



MEKELLE UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING

**DETERMINANTS OF INCOMPLETE VACCINATION AMONG
CHILDREN AGED 12-23 MONTHS IN NAEDIER WOREDA,
CENTRAL ZONE, TIGRAY, ETHIOPIA, 2024/2025**

COMMUNITY BASED UNMATCHED CASE CONTROL STUDY

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Assurance of principal investigator

I, the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the thesis and for the provision of required progress reports as per the terms and conditions of the requirements of the department. I provide timely progress report to my advisors and seek the necessary advice and approval from my advisors

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Acronyms and Abbreviations

ANC	Antenatal Care
AOR	Adjusted Odds Ratio
BCG	Bacillus CalmetteGuerin
CI	Confidence Interval
DPT	Diphtheria, Pertussis and Tetanus
DPT, HepB, Hib	Diphtheria, Pertussis, Tetanus, Hepatitis B and Haemophilus influenza tyB
EDHS	Ethiopian Demographic Health Survey
EMDHS	Ethiopian Mini Demographic Health Survey
EPI	Expanded Program on Immunization
ETB	Ethiopian Birr
HW	Health Worker
IA	Immunization Agenda
IPV	Inactivated Polio Virus
OPV	Oral Polio Vaccine
PCV	Pneumococcal Conjugated Vaccine;
PNC	Postnatal Care
RI	Routine Immunization
SD	Standard Division
SPSS	Statistical Package for Social Sciences
TT	Tetanus Toxoid
UNCEF	United Nations Children Fund
VPD	Vaccine Preventable Disease
WDG	Women's Development Group
WHO	World Health Organization

ABSTRACT

Background: Vaccination is among the most cost-effective health interventions and has been responsible for substantial reductions in mortality and morbidity, especially for those under five. Globally, around 67 million children are only partially immunized. Neglecting to protect children from vaccination can lead to severe outcomes such as permanent disability, child mortality, and vaccine-preventable disease outbreaks. In Africa, an estimated 12.7 million children, 1.4 million children in Ethiopia and 41% of children in Tigray are partially immunized. The reasons behind these incomplete vaccinations haven't been extensively studied. Therefore, this study aimed to identify the determinants of incomplete vaccination among children aged 12-23 months in Naedier Woreda, Central Zone, Tigray, Ethiopia, 2024 /2025

Methods: A community-based unmatched case-control study design was implemented with a total sample size of 294 among children aged 12 to 23 months in Naedier Woreda, Central Zone of Tigray, Ethiopia, from August to October 2024. A participant was selected from 12 Kebeles by a simple random sampling technique. Data was collected from mothers/caregivers using a pretested, structured questionnaire. Data were entered into Epi Info 7 and analyzed using the Statistical Package for Social Sciences version 27. Multicollinearity was checked using the variance inflation factor, and the model of fitness was checked by Hosmer Lemeshow. Multivariable logistic regression analysis was used to control confounding variables at the p -value < 0.05 , and the strength of the statistical association was measured by using adjusted odds ratios and 95% confidence intervals.

Result: This study revealed that children born to mothers/caregivers who did not receive antenatal care follow-up (AOR = 4.58, 95% CI: 1.23-17.1), households not visited by health workers (AOR = 2.53, 95% CI: 1.23-5.17), mothers/caregivers who were not informed about the types of vaccines received (AOR = 3.209, 95% CI: 1.29-8.0), were not informed about potential side effects of vaccines (AOR = 2.92, 95% CI: 1.36-6.31), and were not given information about the next vaccination date (AOR = 3.76, 95% CI: 1.8-7.42) were the determinants to default on completing their vaccination.

Conclusions and Recommendations: From this study, suggested several determinants contributing to children aged 12-23 months failing to complete their full vaccination schedule are no antenatal care follow-up, absence of home visits by healthcare workers, and no information on vaccinations, including potential side effects and subsequent vaccination schedules. To address those factors, health offices and healthcare workers should prioritize providing detailed information about the specific vaccines administered, including expected side effects and the timing of future vaccinations, and reinforce the importance of consistent antenatal care for both maternal and child health.

Keywords: Determinant, Default, vaccination, Case-Control, Ethiopia

1. INTRODUCTION

1.1 Background

Vaccination is a process that creates immunity to pathogens, including bacteria and viruses, by introducing live, dead, or modified antigens that prompt the body to create antibodies and reduces the rates of morbidity and death that can be prevented by vaccination [1, 2]. Vaccination is one of the most cost-effective ways of saving lives and promoting good health and well-being [3]

Incomplete vaccination refers to a child who has begun their vaccination but has not completed all recommended doses as outlined in the national immunization schedule for children under one year old [4]. Full vaccination is complete vaccine dose administered according to the national routine immunization schedule [5].

Incomplete tracing involves identifying children who have not received their scheduled vaccination by the end of each month [6]. Immunization register is a book or a form that stays in the health facility for the purpose of to identify infants who miss scheduled vaccinations and who need to be added to the defaulter tracking lists and source of data for monthly and other reports [7].

Globally, incomplete vaccination' have become key concepts in explaining immunization coverage in aligning global efforts to improve vaccine coverage and for monitoring success [8].

According to the WHO 2020 report, there are many context-specific reasons why routinely scheduled vaccinations may be missed (e.g., difficulty accessing health services and other barriers, health worker practices, stock outs, beliefs held by caregivers and community members about vaccination) [9]

To maintain a national immunization program and mitigate the risk of vaccine-preventable disease outbreaks, international communities and the Ethiopian government collaborated on a catch-up vaccination strategy to address potential gaps in immunization coverage [10].

The expanded program on immunization was started by the World Health Organization (WHO) in 1974 to ensure that all infants received vaccinations against various VPD. In 1980, Ethiopia launched its expanded program on immunization (EPI). Throughout time, it has been raised to include more vaccinations in an attempt to reduce childhood vaccine-preventable disease mortality and morbidity[11, 12].

