal education, secondary school maternal education, diploma graduated mothers, ANC follow up, and delivery at health facilities were significantly associated factors with the vaccine[29].

According to Demographic and Health Survey of Ethiopia 2016, the percentage of children age 12-23 months received a measles vaccination (MCV1) is 54 % [38]. Among children age 12-23, vaccination coverage declines as the birth order of children increases, from 47% for first order births to 29% for sixth or higher order births. Children age 12-23 months in rural areas is more likely to receive all basic vaccinations than children in urban areas (65% versus 35%). At the regional level, coverage of all basic vaccinations is highest in Addis Ababa (89%), Dire Dawa (76%), and Tigray (67%) and lowest in Afar (15%), Somali (22%) and Oromiya (25%) while in Amhara (46%).

Vaccination cards are critical tools in ensuring that children receive all recommended vaccinations according to schedule. The 2016 EDHS found that 46% of children age 12-23 months and 35% of children age 24 -35 months were reported to have a vaccination card. However, interviewers were able to see a vaccination card, booklet, or other home-based record for only 34% of children age 12-23 months and 17% of children age 24-35 months [38].

According to Mini Demographic and Health Survey of Ethiopia 2019, 59 % of children received a measles vaccination (MCV1) while 9 % of children age 24-35 months received the second dose of the measles vaccine (MCV2)[40].

2.2. Factors associated with measles conjugated vaccine 2 utilizations

A community-based cross-sectional study was conducted in NIGERIA (2019) health service factors like absence of delivery services, shortage of health workers, unavailability of vaccines at scheduled times, and indirect costs of immunization contributed to low utilization [36].

A cross-sectional household survey was conducted in 2017 on Cameroon the final multi-level logistic regression model, factors significantly associated with incomplete immunization status were: retention of immunization card, lower mothers' utilization of antenatal care (ANC) services, being the ≥3rd born child in the family, younger mothers' age, parents' negative attitude towards immunization, and poorer parents' exposure to information on vaccination. Longer distance from the vaccination centers was marginally significant (p=0.05) [37].

A study conducted in Northwest Ethiopia, Child full vaccination status has a positive association with urban residence, having antenatal care visit, institutional delivery for the study child, vaccination site at health institutions, mothers who knows vaccination schedule of a catchment area, and mothers taking a child for vaccination even if the child is sick. However, mothers who ever-married and their travel time to the nearest vaccination site ≤ 30 minutes were negatively associated with child full-vaccination status [31].

A community based unmatched case-control study was conducted in Arbegona district, southern Ethiopia among randomly selected children aged 12 to 23 months and with a total sample size of 548 (183 cases and 365 controls) The incomplete immunization status of children was significantly associated with young mothers, being born second to fourth and being born fifth or later in the family as compared to being born first, a mother's lack of knowledge about immunization benefits and a mother's negative perception of vaccine side effects. The qualitative finding revealed that the

migration of mothers and unavailability of vaccines on appointed immunization dates were the major reasons for partial immunization of children [26].

A community based Cross sectional study was conducted in Tehulederie district North East Ethiopia from February 1 to 15, 2015. All the villages were staffed with two Health Extension workers with ratio of 1:2591and 1:5180 population in rural and urban residences respectively. In the multivariate logistic regression analysis, children in rural areas were 8 times more likely to be fully immunized than children in urban residence and children who had access for the service were 8 times more likely to be fully immunized than children who had no access for the service [26].

A study conducted in the emerging regions of Ethiopia (2020) Mothers' formal, ANC, health facility delivery of last birth, rich wealth and average child birth weight were positively associated with childhood access to vaccination. On the other hand, mothers' ANC attendance and rich wealth were positively associated with the continuum of the services. On the contrary, children with rural resident mothers and small birth weight were negatively associated to the access and continuum of childhood vaccination, respectively [27].

A community-based cross-sectional study was conducted in Northwest Ethiopia in 2016 on 846 children aged 12 to 23 completed months child full vaccination status has a positive association with urban residence, having antenatal care visit, institutional delivery for the study child, vaccination site at health institutions, mothers who knows vaccination schedule of a catchment area, and mothers taking a child for vaccination even if the child is sick. However, mothers who ever-married and their travel time to the nearest vaccination site $\leq$ 30 minutes were negatively associated with child full-vaccination status [29].

A cross-sectional study was conducted in Wadera District, South East Ethiopia on Children Aged 12-23 Months from May to June 2016. 404 mothers were interviewed, giving a response rate of 98.2% and from the total, 41.4% were MCV 1 vaccinated while 5.9% of the children were unvaccinated. Variables showing further association includes; had three or above Anti Natal Care (ANC) visit, three or above doses of TT vaccine, Children born in health institutions, had Post Natal Care (PNC) follow up, mothers who were walked less than 30 min to Vaccination site and mothers who had good knowledge on vaccine [42].

According to Demographic and Health Survey of Ethiopia 2016, Children are more likely to receive all basic vaccinations if their mothers have more than secondary education (72%) or secondary education (70%), than if their mothers have only a primary education (46%) or no education (31%).

Children in the highest household wealth quintile are more likely to receive all basic vaccinations than children in the lowest quintile (63% versus 22%) [38].

Coverage of all basic vaccines and/or any vaccination coverage has been strongly associated with better wealth status, better education of care givers, and living in urban areas. Fifty-seven percent of children living in urban areas have received all basic vaccinations compared with only 37% of children in rural areas. Children in the highest wealth quintile (65%) are more than twice as likely to have received all basic vaccinations as children in the lowest quintile (25%). Sixty-five percent of children whose mothers have more than secondary education were received all basic vaccinations compared with 34% of children whose mothers have no education. Coverage of all basic vaccinations is highest in Addis Ababa (83%) and lowest in Afar (20%) [40]. From those the percentage of children age 12-23 months who are MCV 1 vaccinated increased by 15%, from 24% in 2016 to 39% in 2019 [40].

## 3. CONCEPTUAL FRAME WORK

Several factors play a role in determining the utilizations of MCV 2.These are socio-demographic and socio-economic factors like Family size, Ethnicity, Religion, Age, Sex, Marital status, Residence, Occupation, Education [38]. Health facility related Factors like Accessibility of health facility, Provision of supplies [38]. Maternal and child health care services utilization like:-ANC follow up, Place of delivery, postnatal care, Birth order, Parity, Birth interval [27, 38].