Vaccines are a global lifesaver, preventing millions of deaths each year. By implementing vaccination programs, we can dramatically lower child mortality rates and prevent millions from the devastating consequences of poverty [13, 14]. The World Health Organization (WHO) reports that millions of children in the African region missed routine vaccinations either partially or entirely during disease outbreaks and conflict and increased their vulnerability to vaccine-preventable illnesses [15].

The routine vaccination schedule in Ethiopia for all infants is to receive one dose of BCG (Bacillus Calmette-Guerin), three doses of DPT-HepB-Hib(Diphtheria, Pertussis, Tetanus, Hepatitis B, Haemophilus Influenza Type B), three doses of pneumococcal conjugate vaccine, two doses of rotavirus vaccine, four doses of OPV(Oral Polio Vaccine), one dose of IPV (inactivated Polio Virus) , one dose of measles before the age of one year and MCV2 (Measles containing vaccine) during the 2nd year of life [16].

1.2 Statement of Problem

Throughout the world, vaccination coverage were declining during outbreaks, which has a detrimental influence on economies, health systems and immunization programs, especially true in low- and middle-income nations [17]. The number of children worldwide who have not received their recommended immunizations for less than a year has increased due to epidemics like the coronavirus disease, rising from around 19 million in 2019 to 25 million in 2021 [18].

WHO estimates that 18.2 million children globally, 91% of whom reside in lower-income nations like Ethiopia were not full vaccinated at all throughout their childhood [19]. Worldwide, around 67 million children are only partially immunized and neglecting to protect children from illness can lead to severe outcomes such as permanent disability, child mortality and an excessive number of vaccine-preventable disease outbreaks, such as polio [14]. The children in horn of Africa who were targeted for routine immunization were 41% fully immunized, 53% had partial immunity and 6% were not immunized and still susceptible to infectious diseases [20].

In 2021, an estimated 12.7 million children in Africa incomplete their vaccination .This led to disruptions in healthcare services, burdened healthcare systems and limited resources [21]. Approximately 1.7 million children globally who are not fully vaccinated against measles, Ethiopia has the third-highest rate [22]. According WHO African Region, 1.4 million children in Ethiopia were incomplete their scheduled vaccinations in 2021. To safeguard these communities from diseases preventable by vaccines the Ethiopian government and international organizations are working together to develop effective programs to get their vaccinations [23].

A 2019 survey revealed significant gaps in childhood vaccinations in Ethiopia. 38% of children aged 12-23 months had incomplete vaccinations, 19% received none, and only 43% were fully vaccinated. In Tigray, vaccination rates were even lower, with only 59% of eligible children fully vaccinated, 35% partially vaccinated, and 6% never initiated vaccinations [24]. During the war in Tigray, vaccination rates plummeted further, with 41% of infants receiving some but not all vaccines, 39% receiving none, and only 20% completing the recommended vaccination schedule [25]

Morbidity and mortality in infants and under five years children is a major global burden in 2020, there were 5 million mortalities among children under five, majority of them were caused by that diseases can be prevented by vaccination and treated [26]. Vaccine-preventable diseases remain a worry in developed nations which indicates, 79,000 deaths from influenza type b and one out of ten hospitalizations from measles [27]. The international community started a global immunization effort to reduce morbidity and death from diseases that can be prevented by vaccine [28].

Millions of people do not fully benefit from vaccinations and 2 to 3 million children worldwide die from diseases that could have been prevented by vaccinations each year. In order to address these issues and improve health and health systems especially pandemic preparedness, international organizations like the United Nations Children Fund (UNICEF) develop immunization roadmaps for 2022–2030 [29].

According to a 2018 report, VPD is one of the world's top causes of morbidity and death. Out of 5.3 million under five deaths, 700,000 under five children died from VPD, with 99% of the died children lived in low- and middle-class counters [30]. Every year, more than 30 million African children under the age of five are affected with VPDs of them, more than half a million die as a result of inadequate access to immunization programs [31].

Africa still has high incomplete vaccination rate due to a number of determinates, such as parents' economic, gender, age, place of birth, residence, cultural and religious affiliations, fear of side effect, maternal health service and vaccine awareness [32]. In Ethiopia among children aged 12-23 month based on Meta-Analysis and systemic review 3 in every 10 children had incomplete vaccination, which is a public health concern in the country. Maternal education, knowledge, decision-making power, urban residence, husband employment, ANC visits, home delivery, postnatal care, and tetanus toxoid vaccine were identified as factors associated with incomplete vaccination [33]

In Ethiopia, incomplete vaccination coverage was 38% in 2019. Data from 2022 indicates that in Tigray, approximately 41% of children aged 12-23 months had incomplete routine vaccinations. This figure significantly exceeds the World Health Organization's (WHO) acceptable threshold of less than 5% [33] incomplete vaccination, highlighting a critical public health concern. Achieving high vaccination coverage is crucial for controlling and eliminating vaccine-preventable diseases (VPDs). Understanding the factors contributing to incomplete childhood vaccination is essential for developing effective interventions. While limited research exists on community-level determinants of incomplete vaccination in the study area, this study aims to identify these determinants among children aged 12-23 months in Naedier Woreda, Central Zone, Tigray, Ethiopia

1.3 Significance of the study

Vaccinations are a cornerstone of child health dramatically reducing illness and death. However, some parents not to fully vaccinate their children. This study aims to understand the reasons behind this decision by identify these determinants. Health professionals can be better equipped to counsel parents on the importance of complete vaccination schedules. This not only protects individual children's health but also reduces the spread of VPDs within the community. Furthermore, this study will be valuable for governmental and non-governmental organizations managing incomplete vaccination issues and guide future research efforts.

2. LITERATURE REVIEW

2.1 Determinants of incomplete vaccination

2.1.1 Socio-demographic characteristics of mothers/caregivers and the child

A case-control study conducted in Papua revealed that low maternal education (AOR = 2.001) and low-income families (AOR = 1.97) were the determinants of an increased rate of incomplete basic vaccination [26].

A study conducted in the Arbegona district of southern Ethiopia found that children born second to fourth (AOR = 3.64) and fifth or later (AOR = 5.27) in the birth order were more likely to in complete their vaccination[34]. Another study carried out in Gindhir District, southeastern Ethiopia, identified several determinants with mothers' failure to fully vaccinate their children. These factors included birth order (AOR = 6.33), lower average monthly income (AOR = 2.33), no a model family (AOR = 2.50), having more than three children under five (AOR = 4.90) and lower maternal education (AOR = 2.61)[35].

A study conducted in the Hawassa Zuria District of Southern Ethiopia identified several factors associated with vaccine defaulting like; living alone (AOR: 2.1), residing in a rural area (OR: 2.9), mothers with no formal education (AOR: 6.6), having a female child (OR: 2.4) and having a child born third or later (AOR: 2.7) [36].

A study conducted in Ambo town, Oromia, Ethiopia, identified several determinants with children not completing their vaccinations. These determinants included residing in urban areas (AOR = 1.288), having a private-sector government employee as a caregiver (AOR = 3.179), having a family with more than four members (AOR = 2.69) and having a monthly income below 4000 ETB (AOR = 1.250) [37].

A study conducted in Dabat district, Northwest Ethiopia shows that mothers /care givers being single (AOR=2.36) were the determinants of default to full vaccination among children's [38]

study conducted on Laelay Adiabo District, Tigray Region, Northern Ethiopia shows 73.3% case and 62.2% control were illiterate 86.7% case 88.9% control were participate in WDGs and 94.4% case 92.8% control were housewives [39]

2.1.2 Maternal Health and Child Vaccination Service Delivery Related Characteristics

A case-control study conducted in Nepal identified that children born third or later in the birth order and those delivered at home are more likely to have incomplete vaccination (AOR = 3.53) [40]. A study conducted in Sub-Saharan Africa found that several factors contribute to incomplete routine childhood vaccinations. These factors include irregular vaccine supplies and distribution, long travel distances to immunization centers and inadequate guidance from healthcare professionals during the first vaccination appointment [41].

A Nigerian study identified determinants of children failing to complete their full course of vaccinations included being born at home (AOR = 1.93) and having mothers who did not receive postnatal care (AOR = 6.53) [42]. A study conducted in Sudan identified several determinant of default to full childhood vaccination like long distances to healthcare facilities, difficulties with transportation to reach healthcare facilities and misinformation about vaccinations [43].

A study conducted in Techiman Municipality, Ghana, identified reasons why children were not fully immunized in the area. These reasons included inconvenient immunization schedules, lack of awareness about immunization locations, mothers' busy schedules and inadequate vaccine availability [44].

A study conducted in Lomé, Togo, identified factors associated with children receiving incomplete vaccination compared to full vaccination. These factors included parents not having enough time to take their children to healthcare workers for vaccinations, delaying visits for vaccinations, vaccine shortages and the long distance to vaccination sites [45].

A study conducted in the Worebabo district of Ethiopia identified determinants of children not receiving all the recommended vaccinations included mothers having limited access to prenatal care (AOR = 3.68), delivering at home (AOR = 5.47), not receiving visits from Health Extension Workers (HEWs) at home (AOR = 3.56) and having a travel time of more than one hour to reach vaccination sites (AOR = 10.07) [46]

A study conducted in the West Arsi zone of Oromia, Ethiopia, a lack of discussion about vaccination between parents (AOR = 2.16), children being delivered at home (AOR = 2.43) and mothers not attending antenatal care (ANC) follow-up visits (AOR = 2.47) where the main determinants of children default from full vaccination [47].

A study conducted in Yirga Cheffe District, Southern Ethiopia, found that mothers who did not attend any antenatal care (ANC) visits during pregnancy were more likely to have children who defaulted on full vaccination (AOR = 1.55) [48].

A study in Yilmana Densa district identified determinant from full completion of recommended vaccinations. These factors included mothers who: No anti natal care follow-up (AOR = 5.55) ,travel times exceeding 39 minutes to reach vaccination sites (AOR = 3.252) , long waiting times at clinics exceeding 45 minutes (AOR = 2.674) and delivered their babies at home (AOR = 3.19) [49]

A study conducted in the north Gondar zone of northwest Ethiopia identified mothers who did not receive counseling about vaccinations (AOR = 7.2), did not attend postnatal care (PNC) visits (AOR = 3.6) and had not themselves received tetanus toxoid vaccination (AOR = 2.4)were the main reason of children become incomplete from the recommended schedule [50].

A study conducted in Gindhir District, Southeastern Ethiopia, identified several determinants with default childhood vaccination. These determinants included: Not being part of a WDA (AOR = 2.50), mothers not receiving the tetanus toxoid (TT) vaccine during pregnancy (AOR = 1.45), having more than four children under five years old in the household (AOR = 4.90) and Children being first born (AOR = 6.33) [35].

A study conducted in Bench Maji, Southwest Ethiopia, identified reason with children failing to complete their immunizations. These factors included: mothers not attending antenatal care (ANC) visits (AOR = 8.3), delivering babies at home (AOR = 4.51), mothers not attending postnatal care (PNC) visits (AOR = 4.2) and inconvenient vaccination appointment times (AOR = 3.44) [51]

A study conducted in Machakel district, northeastern Ethiopia, identified determinants with children failing to complete their childhood vaccinations. These determinants included being delivered at home (AOR = 4.113), being born to mothers who did not attend antenatal care (ANC) visits during pregnancy (AOR = 2.549) and being born to mothers who did not attend postnatal care (PNC) visits (AOR = 2.512) [52].