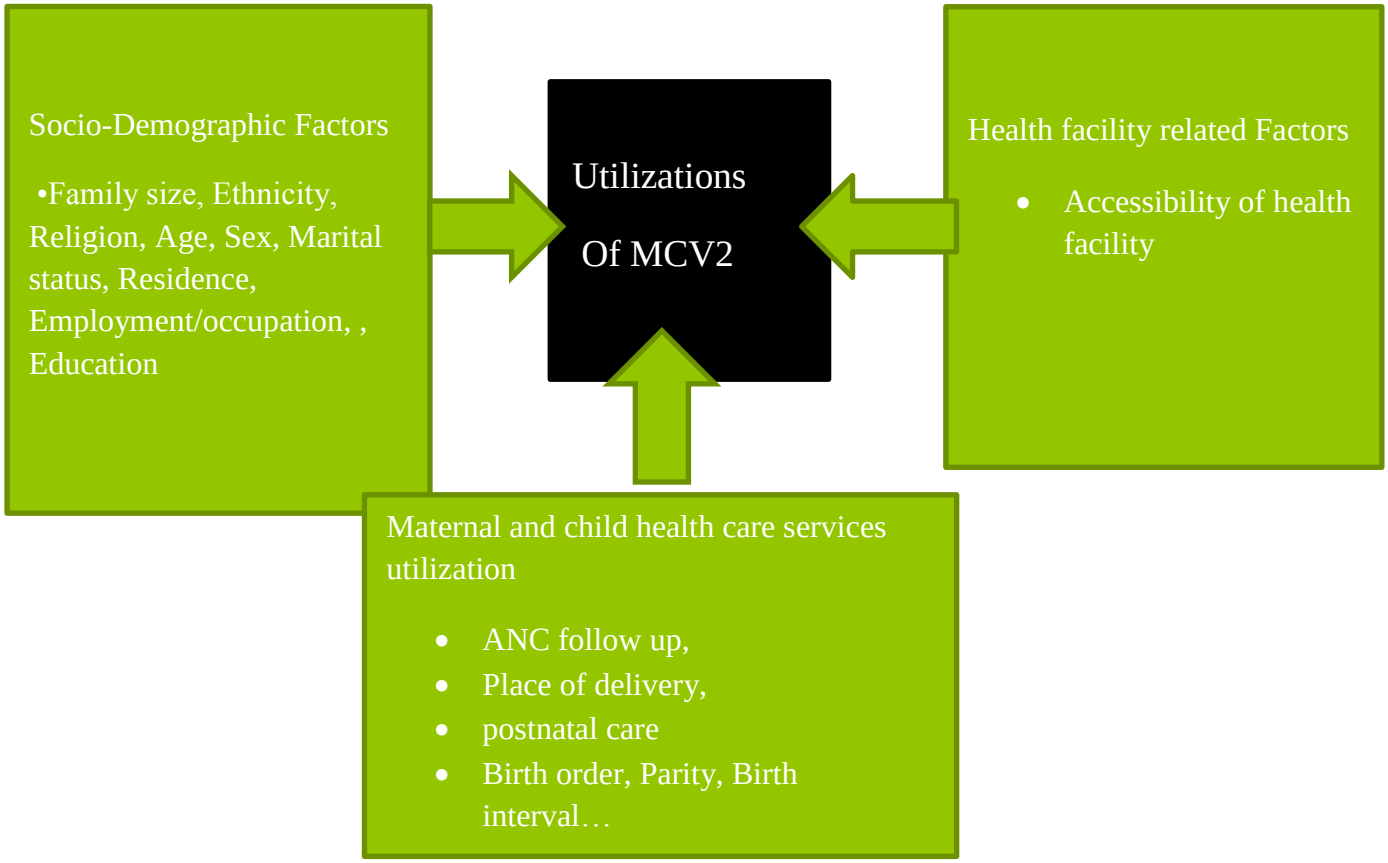


Figure 1:Frame work of Assessment of utilization of measles conjugated vaccine 2 among children of age 24-35 months and its associated factors, community based cross sectional study in North Mecha district, West Gojjam administrate zone, North West Ethiopia,2020

# 4. OBJECTIVE

## 4.1. GENERAL OBJECTIVE

To assess utilization of measles conjugated vaccine 2 and its associated factors among children of age 24 - 35 months in North Mecha District, West Gojjam Zone, North West Ethiopia 2020.

## 4.2 SPECIFIC OBJECTIVE

- To determine the proportion of measles conjugated vaccine 2 among children of aged 24 - 35 months in North Mecha district, West Gojjam zone in 2020.
- To identify factors associated with utilization of measles conjugated vaccine 2 among children of aged 24 - 35 months in North Mecha district, West Gojjam zone in 2020.

# 5. METHODS

## 5.1 STUDY DESIGN

Community based cross sectional study was used to assess utilization of measles conjugated vaccine 2 and factors associated with it from December 01 to January 31, 2021.

## 5.2 STUDY AREA AND PERIOD

The study was conducted from July 2020 to January 2021 in North Mecha District; North Mecha is one of the Districts as in the Amhara Region Part of the west gojjam Zone. North Mecha is bordered on the southwest South Mecha, on the west by Awi zone and South Achefer Woreda , on the north by North Achefer Woreda, on the South east by Yilmana Densa and, on the east by Bahir Dar zuria woreda. The administrative city of North Mecha is Merawi which is located 508 km far from Addis Ababa, capital city of Ethiopia and 34 km from Bahir Dar which is the capital city of Amhara region. Based on the 2007 national census conducted by the Central Statistical Agency of Ethiopia (CSA), this District has a total population of 311,498, of whom 157,306(50.5%) of them is male and 154,192 (49.5%) of them is female; 38,937 or 12.5% are urban inhabitants [43]. With an area of 768.83 square kilometers, North Mecha has a population density of 180.39, which is greater than the Zone average of 160 persons per square kilometer. A total Expected households is 13,394 with expected persons per household is 4.3. In North Mecha there is one government hospital, 10 health centers, 38 health posts and 2 medium private clinics and 4 drug vendors [45].

## 5.3 POPULATION

### 5.3.1 SOURCE POPULATION

All mother/caregivers who have child's aged 24-35 months and who are resident in North Mecha district 2020.

### 5.3.2 STUDY POPULATION

Mother/caregivers whose child's aged 24-35 months who live more than six months in the selected kebele in North Mecha district during the study period 2020.

### 5.3.3 STUDY UNIT

Mother/caregivers who have child's aged 24-35 months in every house hold will be selected.

## 5.4. SAMPLE SIZE DETERMINATION AMD SAMPLING PROCEDURE

### 5.4.1. SAMPLE SIZE DETERMINATION

The sample size (n) for the study was calculated using single population proportion formula by considering the total household as a sample unit. assuming 95% level of confidence and 5% margin of error (w) with proportion of the study (p)=0.5 and z =1.96.

$$n = \frac{(Z\alpha/2)^2 p(1-p)}{d^2}$$

n= 384.16 ~ 385

Adding 10% non-response rate, n= 424

### 5.4.2. SAMPLING PROCEDURE

The population is homogenous.so there is pre structured 10 cluster health centers in the District. I randomly assume 10 cluster. Then a multi stage sampling technique was used to select kebeles. All 38 kebeles of North Mecha was listed and used as a sample frame. Out of 38 kebeles of North Mecha, Ten kebeles was selected by using a simple random sampling technique by lottery method. To select each study unit systematic sampling technique was used. Finally from those study unit or households, we select a family member who meets the eligibility criteria by lottery method.