A study conducted in Laelay Adiabo District, Tigray Region, Northern Ethiopia, showed that mothers who: took more than 30 minutes to reach the vaccination site (AOR = 3.56), lived in households not visited by health extension workers at least monthly (AOR = 2.68), participated minimally in women's development groups (AOR = 3.3) and did not attend postnatal care follow-up visits (AOR = 5.2) are the determinates of default children from vaccination.

2.1.3 Knowledge and Attitude of mothers/ caretakers on child vaccination

In the slums of Kathmandu valley, Nepal, shows the main reason for default of immunization are primary caretakers with poor knowledge about the schedule of vaccination (AOR: 3.90), inconvenient appointment days of vaccination (AOR: 3.22), caretakers with negative perception towards vaccinating sick child (AOR: 3.23) [40].

A study done in Arbegona district, southern Ethiopia, found that a mother's lack of knowledge about immunization benefits (AOR = 5.51) and a mother's negative perception of vaccine side effects (AOR = 1.92) were the major reasons for partial immunization of children [34].

In a study conducted in Worebabo district, Ethiopia, the main reasons children did not complete their routine immunization were poor knowledge of the mother or caregiver on the benefits of vaccination (AOR = 2.02) and negative attitudes of the mother or caregiver towards immunization (AOR = 4.9) [46].

2.2 Conceptual frame work

This conceptual frame work is developed from different literatures related to determinates of default from fully completion of routine vaccination [34, 35, 37-40, 43, 48, 49, 53] this conceptual frame work showed that to link or illustrate the interplay between dependent and independent variables.

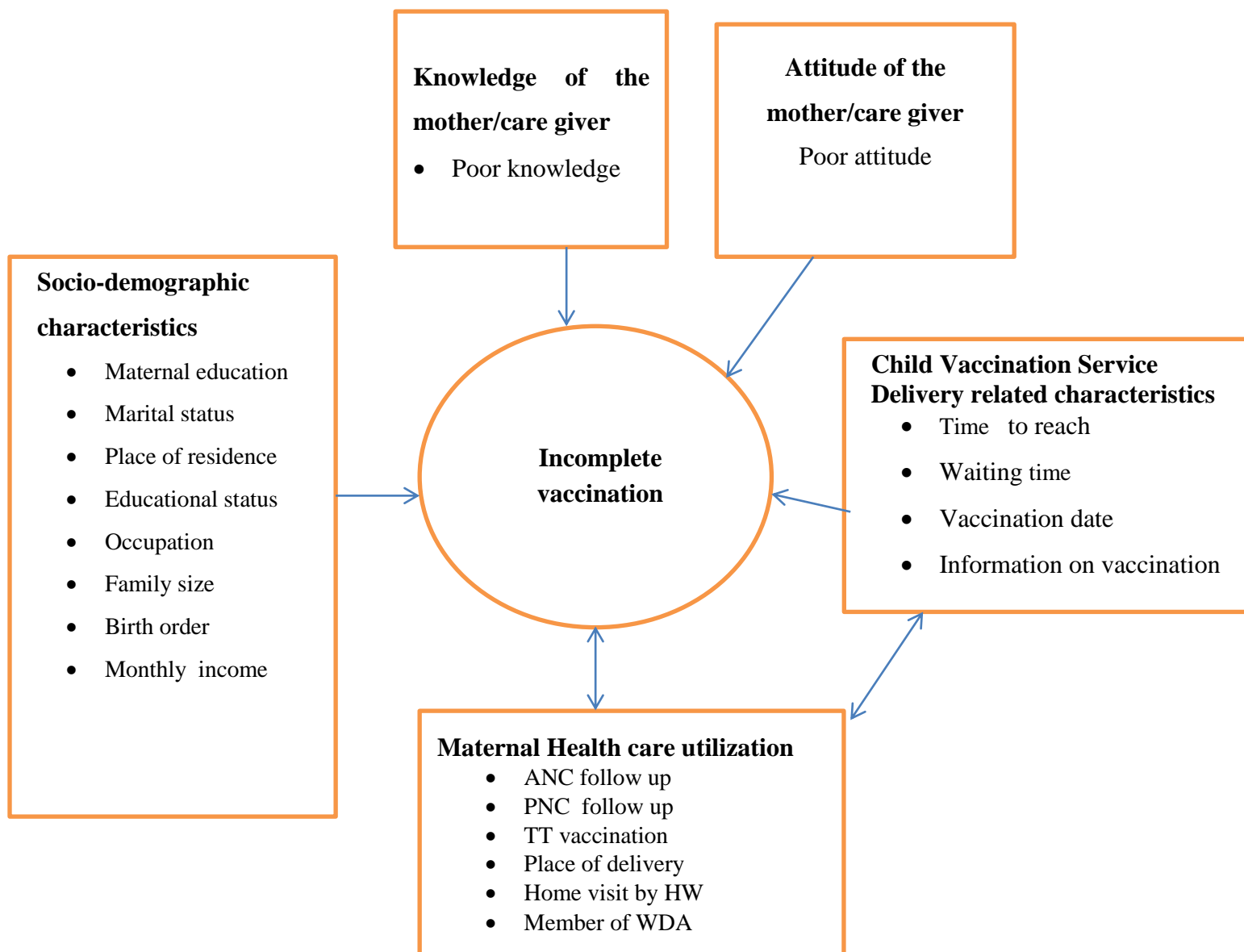


Figure 1: Conceptual framework to assess the determinants of incomplete vaccination among children aged 12to 23 months in Naedier Woreda, Central Zone, Tigray, Ethiopia

3. OBJECTIVE

To identify the determinants of incomplete vaccination among children aged 12 to 23 months in Naedier Woreda, Central Zone, Tigray, Ethiopia, 2024/2025

4. METHODS AND MATERIAL

4.1 Study area and period

The study conducted in Naedier Woreda Central Zone of Tigray Region from August –October 2024. Naedier Woreda is one of the districts found in the Central Zone of Tigray Region 260 kilometer from Mekelle and composed of 12 Kebeles. The total population in this Woreda based on Woreda office data is 67582 and 9201 under-five children. According to the Naedeier Woreda health office estimate the number of children aged 12–23 months was 2094 and the Woreda has 4 health centers and 12 health posts.

4.2 Study design

A community based unmatched case control study design was conducted

4.3 Source population

All children in the age group 12–23 months of age who are starting vaccination in the study area

4.4 Study Population

Cases: Selected children in the age group of 12 to 23 months who did not complete the recommended vaccination before celebrating his/her first birthday

Controls: Selected children in the age group of 12 to 23 months who completed the recommended vaccination before celebrating his/her first birthday.

4.5 Variables

4.5.1. Dependent variable

Incomplete vaccination

4.5.2 Independent variables

Socio-demographic characteristics of mothers/caregivers and the child; maternal education , Marital status, place of residence , educational status , occupation, family size ,monthly family income and birth order

Health care utilization of the mother; includes; ANC follow up, PNC follow up, TT vaccination , place of delivery and home visit by health workers

Child vaccination service delivery related characteristics includes; time to reach, waiting time, inconvenient time for vaccination and information on vaccination

Knowledge and attitude of the respondent to child vaccination; poor knowledge and poor attitude

4.6 Operational definitions

Incomplete/Defaulter (cases): The child missed at least one of the recommended vaccines (the recommended vaccines include BCG, three doses of pentavalent, three doses of PCV, two doses of Rota vaccine, four doses of polio and one dose measles vaccines by the age of 12 months) considering us defaulter [56].

Full vaccination (controls): The child has received all recommended vaccines, including BCG, three doses of pentavalent, three doses of PCV, two doses of Rota vaccine, four doses of polio and one dose measles vaccines by the age of 12 months considering us control [56].

Care giver: is the most responsible person who provides care to the child other than the mother due to different reasons such as the parents' death, adoption of a child, separation from family and others [47].

Knowledge of mother/ care giver about child vaccination: Assessed using immunization knowledge related questions. Correct answers give a score of one and incorrect answers score zero. Those scoring greater than the mean were consider as have a good knowledge and those who scored below or equal the mean were considered to have poor knowledge [39].

Attitude of mother/ care giver about child vaccination: the attitude was graded on a 5-point scale ranging from strongly agree to strongly disagree, with a score ranging from 1 to 5. Respondents with scores greater than the mean value of the sum of attitude-related questions was considered to have a positive attitude, while those with scores less than or equal the mean value of the sum of attitude-related questions considered as negative attitude [37]

4.7 Inclusion and Exclusion Criteria

4.7.1 Inclusion criteria for Controls

All mothers/caretakers who had children aged 12–23 months received the total recommended vaccination by Ethiopia national immunization schedule at the age of -one-year children and living in Naedier Woreda in each Kebeles at least 12 months before the day of data collection and children who had a full address from the EPI registration book

4.7.2 Inclusion criteria for Cases

All mothers/caretakers of children aged 12–23 months who had missed at least one dose of the recommended vaccination by Ethiopia national immunization schedule at the age of -one-year children and living in Naedier Woreda Kebeles for at least 12 months before the day of data collection and children who had a full address from the EPI registration book

4.7.3 Exclusion Criteria for cases and control

Mothers/caregiver who have illness which could interfere with verbal comprehension of consent to participate, mothers/caretakers those who lived less than 12 months in the Kebeles and Children who had no full address from the EPI registration book

4.8 Sample size determination and sampling procedures

4.8.1 Sample size determination

The sample size was computed using Epi-info version 7.2. 6 Stat Calc W/cc with, 95% confidence level, 80% power and 10% of non-response rate assumptions were used. The ratio of cases to controls set at 1:2. Moreover, estimate the sample size used all significantly determinant in a previous similar study conducted in Ethiopia and compared to get a larger sample size use marital status being single care giver [38]. Accordingly, the total sample size using Fleiss w/cc method is 294 (98cases and 196 controls)

Table1. Sample size calculation by using determinants s variables from previous study

Significant determinants	CI (%)	Power %	Case Control	% of exposure		AOR	Samples size including 10% non-response		
				Cases	Control		Cases	Cont rol	Total
				Marital status care giver	95		80	1; 2	32.3
Home place of delivery	95	80	1; 2	64.6	28.9	2.7	63	124	187
Poor knowledge to vaccination	95	80	1; 2	65.4	32	4	33	66	99
Poor attitude to vaccination	95	80	1; 2	48	46.1	6.1	24	48	72

4.8.2 Sampling procedure

All eligible cases and controls in all Kebeles of the Woreda was used from health post and health center EPI registration books, then a two-sampling frame was developed, which consist of a total 2019of 12-23 month-old children (293 defaulters (cases) and 1726 full vaccinations (controls)). A house-to-house survey data was used from Woreda to confirm the eligibility of the children identified in the registration books before actual data collection. Children who had permanently changed their residence or did not meet the eligibility criteria of a case or control were excluded from the study. Based on the survey, a sampling frame was prepared in all Kebeles. For every case and controls was selected using a simple random sampling technique using lottery method after proportionally allocating the number of children. The child's vaccination card and the mother's or caregiver's oral response used to verify the vaccination status of the child during data collection.