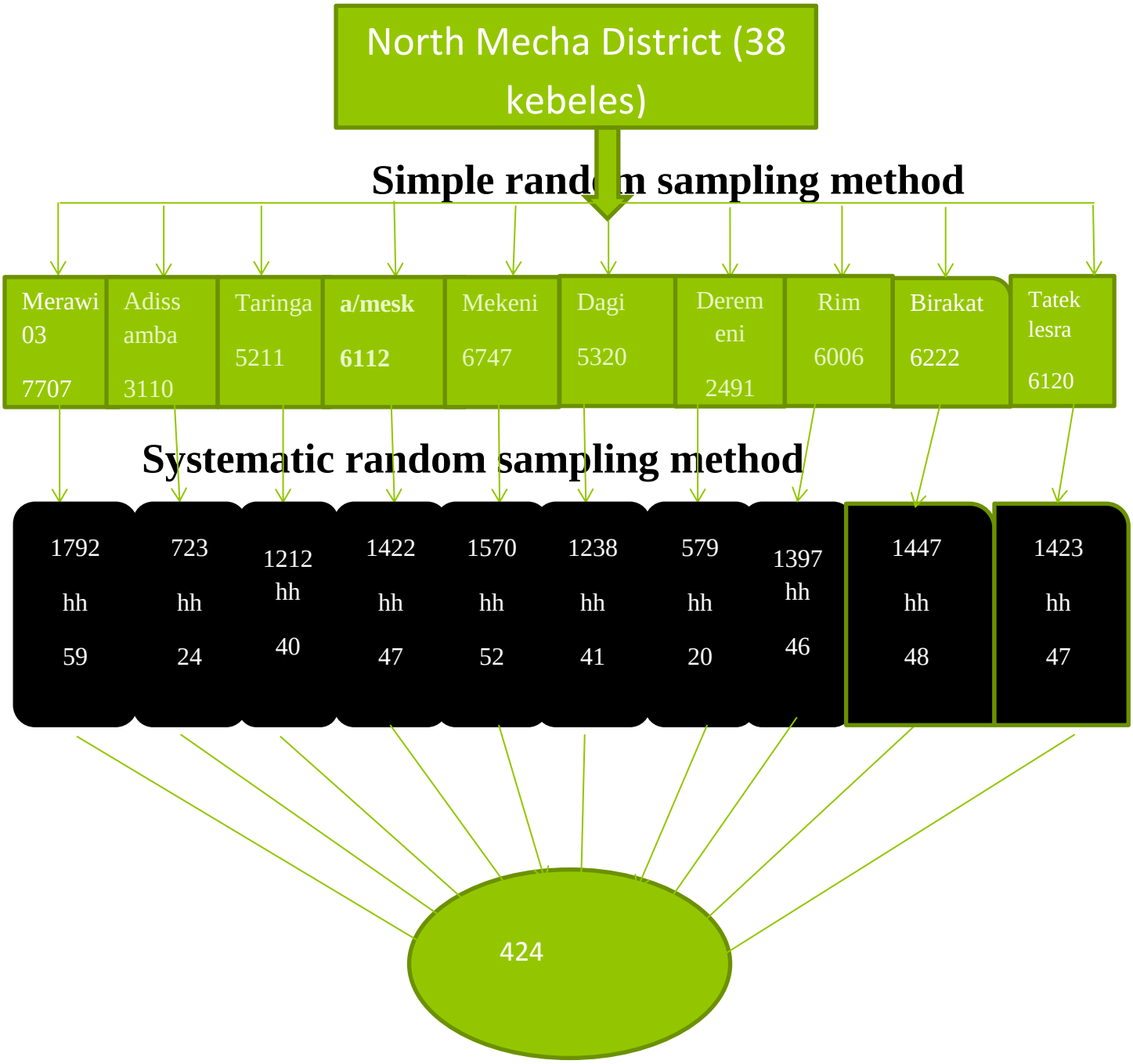


**Figure 2. Schematic presentation of sampling procedures**

As shown on the diagram above the list of households prior to data collection was taken from each of the selected kebeles health post CHIS. The registration procedures and completeness of the records was checked. House number of the households was identified and sampling frame was prepared for each of the selected kebeles. Finally, the required number of sample was selected from each kebeles using systematic random sampling technique.

According to North Mecha Woreda plan commission office the total population of the selected kebele is 55046.Therefore households(N)in the selected kebele and dividing it by sample size (n) the selected study participants (K) was interviewed by using systematic random sampling method (K=N/n=12803/424=31).

nh=n*Nh/N

N=total house holds

Nh=total households from each kebele

n=total sample size

nh=selected households from the total house hold

Therefore, an eligible study participant was interviewed by going in every 31 households. For households with more than one eligible study participants, interview was done by selecting a participant using lottery method although in the event of a household with no eligible participants the immediate next household was interviewed.

## 5.5. ELLIGIBILITY CRITERIA

### 5.5.1 INCLUSION CRITERIA

All selected child's aged, 24-35 months who live in the study area for six Months or more, were included.

### 5.5.2 EXCLUSION CRITERIA

Child's who was ill before or in their life time with measles.

## 5.6 STUDY VARIABLES

### 5.6.1. DEPENDANT VARIABLE

MCV 2-----Vaccinated or Non- vaccinated

### 5.6.2. INDEPENDENT VARIABLES

- Socio demographic status and Socio -economic status [Family size, Ethnicity, Religion, Age, Sex, Marital status, Residence, Employment/occupation, Occupation, Education]
- Maternal and child health care services utilization [ANC follow up, Place of delivery, postnatal care, Birth order, Parity, Birth interval]
- Health facility related factors [Accessibility of health facility]

## 5.7. OPERATIONAL DEFINITIONS

1. Not vaccinated: a child who does not receive the dose of MCV 2 from eligible.

2. Vaccinated: a child who received the dose of MCV 2 from eligible

3. Awareness about MCV 2:- Having knowledge of mother's/caregiver's on MCV 2 with a minimum knowing that there is MCV 2 vaccine and when to give to their child.

4. PNC service utilization:- Mother who attend at least one PNC service from health institutions by health professional (midwife, nurse, health officer, and medical doctor) or health extension worker during the first six weeks starting immediately after the time of delivery and at any set up within the first seven days of delivery after discharged from health facility [15].

### 5.8 DATA COLLECTION Tool And Procedure

#### 5.8.1 DATA COLLECTION TECHNIQUE

A structured and pretested questionnaire was used and face to face interview was carried out on child's care giver. The pre -test was run in kebeles which is not included in North Mecha on 5 % [22] of the total sample size. The questionnaire included socio-demographic characteristics, socio-economic factors, awareness related factors and Maternal and child health care services utilization. The questionnaire was originally developed in English and then translated into Amharic. It was translated back to English to ensure its consistency. Most of the items were adapted from existing literatures. The Amharic language questionnaire was used to collect data at all kebeles during the study period. Supervision of data collectors was made each day by the principal investigator and by two supervisors. The collected data was carefully checked for completeness as well as consistency. Any confusion on the data collection procedure and or responses was handled immediately (on spot).

#### 5.8.2 DATA COLLECTORS

The data was collected by interviewing the study participants after getting informed consent. Three clinical nurses and two BSc nurses (supervisors) was participated in data collection after being given intensive one day training on the data collection tools and collection procedures by the principal investigator for data collectors and supervisors.

#### 5.8.3 DATA QUALITY CONTROL

The collected data was checked for the completeness and clarity and after conducting pre-test.Any error; ambiguity or incompleteness identified was corrected immediately. The data

collection process was supervised by the investigator throughout the data collection period. This was helped to solve problems which are occurred during data collection.

### 5.8.4 DATA PROCESSING AND ANALYSIS

After data collection, the questionnaires were checked for completeness and consistency, retranslated to English from Amharic and then the data was entered into SPSS version 23 statistical software for analysis. Descriptive statistics like frequencies and percentages were done to describe the study variables. Each independent variable was assessed for statistically significant association with the dependent variables in bivariate analysis at 95% confidence interval and p-value of <0.2. Those variables whose p-values less than 0.2 during the bivariate analysis were fitted to the final multi variable binary logistic regression analysis to adjust for potential confounders. Goodness of fit of the final models were checked using Hosmer and Lemeshow test of goodness fit. Significant independent variables were declared by adjusted odds ratio at 95% confidence interval and P-value of less than 0.05.

## 5.9 ETHICAL CONSIDERATIONS

Ethical clearance was obtained from Ethical review committee of university of BDU and in order to obtain permission letter I were contact north mecha district health office. Then the selected child's caregiver from each household was informed about the purpose of the study, the importance of their participation, Withdraw at any time and written consent was obtained prior to data collection. Privacy and confidentiality of information given by each respondent was kept properly and a name was not recorded. For those who was found not vaccinated child during the study period was linked to nearest health post or health center for vaccination

## 6. PLANS FOR DISSEMINATION OF RESULTS

The results of the study will be presented to Bahir Dar University College of Medicine and Health Sciences School of Public Health as part of master of GMPH thesis. It will also get shared to Amhara Regional Health bureau, West Gojjam Zonal Health department, North Mecha district Health office and respective kebele administrations. Efforts will be made to present the results on scientific conferences and peer reviewed journal publications will be considered.

## 7. Results

7.1 Maternal and child socio-demographic characteristics

A total of 422 women with children aged 24–35 months were included in the final analysis, which made 99.5% response rate. Among the total children, more than half were girls (52.8%). The majority (86%) women were rural dwellers and 64% of mothers had unable to read and write. The median age of the women was 27 years old, and more than half of them were aged between 25 and 34 years (69.4%); also 1.4% and 98.6% were Muslims and Orthodox Christians, respectively. Besides, the majorities of them (89.8%) were housewives and 98.8% were married (Table1).