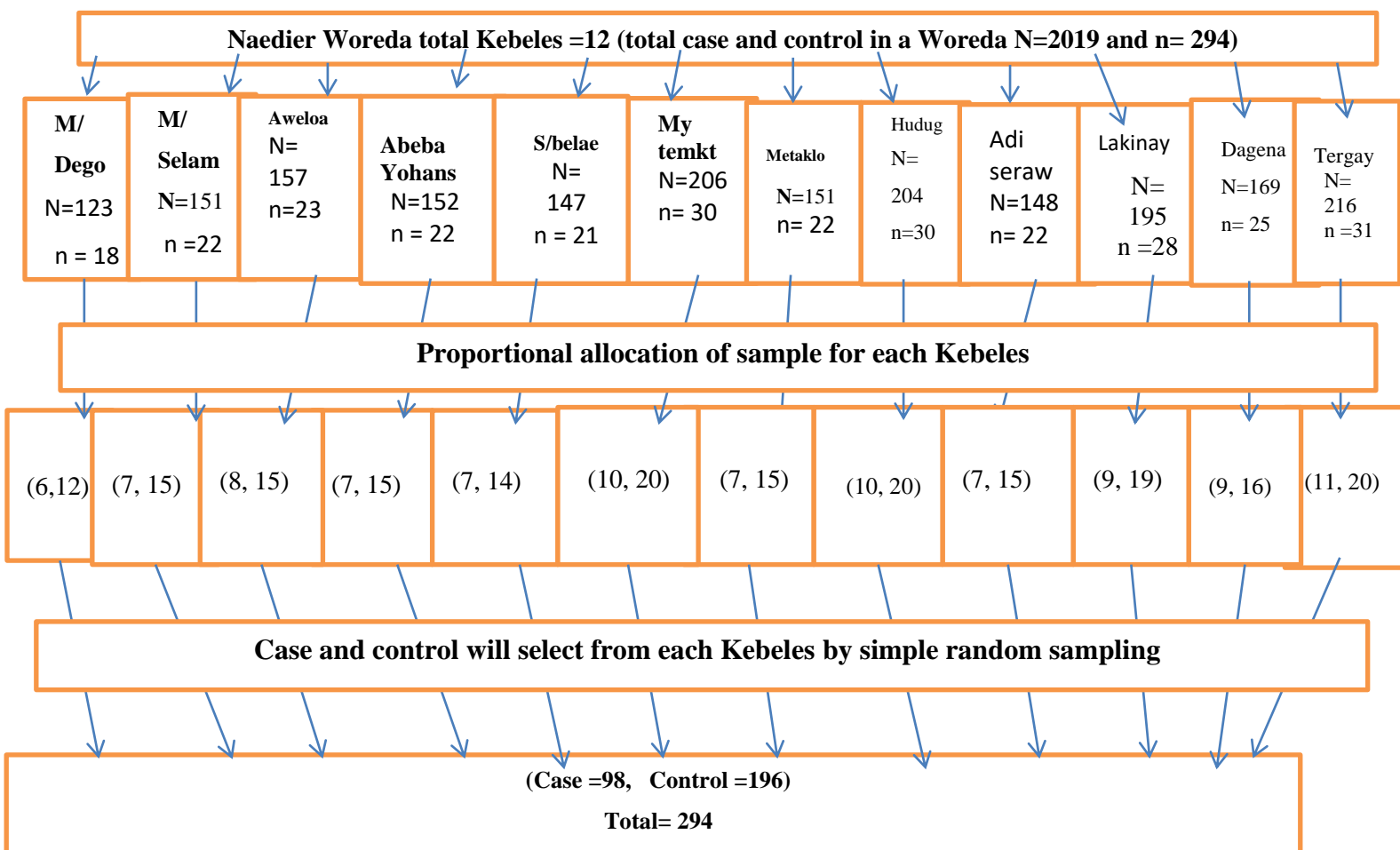


Figure 2: Schematic representation of sampling procedures on determinants of incomplete vaccination among children aged 12–23 months in Neader Woreda, Central Zone, Tigray, Ethiopia

4.9 Data collection tools and techniques

The data was collected by a pre-tested and structured questionnaire. The questionnaire were covered various aspects including socio-demographic characteristics, maternal health service utilization, child vaccination service utilization, mothers' knowledge and attitudes towards vaccination. The questionnaire was adapted from a previous similar study [35, 38, 39, 53]

The data was collected by 3 BSc nurse and 5 diploma nurse and one MSc and one BSc nurse supervisor were recruited based on their fluent in speaking, reading, writing and listening Tigrigna. The training was given for one day before data collocation by the principal investigator about the purpose of the study, how to prepare sampling frame of the eligible mothers, techniques of interviewing subjects and record responses accurately and uniformly. Finally face to face interview administered data was collected.

4.10 Data quality control

The questionnaire was prepared in English and translated into the local language (Tigrigna) and then back translated into English to ensure consistency. The Tigrigna version of the questionnaire was used for data collection. Pre-test was conducted among 15(5 cases and 10 control) children (12-23months) in Laelay machew Kebeles (Miha and Deberkale). Reliability of data collection tools were used cronbach alpha with finding was 76.2 %. The principal investigator and supervisors was checked completeness and consistency of the collected data on daily basis

4.11 Data management and analysis

All data were checked manually for completeness. The data were coded and entered into Epi Info version 7.2.6 and analyzed using SPSS version 27. Multicollinearity was tested using variance inflation factor (VIF) with result of 5.6. All variables with a p-value less than 0.25 in the bivariable analysis were included in multivariable logistic regression model. Hosmer-Lemeshow goodness-of-fit was tested the model's fitness and the value was non-significant (significant level = 0.181), indicating an adequate fit. The strength of the associations in the final model will be measured using adjusted odds ratios and their corresponding 95% confidence intervals. Variables with a p-value less than 0.05 were considered as statistically significant. Descriptive statistics were presented tables and charts.