**Table 1 Socio-Demographic Characteristics of mothers and index children aged 24-35 months, North Mecha Districts ,West Gojjam Zone, North West Ethiopia January 2021,(n = 422).**

| Variable | Frequency | (%) |
|---|---|---|
| **Age of women** | | |
| ≤ 24 years | 94 | 22.3 |
| 25-34 years | 293 | 69.4 |
| ≥35 years | 35 | 8.3 |
| **Sex of index child** | | |
| Male | 199 | 47.2 |
| Female | 223 | 52.8 |
| **Sex of household head** | | |
| Female | 5 | 1.2 |
| Male | 417 | 98.8 |
| **Residence** | | |
| Urban | 59 | 14 |
| Rural | 363 | 86 |
| **Living condition of index child** | | |
| Both parents | 417 | 98.8 |
| Mother only | 5 | 1.2 |
| **Religion of the care giver/mother** | | |
| Orthodox | 416 | 98.6 |

| | | |
|---|---|---|
| Muslim | 6 | 1.4 |
| **Marital status of the care giver/mother** | | |
| Single | 5 | 1.2 |
| Married | 417 | 98.8 |
| **Educational status of the care giver/mother** | | |
| Unable to read and write | 270 | 64 |
| Read and write | 25 | 5.9 |
| Primary school | 57 | 13.5 |
| Secondary school | 38 | 9 |
| College and above | 32 | 7.6 |
| **Education status of Husband** | | |
| Unable to read and write | 176 | 41.7 |
| Read and write | 156 | 37 |
| Primary school | 35 | 8.3 |
| Secondary school | 27 | 6.4 |
| College and above | 28 | 6.6 |
| **Current occupation of the care giver/mother** | | |
| Merchant | 17 | 4.1 |
| Government employees | 26 | 6.1 |
| Housewife | 379 | 89.8 |
| **Current occupation of the Husband** | | |
| Merchant | 34 | 8.1 |
| Farmer | 350 | 82.9 |
| Government employees | 38 | 9 |
| **Total family size** | | |
| 1-3 | 19 | 4.5 |
| 4-5 | 226 | 53.5 |
| 6+ | 177 | 41.9 |

7.2 Reproductive health history and access to a health facility characteristics

All most all (98.8%) of the mothers reported that they had ANC follow up for the indexed child and from those 72.2% of mothers had 2-3 times ANC visits and also most (85.8%) of

the mothers were started ANC visit 3-7 months of pregnancy. only 53.1% of the index child's mothers were PNC follow up. 92.5% were born in health institutions (table 2).

**Table 2 Reproductive health history and access to a health facility characteristics of mothers and index children aged 24 – 35 months, North Mecha Districts, West Gojjam Zone, North West Ethiopia January 2021, (n = 422).**

| Variable | **Frequency** | (%) |
|---|---|---|
| **ANC follow up for the index child** | | |
| No | 5 | 1.2 |
| Yes | 417 | 98.8 |
| **ANC number of visits** | | |
| 1 times | 17 | 4.1 |
| 2–3 times | 301 | 72.2 |
| ≥4 times | 99 | 23.7 |
| **First ANC visit started** | | |
| <3months | 13 | 3.1 |
| 3–7months | 358 | 85.8 |
| >7months | 46 | 11.1 |
| **Birth order** | | |
| 1 | 20 | 4.7 |
| 2-5 | 247 | 58.5 |
| 6+ | 155 | 36.7 |
| **Preceding birth interval in months** | | |
| 24 – 47 | 355 | 88.3 |
| >47 | 47 | 11.7 |
| **Place of delivery** | | |
| Health facility | 390 | 92.5 |
| Home | 32 | 7.5 |
| **PNC follow up (PNC service utilization) for the index child** | | |
| No | 198 | 46.9 |
| Yes | 224 | 53.1 |
| **PNC performed by** | | |

| | | |
|---|---|---|
| Doctor | 2 | 0.8 |
| Nurse | 4 | 1.8 |
| Midwife | 211 | 94.2 |
| HEW | 7 | 3 |

7.3 Utilization and Mothers' Perception about MCV 2 and Children Vaccination status

All most all 96.2% of the care givers/mothers home did not visit by HEW within 12 months. More than three-fourths of (78.2%) of children mothers' were heard about MCV 2 and Knew about schedule of their catchment area. Three hundred four (72%) of the mother/care giver were vaccinated their children from outreach site. Nearly half (49.3%) of mothers were travel time to the nearest vaccination site from their home were ≤ 30 minutes. Around one-in-three children Mothers' (32.2%) had reported that they ever returned without getting a vaccine. Only (3.3%) of mothers worried vaccines would cause the child to be sick. Majority of the mothers (94.5%) stated they would take their child for vaccination even if the child was sick (Table 3).

**Table 3 Mothers' Perception, Children Vaccination status and related factors about MCV 2 characteristics of mothers and index children aged 24 – 35 months, North Mecha districts, West Gojjam Zone Northwest Ethiopia January 2021.**

| Variable | Frequency | (%) |
|---|---|---|
| **HEWs visited your home (within 12 months)** | | |
| **No** | 406 | 96.2 |
| **Yes** | 16 | 3.8 |
| **HEWs given information on MCV 2** | | |
| **No** | 276 | 65.4 |
| **Yes** | 146 | 34.6 |
| **Heard about MCV 2** | | |
| **No** | 92 | 21.8 |
| **Yes** | 330 | 78.2 |
| **Know about schedule of MCV 2** | | |

| | | |
|---|---|---|
| **No** | 92 | 21.8 |
| **Yes** | 330 | 78.2 |
| **Available vaccination site to your residing area** | | |
| **Yes** | 422 | 100 |
| **Type vaccination site in your area** | | |
| **Hospital** | 50 | 11.8 |
| **Health Canter** | 86 | 16.1 |
| **Outreach Site** | 304 | 72 |
| **Travel time to Nearest Vaccine site (in walk time)** | | |
| **15 – 30 min** | 208 | 49.3 |
| **30 – 60 min** | 174 | 41.2 |
| **>one hour** | 40 | 9.5 |
| **Ever gone for your child's vaccination for MCV 2** | | |
| **No** | 92 | 21.8 |
| **Yes** | 330 | 78.2 |
| **Waiting time for vaccination** | | |
| **<15 min** | 10 | 4.5 |
| **15 – 30 min** | 19 | 8.5 |
| **30 – 60 min** | 48 | 21.4 |
| **>one hour** | 147 | 65.6 |
| **Any cancelation/postponed of vaccine schedule** | | |
| **No** | 224 | 67.8 |

| | | |
|---|---|---|
| **Yes** | 106 | 32.2 |
| **Ever return without getting vaccine** | | |
| **No** | 224 | 67.8 |
| **Yes** | 106 | 32.2 |
| **Heard about vaccine (MCV2) side effects** | | |
| **No** | 115 | 27.3 |
| **Yes** | 307 | 72.7 |
| **Worried vaccines (MCV2) can cause your child sick** | | |
| **No** | 408 | 96.7 |
| **Yes** | 14 | 3.3 |
| **Will you take your child for vaccination if he/she is sick?** | | |
| **No** | 23 | 5.5 |
| **Yes** | 399 | 94.5 |

Vaccination status

Only two hundred twenty four 53.08% with 95% CI: (48.8, 58.5) reported that the indexed child were received MCV 2 vaccination (Figure 3)

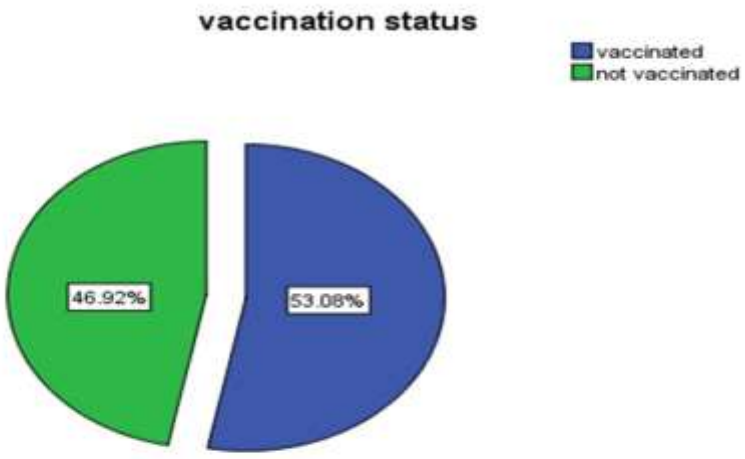


Figure 3 Vaccination status of children aged 24 – 35 months, in North Mecha Districts, North West Ethiopia. (n= 422)

Reasons for not vaccinated MCV2

Mothers were asked reasons for not vaccinated their children .Out of the total children who were not vaccinated had more than half (53.6%) of the index child's mother were not vaccinated their child do to the reason of no enough child to open the vial. (Figure 4).

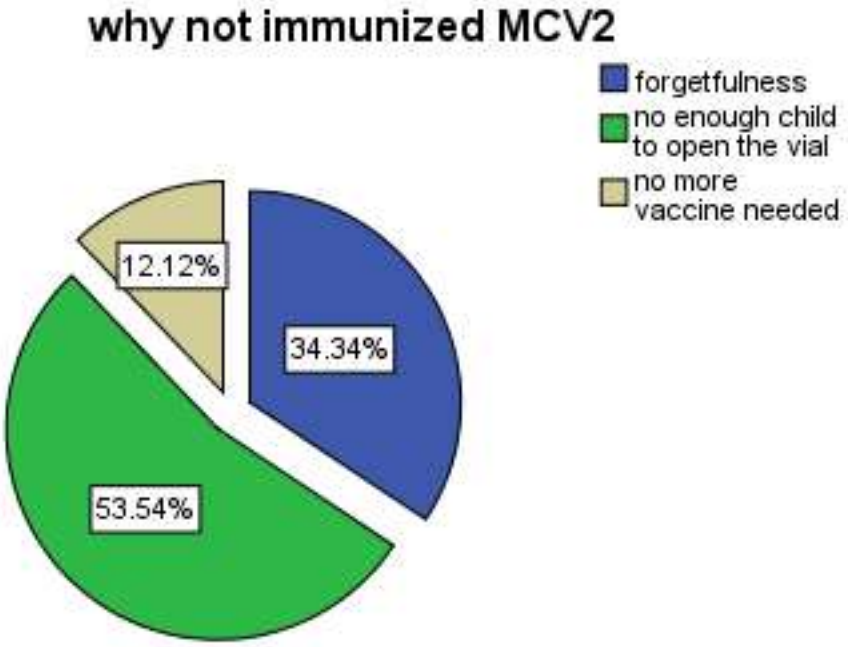


Figure 4 The reason not vaccinated for MCV 2 aged 24 – 35 months, in North Mecha Districts, North West Ethiopia. (n = 422)

7.4 Factors Associated with the Utilization of MCV2

In the bivariable logistic regression analysis: age of women, residence, mother's education level, father's education level, place of delivery, HEWs given information on MCV 2, know about schedule of MCV 2, type of vaccination site in your area, travel time to nearest vaccine site (in walk), and take your child for vaccination if he/she is sick were found to be associated with utilization of MCV2.

In the multi variable binary logistic regression analysis, the following five variables were identified as independently associated with utilization of MCV2. These were: mother's educational status, place of delivery, HEWs given information on MCV 2, knowledge about schedule of MCV2 and travel time to Nearest Vaccine site ≤30 minute (in walk).

Women who had educational statues College and above were 9.4 times [AOR=9.45; 95% CI (1.25-10.28)] more likely to vaccinated their children than those who has unable to read and write.

Women who had delivered in health facility were 4.1 times more likely to vaccinated their children compared to those women who had delivered in home [AOR= 4.13 ;95%, CI: (1.092-15.618)].

Women who were informed of MCV2 vaccinating by HEWs were 3.7 times more likely to vaccinate their children than those who did not [AOR=3.71; 95%, CI: (1.748-7.890)].

Knowledge of vaccination schedule of a catchment area [AOR: 9.14, 95% CI: (4.42, 18.88)] were positive significantly associated predictors with child MCV 2 vaccination status.

Children at ≤ 30 minutes travel time to the nearest vaccination site were more likely to be MCV 2 vaccinated when compared to child who had more than one hours travel time (in walk time) [AOR: 6.7, 95% CI: (2.99, 15.00)] (Table 4)

Table 4 Factors Associated with the Utilization of MCV2 2 in North Mecha district, North West Ethiopia, January 2021, (n=422)

| Variables | Vaccination status | | COR (95%CI) | AOR (95% CI) | P-value |
|---|---|---|---|---|---|
| | Yes (%) | No (%) | | | |
| Age of women | | | | | |
| **≤ 24 years** | 75(33.5) | 19(9.6) | 5.26(2.27-12.16) | 2.7(0.72-10.65) | 0.136 |
| **25-34 years** | 134(59.8) | 159(80.3) | 1.12(0.55-2.28) | 1.49(0.66-3.37) | 0.335 |
| **≥35 years** | 15 (6.7) | 20(10) | 1 | 1 | |
| **Residence** | | | | | |
| **Urban** | 52(23.2) | 7(3.5) | 8.24(3.64-18.64) | 2.67(0.46-15.49) | 0.273 |
| **Rural** | 172(76.8) | 191(96.5) | 1 | 1 | |
| **Educational status of the care giver/mother** | | | | | |
| **Unable to read and write** | 112(50) | 158(79.8) | 1 | 1 | |
| **Read and write** | 22(9.8) | 3(1.5) | 10.345(3.02-35.40) | 1.66(0.36-7.59) | 0.513 |
| **Primary school** | 46(20.5) | 11(5.6) | 5.89(2.92-11.89) | 1.28(0 .28-5.72) | 0.744 |
| **Secondary school** | 22(9.8) | 16 (8.1) | 1.94(0.97-3.85) | 0.75(0.15-3.72) | 0.725 |
| **College and above** | 22(9.8) | 10(5.1) | 3.1(1.41-6.80) | 9.45(1.25-10.28) | **0.029*** |
| **Educational status of the Husband** | | | | | |
| **Unable to read and write** | 97(43.3) | 79(39.9) | 1 | 1 | |
| **Read and write** | 53(23.7) | 103 (52) | 0.41(0.26-0.65) | 0.54(0.16-1.81) | 0.322 |
| **Primary school** | 30(13.4) | 5(2.5) | 4.88(1.81-13.18) | 0.53(0.04-6.54) | 0.623 |
| **Secondary school** | 24(10.7) | 3(1.5) | 6.51(1.89-22.43) | 6.51(1.89-22.43) | 0.403 |
| **College and above** | 20(8.9) | 8(4) | 2.03(0.851-4.87) | 1.82(0.11-28.82) | 0.668 |
| **Place of delivery** | | | | | |
| **Health facility** | 214(95.5) | 176(88.9) | 2.67(1.23-5.79) | 4.13(1.09-15.61) | **0.037*** |
| **Home** | 10(4.5) | 22(11.1) | 1 | 1 | |
| **HEWs given information on MCV2** | | | | | |
| **No** | 124(55.4) | 152(76.8) | 1 | 1 | |
| **Yes** | 100(44.6) | 46(23.2) | 2.66(1.747-4.064) | 3.71(1.74-7.89) | **0.001*** |
| **Know about schedule of MCV 2** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **No** | 16(7.1) | 76(38.4) | 1 | 1 | |
| **Yes** | 208(92.9) | 122(61.6) | 8.09(4.518-14.516) | 9.14(4.42-18.88) | **0.000*** |
| **Type of vaccination site in your area** | | | | | |
| **Hospital** | 45(20.1) | 39(2.5) | 11.26(4.35-29.16) | 2.20(0 .30-15.89) | 0.433 |
| **Health Canter** | 44(19.6) | 24(12.1) | 2.29(1.329-3.96) | 0.06(0.003-1.442) | 0.533 |
| **Outreach Site** | 135(60.3) | 169(85.4) | 1 | 1 | |
| **Travel time to Nearest Vaccine site (in walk time)** | | | | | |
| **15 – 30 min** | 190(84.8) | 18(9.1) | 7.03(3.17-15.6) | 6.7(2.99-15.00) | **0.000*** |
| **30 – 60 min** | 10(4.5) | 164(82.8) | 0.04(0.01-0.10) | 0.04(0.01-0.10) | 0.200 |
| **>one hour** | 14(10.7) | 164(82.8) | 1 | 1 | |
| **Take your child for vaccination if he/she is sick** | | | | | |
| **No** | 9(4) | 14(7.1) | 1 | 1 | |
| **Yes** | 215(96) | 184(92.9) | 1.81(0.76-4.29) | 2.73(0.88-8.47) | 0.081 |

Keys *= Statistically Significant

## 7. Discussion

This study tried to assess level of vaccination coverage and associated factors among children aged between 24-35 months living in selected ten kebeles of North Mecha district. This study found that the level of vaccination coverage in the study area using either vaccination card or maternal or care giver recall method was 53.08% with 95% CI: (48.8, 58.5).This finding is higher compared to other recent studies such as Mini EDHS 2019 (9%) [40] And lower than the recommended herd immunity threshold, (95%) (19]. This childhood MCV2 coverage below the recommended herd immunity threshold (95%) may indicate that childhood MCV2 coverage may still be at considerable risk for measles outbreaks. The possible explanation could be: EDHS 2019 has used samples from all the regions of Ethiopia including developing regions such as Afar, Somali, Benishangule-Gumuz and Gambella. The residents of these regions are pastoral that may have low awareness and health seeking behaviour including vaccination of their children.