4.12 Ethical approval and consent to participants

Ethical clearance was obtained from ethics committee of the Mekelle University, College of Health Sciences (Reference number: MU-IRB2283/2024) and Tigray Regional Health Bureau (441/365/16). Permission letter to conduct the study was also be taken from Naeder Woreda Health office. Before data collection, adequate information was given on study procedure, data storage, benefit, privacy concern and voluntary participation. Verbal informed consent was obtained from study participants before data collection. To ensure study participants confidentiality and privacy, the data was stored in secured and the personal name and other identification of the participants were not recorded on the data collection format

4.13 Plan for dissemination of findings

The finding will be submitted and presented to Mekelle University, College of health science and school of nursing. It will also submit to Tigray region health bureau and for the district Woreda study done and result of this study will be presented on different scientific forums and lastly, efforts will be done to publish in peer reviewed journal

5. Results

Socio-demographic characteristics of mothers/caregivers and child

From the total sample 294 (98 case and 196 control) about 288 (96 cases and 192 controls) of mothers/caretakers of children aged between 12– 23 months from twelve Kebeles participated in this study with 98 % response rate. The mean \pm age and standard deviation of respondents (mothers/caretakers) and children in both groups (cases and controls) were 30 ± 6.33 years and 18.4 ± 2.78 months respectively. Among the total respondents, about 165(85.9%) control and 85(88.5 %) cases were from rural residency areas and above half of the children's were 151 (52.4 %) female. All participants were biological mothers serving as primary caregivers. Concerning the marital status of mothers/ caretakers, the majority 79(82.3)cases and 173 (90.1) control mothers/caretakers were married. Nearly half 42 (43%) of mothers/caregivers of the children in cases were illiterate and 63 (32.8%) controls had primary by educational level. About 74 (77.1 %) cases and 147(76.6 %) control of the participants had less than five family size. All respondents were of Tigray ethnicity and Orthodox religion, about 76 (79.2 %) of cases and 139 (72.4 %) of controls were housewives and about 93(48.4%) control 69 (71.9 %) cases were less than 1000 ETB family monthly income (**Table 2**)

Table2: Socio-demographic characteristics of mothers/caregivers and child on determinants of incomplete vaccination among children aged 12–23 months, in Naeder Woreda, Central Zone, Tigray, Ethiopia,2024 /2025

Variables	Category	Vaccination status	
		Cases (n=96) n (%)	Controls(n=192)n (%)
Maternal /care giver Age	<20	11 (11.5)	8 (4.2)
	20-24	14 (14.6)	25 (13)
	25-29	23(24)	60 (31.3)
	30-34	18(18.8)	51 (26.6)
	35-40	15(15.6)	35 (18.2)
	>40	15(15.6)	13 (6.8)
Marital status	Married	79(82.3)	173 (90.1)
	Divorced	10(10.4	11 (5.7)
	Widowed	7(7.3)	8 (4.2)
Place of residence	Urban	11(11.5)	27 (14.1)
	Rural	85(88.5)	165 (85.9)
Maternal educational status	Illiterate	42 (43.8)	57 (29.7)
	Read and write	14(14.6)	30 (15.6)
	Primary	23(24)	63 (32.8)
	Secondary	17(17.6)	42 (21.9)
Maternal occupation	House wife	76 (79.2)	139 (72.4)
	Farmer	8 (8.3)	32 (15.7)
	Merchant	5 (5.2)	13 (6.8)
	Daily labor	7 (7.3)	8 (4.2)
Husband’s educational level	Illiterate	32 (40.5)	27 (15.6)
	Primary	32 (40.5)	71 (41)
	Secondary	15 (19)	75 (43.4)
Husband’s occupation	Farmer	54 (68.4)	129 (74.6)
	Merchant	6 (7.6)	21 (12.1)
	Daily laborer	19 (24)	23 (13.3)
Family size	≤5	74 (77.1)	147(76.6)
	>5	22 (22.9)	45(23.4)
Monthly family income in ETB	≤1000	69 (71.9)	93 (48.4)
	1001-2000	18 (18.8)	40 (20.8)
	2001-3000	9 (9.3	59(30.8)
Sex of Child	Male	41 (42.7)	96(50)
	Female	55 (57.3)	96(50)
Age of the child in month	12-18	22 (22.9)	129 (67.2)
	19-23	74 (77.1)	63 (32.8)
Birth order of the child	First	24 (25)	45 (23.4)
	Second and above	72 (75)	147 (76.6)

Child vaccination service delivery related characteristics

The result of child vaccination service related factors showed that the majority of health facilities exist nearby were health posts in 84(87.5 %) of cases and 141 (73.4 %) of controls. All participants relied on walking as their primary mode of transportation to access vaccination services. About 39.8% cases faced >60 minutes, while about 35.9% controls had 15-30 minutes travel time to vaccination site . Both cases 65 (33.9 %) and controls 36(37.5 %) experienced substantial waiting for more than 30 minutes at health facilities. Majority of the mothers /care givers 175(91.1 %) controls and 50(52.1%) of cases were received advice about types of vaccination vaccinated by health workers and also 159(82.8 %) controls and 34(35.4%) cases were received information about possible vaccine side effect by health workers. About 27(28.1 %) cases and 148(77.1%) controls mothers /care givers were had information on next vaccine schedule by health workers. From the total respondent of mothers/caregivers fifty two (55.2%) of cases and 61 (31.8%) of controls missed vaccination opportunities (**Table 3**).