Maternal education was identified as a strong predictor of childhood immunization in other studies [35, 36]. Children from mothers with educational status college and above had higher odds of being vaccinated for MCV2. This finding is supported by other studies in Nigeria (AOR=1.99, 95% CI: 1.09, 3.61) [36] and South Africa (AOR: 7.89; 95 % CI: 1.08–57.37), [31] the possible explanation could be women increase educational level has better understanding about benefits of vaccination. This is also due to the contribution of education, changes in attitudes, traditions and beliefs, increased autonomy, and decision-making which could directly enhance a health seeking behaviour of the mothers.

Those children are born in health institution were more likely to be MCV2 vaccinated than those who born at home; which is consistent with studies done in Kenya (AOR=1.58; 95%CI: 1.19, 2.82) [32]. This can be explained by; being delivered at health facility, in addition to having safe delivery by health professionals, had additional benefit on post-delivery follow up and vaccination related information from health professionals. The information includes appointing the mother for vaccination and other maternal and child health, which might increase the practice of mother to vaccinate their children.

Children whose mothers had get information on vaccine and vaccine preventable diseases by HEWs or other health provisional were more likely to be MCV 2 vaccinated than children of mothers who had not informed on vaccine and VPD; this finding is similar with study done in Lomé (AOR=3.68; 95%CI: 2.48, 5.47) [37]. This strong association can be explained by; MCV2 vaccinating of children is practice and one of the determining factors for good practice is having knowledge, having good knowledge towards vaccination and VPD can increase the practice of MCV2 vaccinating children.

Mothers who knew the schedule of immunization were more likely to have vaccinated their children than mothers who didn't knew the Schedule of immunization. Other studies were conducted in South Africa (AOR=2.07; 95%CI: 1.15, 3.71) also shown that a mother's knowledge of the Schedule of vaccination has a strong association with complete immunization status of children [31].which might indicates that mothers had access to medias, participated in EPI program by giving information to habitants, motivating mothers

and community health service utilization also showed improvement in immunized their children. This in turn might reveal the importance of political commitment to improve immunization status of children.

Children at ≤ 30 minutes travel time to the nearest vaccination site were more likely to be MCV 2 vaccinated when compared to child who had more than one hours travel time (in walk time). Long distance is a demotivating factor to immunize children[47]. This finding agrees with other studies carried out in Kenya (AOR=5.27; 95 % CI=2.20, 12.64) [46] and Sudan (AOR=1.92; 95 % CI=1.01, 3.70) [47].

## 8. Strength and limitation

### 8.1 Strength

Data collectors were not working in that specific community in order to minimize information bias.

### 8.2 Limitation

Some mothers/care givers cannot differentiate MCV2 and measles campaign program.

## 9. Conclusion

The current study reveals that, MCV2 vaccination coverage of Children's 24-35 months of age is low as compare to the recommended herd immunity threshold or target, (95%). Mother's educational status college and above, place of delivery in healthy facility, HEWs given information on MCV 2, knowledge about schedule of MCV2 and travel time to Nearest Vaccine site ≤30 minute (in walk) were have positive association with MCV2 vaccination.

## 10. Recommendation

Generally, the findings of this study have important policy implications for health intervention programs and underline the view that encouraging awareness of the community on the importance of the recommended immunization may have a considerable importance on children's' health. Therefore, the following recommendations were forwarded based on the findings of this study.

**Government level**

- Establish infrastructure
- Give health education to increase community awareness.

**Health facility level**

- Health care providers give emphasis and strengthen linkage of women/care giver to immunization service while women came to health institute for MCH service activities.

- Open available outreach vaccination site in nearest area

**Community level**

- Sufficient information should be provided to rural women, which will encourage them to seek vaccination at the appropriate age of the child.
- Health extension workers and HDA should rigorously aware the mothers and the community about the advantage of completing immunization for children, when a child start vaccine, the number of sessions needed, and when a child will be MCV2 immunized.

**Researchers**

- Recommended further survey in national /population survey needed.

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## 12. Appendix

12.1 Consent Form

12.2 In English Language

English questionnaire

Consent form

Hello! My name is ----------I am one of the members of the research team, which has the objectives of Utilizations of measles conjugated vaccine 2 and its associated factors in North Mecha district, West Gojjam Amhara region. You may be one of the person who will be selected to participate in this study, therefore you are kindly requested to participate in this study and provide the information required from you. Your participation in this study is completely on voluntary basis and you have the right to refuse from participating. Your responses will be kept confidential and there will be no way of linking your individual responses to the final results of the study findings. We would like to inform you that the responses that you provide to the questions are very essential for the successful accomplishment of this study.

Are you willing to participate in this study to give your responses based on the questionnaire?

1. Yes ----------signature----------
2. No

- Name and Signature of the data collector _____
- Name and signature of the supervisor _____
- Date of interview _____
- Code _____

12.3 English Questionnaire

| Part 1 Socio-Demographic Characteristics | | | |
|---|---|---|---|
| No | Questions | Responses | Skip |
| 101 | Age of women | ----------years old | |
| 102 | Sex of index child | 1.Male<br>2.Female | |
| 103 | Sex of house hold head | 1.Male<br>2.Female | |
| 104 | Residence | 1.Urban<br>2.Rural | |
| 105 | Living condition of index child | 1.Both parents<br>2.Mother only<br>3.Grand parents | |
| 106 | Religion of the care giver/mother | 1. Orthodox<br>2 .Muslim<br>3 .Protestant<br>4.Catholic<br>5.Others specify------ | |
| 107 | Marital status of the care giver/mother | 1.Single<br>2.Married<br>3.Divorced | |
| 108 | Educational status of the care giver/mother | 1.Unable to read and write<br>2.Read and write<br>3.Primary school<br>4.Secondary school<br>5.College and above | |
| 109 | Education status of Husband | 1. Unable to read and write<br>2. Read and write<br>3.Primary school<br>4.Secondary school<br>5. College and above | |

| | | | |
|---|---|---|---|
| 110 | Current occupation of the care giver/mother | 1.Merchant<br>2.farmer<br>3.Un-Employed<br>4.Government employees<br>5.Student<br>6.Housewife<br>7.Others, specify---------- | |
| 111 | Current occupation of the Husband | 1. Merchant<br>2. farmer<br>3.Un-Employed<br>4. Government employees<br>5. Student<br>6. Others, specify---------- | |
| 112 | To which Ethnic group do you belong? | Amhara<br>Tigre<br>Oromo<br>Others, specify---------- | |
| 113 | Total family size | ---------- | |

Part 2 Reproductive health history and access to a health facility

| | | | |
|---|---|---|---|
| 114 | Do you have ANC follow up for the index child? | 1 yes<br>2 no | If "no" Que 116 |
| 115 | If "yes" NO 114 ANC number of visits | 1 1 times<br>2 2–3 times<br>3 ≥4 times | |
| 116 | If "yes" NO 114 first ANC visit started | 1 <3months<br>2 3–7months<br>3 >7months | |

| | | | | |
|---|---|---|---|---|
| 117 | Birth order | 1<br>2<br>3 | 1<br>2–5<br>6+ | If "1" Que 119 |
| 118 | Preceding birth interval in months | 1<br>2<br>3 | ≤23 months<br>24 – 47 months<br>>47 months | |
| 119 | Place of delivery | 1<br>2 | Health facility<br>Home | |
| 120 | PNC follow up for the index child | 1<br>2 | yes<br>no | |
| 121 | If "yes" NO 121 PNC performed by | 1<br>2<br>3<br>4<br>5 | Doctor<br>Nurse<br>Midwife<br>HEW<br>Others, specify---------- | |
| Part 3 Access to a health facility, utilization and mothers' perception about MCV 2 | | | | |
| 122 | Is there Presence of HEW s in the kebele | 1.yes<br>2.no | | If "no" Q 125 |
| 123 | If 122 yes ,HEWs visited your home(within one years) | 1.yes<br>2.no | | |
| 124 | HEWs given information on MCV 2 | 1.yes<br>2.no | | |
| 125 | Did You heard about MCV 2? | 1.Yes<br>2.No | | |
| 126 | Did you know about schedule of MCV 2? | Yes<br>No | | |
| 127 | 126 yes, at what months of age your child's get MCV 2? | ----------months of age | | |
| 128 | Is there accessible vaccination site to your residing area? | 1.Yes<br>2.No | | |

| | | | |
|---|---|---|---|
| 129 | If yes 128 available vaccination site in your area? | Hospital<br>2 Health Canter<br>3 Health Post Scheduled<br>4 Outreach Site | |
| 130 | Travel time to Nearest Vaccine site (in walk time) | 1. < 15 min<br>2. 15 – 30 min<br>3. 30 – 60 min<br>4. >one hour | |
| 131 | Do you ever gone for your child's vaccination for MCV 2? | 1.Yes<br>2.No | |
| 132 | Did your child's have immunized for MCV2? | 1.Yes by card<br>2.yes by mothers' verbal reports<br>2.No | |
| 133 | 132 no why? | Specify---------- | |
| 134 | If yes 132 Waiting time for vaccination? | 1. < 15 min<br>2. 15 – 30 min<br>3. 30 – 60 min<br>4. >one hour | |
| 135 | Is there any cancelation/postponed of vaccine schedule? | 1.Yes<br>2.No | |
| 136 | Did you ever return without getting vaccine? | 1.Yes<br>2.No | |
| 137 | Did You heard about vaccine (MCV2) side effects? | 1.Yes<br>2.No | |
| 138 | Do you worried vaccines (MCV2) can cause your child sick? | 1.Yes<br>2.No | |
| 139 | Will you take your child for vaccination if he/she is sick? | 1.Yes<br>2.No | |

Thank you very much for your participation!

## 12.4 ማጠይቅ

የአማርኛ ማጠይቅ

ጠፍ ይስጥልን ስሜ ----------እባላለሁ፡ ፡በባህር ዳር ዩኒቨርስቲ ድጋፍ የሚደረግ ጥናት ለማካሄድ ሲሆን እኔም የዚህ ጥናት ቡድን አባል መሆኔን እየገለፅሁ፤ የጥናቱ ዋና ዓላማ የሚያተኩረዉ በጠፍ ተቋም እና በጠፍ ኤክስቴንሽኖች የሚሰጥ ሁለተኛ ዙር የኩፍኝ ክትባት አገልግሎት በሚሟሉ ህፃናት ላይ ያገልግሎት አሰጣጥ ጥራት ጋር ተያያዥየሆኑ ጉዳዮች መዳሰስ ላይ ያተኮረ ነዉ፡ ፡ስለሆነ ምአርስዎ በዚህ ጥናት ወስጥ እዲሳተፉ እና መረጃ እዲሰጡን እንጠይቀዎታለን፡ ፡የእርስዎ በዚህ ጥናት ወስጥ መሳተፍ በፍፁም ፈቃደኝነ ትዎ ላይ የተመሰረተ ነዉ፡ ፡እርስዎ የሚሰጠኝ መረጃ ሚስጥራዊነ ቱ ሙሉ በሙሉ የተጠበቀ ነዉ፡ ፡የእርስዎ ስምምሆነ ማንኛዉምአይነ ት መለያ መረጃዎች አይመዘገቡም፡ ፡አርስዎ በጥናቱ የመሳተፍም ሆነ ያለመሳተፍ መበት ያለዎት ሲሆን፤ ጥያቄዎችን ያለመመለስ ወይም የሞቋረጥ መበትዎ ሙሉ በሙሉ የተጠበቀ ነዉ፡ ፡ነገር ግን እርስዎ በፈቃደኝነ ት ላይ ተመስርተዉ የሚሰጡ መረጃ ጥናቱን ጀምሮ ለማጠናቀቅ እጅግ በጣም አስፈላጊ ነዉ፡ ፡ስለዚህ ይህ ማጠይቅ የሚሞላዉ እርስዎ ፈቃደኛ ሲሆኑ ብቻ ነዉ፡ ፡

እርስዎ በዚህ ጥናት ወስጥ ለመሳተፍ ፈቃደኛ ነዎት?

አዎ ፈቃደኛ ነኝ ፊርማ----------

ፈቃደኛ አይደለሁም

የመረጃ ሰብሳቢዉ/ዋ ስምእና ፊርማ_____

የተቆጣጣሪዉ/ዋ ስምእና ፊርማ_____

መረጃዉየተሰበሰበበት ቀን _____

የሚስጥር ቁጥር _____

12.5 የአሚርኛ ማጠይቅ

| ክፍል አንድ፡ - ማህበራዊ እና ሰነ -ህዝባዊ ሚጃዎችን በተመለከተ | | | |
|---|---|---|---|
| ተ.ቁ | ጥያቄዎች | ምላሾች | ይዝለሉት |
| 101 | እድሜዎት ስንት ነ ዉየእናት እድሜበዓመት? | ----------ዓመት | |
| 102 | የህጻን ልጅዎ ጾታ? | 1.ወንድ<br>2.ሴት | |
| 103 | የቤተሰቡ መሪ ጾታ? | 1.ወንድ<br>2.ሴት | |
| 104 | የመኖሪያ አድራሻ? | 1.ከተማ<br>2.ገጠር | |
| 105 | ህጻን ልጅዎ ከማን ጋር ነ ውየ ሚኖረው | 1. ከእናትና አባቱ ጋር<br>2. ከእናቱ ጋር ብቻ<br>3. ከአያቱ ጋር | |
| 106 | እምነ ትዎት ምንድን ነ ው? | 1.ኦርቶዶክስ ተዋህዶ<br>2.መኳሊም<br>3.ፕሮቴስታንት<br>4.ካቶሊክ<br>5.ሌላ ካለ ይገለጽ------ | |
| 107 | የትዳር ሁኔታ? | 1.ያላገባ/ች<br>2.ያገባ/ች<br>3.የተፋታች/ታ | |
| 108 | የእናትየ ውየ ትምህርት ደረጃ? | 1.ማንበብእና መጻፍ የማትችል<br>2.ማንበብእና መጻፍ የምትችል<br>3.የመጀመሪያ ትምህርት ያጠናቀቀ/ች<br>4.የሁለተኛ ደረጃ ት/ት ያጠናቀቀ/ች<br>5.ኮሌጅእና በላይ | |

| | | | |
|---|---|---|---|
| 109 | የአባት የትምህርት ደረጃ? | 1.ማንበብ እና መጻፍ የማትችል<br>2.ማንበብ እና መጻፍ የሚችል<br>3.የመጀመሪያ ትምህርት ያጠናቀቀ/ች<br>4.የሁለተኛ ደረጃ ት/ት ያጠናቀቀ/ች<br>5.ኮሌጅ እና በላይ | |
| 110 | የእናትየ ውአሁን የሚሰሩት ስራ? | 1.ነጋዴ<br>2.በግብርና ስራ<br>3.ስራ ያልያዘ<br>4.የመንግስት ሰራተኛ<br>5.ተማሪ<br>6. የቤት እመቤት<br>7.ሌላ ካለ ይገለጽ---------- | |
| 111 | የአባት አሁን የሚሰሩት ስራ? | 1.ነጋዴ<br>2.አርሶ-አደር<br>3.ስራ ያልያዘ<br>4.የመንግስት ሰራተኛ<br>5.ተማሪ<br>6. የቤት እመቤት<br>6.ሌላ ካለ ይገለጽ---------- | |
| 112 | ብሔርዎት ምን ነዉ? | 1.አማራ<br>2.ትግሬ<br>3.አሮሞ<br>4.ሌላ ካለ ይገለጽ---------- | |
| 113 | በቤተሰቡ ዉስጥ የሚኖር የቤተሰብ አባላት ብዛት | …… | |
| **ክፍል ሁለት ፡ - የሰነ -ተዋልዶ እና የእናቶችን ጠፍ ሚጃዎችን በተመለከተ** | | | |

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| 114 | በእርግዝናዎ ወቅት የነፍሰጠፎ ክትትል አድርገዋል; | 1. አዎ<br>2. የለም | መልሱ' 'የለም'' ከሆነ ''117'' |
| 115 | 114 መልሱ አዎ ከሆነ ስንት ጊዜ ክትትል አድርገዋል | 1. አንድ ጊዜ<br>2. ከሁለት እስከ ሦስት<br>3. ከአራት ጊዜ በላይ | |
| 116 | 114 መልሱ አዎ ከሆነ መቼ ነው የነፍሰጠፎ ክትትል የጀመሩት | 1.ከሦስት ወር በፊት<br>2. ከሦስት ወር እስከ ሰባት ወር ባለው<br>3. ከሰባት ወር በኃላ | |
| 117 | ስንተኛ ልጅዎት ናት/ነው | 1. የመጀመሪያ<br>2. ከ2-5 ወስጥ<br>3. ከ6 በላይ | መልሱ' '1'' ከሆነ ''119'' |
| 118 | በስንት ወሩ ነው የወለዱበት/የወለዱባት | 1. ከ23 ወር በፊት<br>2. 24-47 ወር<br>3. ከ47 ወር በኃላ | |
| 119 | የት ነው የወለዱት | 1. ጠፍ ተቋም<br>2.ቤት | |
| 120 | የድህረ ወሊድ ክትትል አድርገዋል | 1. አዎ<br>2.የለም | መልሱ' 'የለም'' ከሆነ ''122'' |
| 121 | 120 መልሱ አዎ ከሆነ ማን ነው የድህረ ወሊድ ክትትል ያደረገልዎት | 1.ሃኪም<br>2 ነርስ<br>3.ሚድዋፈሪ<br>4.ጠፍ ኤክስቴንሽን<br>5 ሌላ፣ ይጥቀሱ---------- | |

| ክፍል ሦስት፡ -የጡት ተቋምተደራሽነ ፣ አጠቃቀምና የእናቶች ግንዛቤ በተመለከተ | | | |
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| 122 | የጡት ኤክስቴንሽን ባለሞያዎች እናንተ ቀበሌ አሉ | 1.አዎ<br>2.የለም | መልሱ' 'የለም'' ከሆነ ''125'' |
| 123 | 122 መልሱ አዎ ከሆነ የጡት ኤክስቴንሽን ባለሞያዎች ቤታችሁን ጎብኝተውያውቃሉ ( በዚህ ሁለት ዓመት ወስጥ) | 1.አዎ<br>2.የለም | |
| 124 | 122 መልሱ አዎ ከሆነ የጡት ኤክስቴንሽን ባለሞያዎች ስለ ሁለተኛ ዙር የኩፍኝ ክትባት ሚጂ ነ ግሮዎት ያውቃሉ ዎይ | 1.አዎ<br>2.የለም | |
| 125 | ስለሁለተኛ ዙር የኩፍኝ ክትባት ያውቃሉ? | 1.አዎ<br>2.የለም | መልሱ' 'የለም'' ከሆነ ''128'' |
| 126 | ልጅዎ በስንት ወሩ እንደሚሰጠውያውቃሉ? | 1. አዎ<br>2. የለም | |
| 127 | 126 መልሱ አዎ ከሆነ ክትባቱ ሚሰጠውልጅዎ ስንት ወር ሲሞላውነ ው | በ----------ወር | |
| 128 | በአቅራቢያዎት ክትባት የሚሰጥበት ቦታአለ | 1. አዎ<br>2. የለም | መልሱ' 'የለም'' ከሆነ ''132'' |
| 129 | 128 አዎ ከሆነ የት ነ ውየሚሰጠው | 1. ሆስፒታል<br>2. ጡት ጣቢያ<br>3. ጡት ኬላ<br>4. የክትባት ጣቢያ | |
| 130 | እስከ ክትባት የሚሰጥበት ቦታ/ጣቢያ ምን ያክል ሰዓት/ደቂቃ ይዎስዳል | 1. ከ 15 ደቂቃ በታች<br>2. ከ15-30 ደቂቃ<br>3. ከ30-60 ደቂቃ<br>4. ከ አንድ ሰዓት በላይ | |
| 131 | ልጅዎትን ሁለተኛ ዙር የኩፍኝ ክትባት ለማከትብ ወስደወት/ወስደዋት ነበር | 1. አዎ<br>2. የለም | መልሱ' 'የለም'' ከሆነ ''135'' |

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| 132 | ልጅዎ ሁለተኛ ዙር የኩፍኝ ክትባት ተከትቦአል/ተከትባልች | 1. አዎ በክትባት ካርድ<br>2. አዎ አሳዳጊ ታወቃለች<br>3 የለም | |
| 133 | 132 የለምከሆነ ለምን? | ጥቀሱ---------- | |
| 134 | 132 አዎ ልጅዎትን ለማስከትብ ምን ያክል ሰዓት/ደቂቃ ጠበቁ | 1.ከ 15 ደቂቃ በታች<br>2.ከ15-30 ደቂቃ<br>3 ከ30-60 ደቂቃ<br>4. ከ አንድ ሰዓት በላይ | |
| 135 | ልጅዎትን ሁለተኛ ዙር የኩፍኝ ክትባት ለማስከትብ ሂደው ክትባት ጣቢያ ውተዘግቶበዎት ያወቃል | 1. አዎ<br>2. የለም | |
| 136 | ልጅዎትን ሁለተኛ ዙር የኩፍኝ ክትባት ለማስከትብ ወስደው ሳይከተብ/ሳትከተብ ተመልሰውያወቃሉ | 1. አዎ<br>2. የለም | |
| 137 | ስለ ሁለተኛ ዙር የኩፍኝ ክትባት የጎንዮሽ ጉዳቶች ሰምተውያወቃሉ | 1. አዎ<br>2. የለም | |
| 138 | ክትባት ልጀን ያሳምምብኛል ብለውያስባሉ/ይጨቃሉ | 1. አዎ<br>2. የለም | |
| 139 | ህጻንዎት ቢታመም ክትባት ያስከትቡታል | 1. አዎ<br>2. የለም | |

ስለተባበሩን እጅግ በጣም እናመሰግናለን !

DECLARATION

I, the undersigned, declared that this is my original work, has never been presented in this or any other University, in partial fulfillment of the requirement for the degree of Master in Public Health department of General Master of public Health.

**Principal investigators**

Name: Asichalew Abiyu

Signature: _____

Date: _____

APPROVAL OF THESIS RESULT FOR SUBMISSION

I hereby certify that I have supervised, read, and evaluated this final thesis titled "utilization of measles conjugated vaccine 2 and its associated factors among children of age 24 - 35 months in North Mecha District, West Gojjam Zone, North West Ethiopia 2020" by Asichalew Abiyu prepared under my guidance. I recommend this final thesis to be submitted to the department for evaluation.

**Advisors**

1. Name: Dabere Nigatu (MPH in Reproductive Health, Assistant Professor)
   Signature: _____

   Date: _____

**Department Head's**

Name: ----------

Signature: _____

Date: _____

**Approval of thesis for defense result**

We hereby certify that we have examined this thesis entitled "utilization of measles conjugated vaccine 2 and its associated factors among children of age 24 - 35 months in North Mecha District, West Gojjam Zone, North West Ethiopia 2020'' a cross sectional study" by Asichalew Abiyu. We recommend and approve the thesis a degree of "partial fulfillment of master in General Master of Public Health".

**Board of Examiners**

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| _____ | _____ | _____ |
| External examiner's name | Signature | Date |
| _____ | _____ | _____ |
| Internal examiner's name | Signature | Date |
| _____ | _____ | _____ |
| Chair person's name | Signature | Date |