Table3: Child Vaccination service delivery related characteristics on determinants of incomplete vaccination among children aged 12–23 months, in the Naeder Woreda , Central Zone ,Tigray, Ethiopia, 2024 /2025

Variables	Category	Vaccination status	
		Cases (n=96) n (%)	Controls(n=192) n (%)
Types of health facility for service of vaccination	Health center	12 (12.5)	51 (26.6)
	Health post	84 (87.5)	141 (73.4)
Means of transport to the vaccination service center	On foot	96 (100)	192 (100)
Time to reach for the service of vaccination in minute	< 15	13 (13.5)	30 (15.6)
	15-30	20 (20.7)	69 (35.9)
	31-60	25 (26)	56 (29.2)
	>60	38 (39.8)	37 (19.3)
Waiting time for vaccination in health facility	≤30 minute	60 (62.5)	127 (66.1)
	>30 minute	36 (37.5)	65 (33.9)
Health worker advice about types of vaccination received	Yes	50 (52.1)	175 (91.1)
	No	46 (47.9)	17 (8.9)
Information about possible vaccine side effect by HW	Yes	34 (35.4)	159 (82.8)
	No	62 (64.6)	33 (17.2)
Information on next vaccine schedule by HW	Yes	27 (28.1)	148 (77.1)
	No	69 (71.9)	44 (22.9)
Missing vaccination opportunity	Yes	53 (55.2)	61 (31.8)
	No	43 (44.8)	131 (68.2)
Reason for missing vaccination opportunity	No provider at that day	6 (11.3)	8 (13.1)
	Vaccination stock out	9 (17)	18 (29.5)
	Vaccination day postpone	38 (71.7)	35 (57.4)

Maternal health care utilization characteristics

About 44(45.8%) cases and 102 (53.1%) controls were multipara mothers. Fifty (52.1 %) of cases and 17 (8.9 %) controls of mothers /care givers had no antenatal care follow up during pregnancy but from mothers who were ANC follow up less than half of the controls 40 (22.9%) attended fourth antenatal care visit while 19 (41.3%) of cases and 22 (12.6 %) followed antenatal care at least one time during their pregnancy. About half of cases 51 (52.1 %) and 30 (15.6 %) controls mothers /care givers did not received tetanus toxoid vaccination during pregnancy. Regarding delivery place, 39 (40.6 %) cases and 19 (9.9 %) controls delivered at home. More than three fourth of cases 73 (76 %) and 75 (39.1 %) of controls had not attended postnatal care services. In addition to these, about 59 (30.2 %) controls and 49(51 %) of cases were not member of women's developmental army. About 52 (54.2 %) cases and 43(22.4 %) control participant were did not receive home visits from health workers. **(Table 4)**

Table4: Maternal health care utilization characteristics on determinants of incomplete vaccination among children aged 12–23 months, in the Naeder Woreda, Central Zone , Tigray, Ethiopia, 2024 /2025

Variables	Category	Vaccination status	
		Cases (n=96) n (%)	Controls (n=192) n (%)
Parity	One	26 (27.1)	42 (21.9)
	Two-Three	44 (45.8)	102 (53.1)
	Above Three	26 (27.1)	48 (25)
ANC follow up during her last pregnancy	Yes	46 (47.9)	175 (91.1)
	No	50 (52.1)	17 (8.9)
How many times ANC attended	One times	19 (41.3)	22 (12.6)
	Two times	14 (30.4)	48 (27.4)
	Three times	9 (19.6)	65 (37.1)
	Four and above	4 (8.7)	40 (22.9)
TT vaccination during pregnancy	Yes	45 (46.9)	162 (84.4)
	No	51 (53.1)	30 (15.6)
Place where the child was delivered	At home	39 (40.6)	19(9.9)
	Health center	46 (47.9)	145 (75.5)
	Hospitals	11 (11.5)	28 (14.6)
Received PNC after delivery of the child	Yes	23 (24)	117 (60.9)
	No	73 (76)	75 (39.1)
How many times PNC attended	One times	12 (52.2)	68 (58.1)
	Two times	8 (34.8)	36 (30.8)
	≥Three times	3 (13)	13 (11.1)
Home visit by HW	Yes	44 (45.8)	149 (77.6)
	No	52 (54.2)	43 (22.4)
Mother /care giver is member of women's developmental army	Yes	47 (49)	133 (69.3)
	No	49 (51)	59 (30.7)

Knowledge of mothers /caregivers on child vaccinations

A majority participants of both cases 81 (84.4%) and controls 185(96.4 %) reported had heard about childhood vaccination and vaccine preventable diseases. Above three fourth of the participant 157 (81 .85) of controls and 49 (51 %) of cases were knew the benefits of vaccination. Thirty two mothers of cases (33.3%) and 134 (69.8%) controls knew when a child should begin vaccination. A total of fourteen mothers of cases (14.6%) and 134 (69.8%) controls knew when to return for their next vaccinations schedules. Twenty eighty mothers of cases (29.2 %) and 117 (60.9 %) controls were aware with the age when a child should complete immunization and the total number of sessions to complete child immunization. Out of the total, 17mothers of cases (17.7 %) and 124 (64.6%) controls scored above the mean score > 1.62(±.299) were classified as having good knowledge on child immunization. **(Table 5)**

Table5: Knowledge of mothers /caregivers on child vaccinations on determinants of incomplete vaccination among children aged 12–23 months, in the Naeder Woreda, Central Zone, Tigray, Ethiopia, 2024/2025

Variables	Category	Vaccination status	
		Cases (n=96) n (%)	Controls (n=192) n (%)
Have you heard about the types of vaccine preventable disease	Yes	81 (84.4)	185 (96.4)
	No	15 (15.6)	7 (3.6)
If Have heard vaccine preventable diseases source of information	From health workers	28 (34.6)	98 (53)
	From media	47 (58)	73 (39.5)
	From relatives	6 (7.4)	14 (7.5)
Do you Know the benefits of vaccination to your child	Yes	49 (51)	157 (81.8)
	No	47 (49)	35 (18.2)
Do you know the age starting vaccination	Yes	32 (33.3)	134 (69.8)
	No	64 (66.7)	58 (30.2)
Do you know the age of completing vaccination	Yes	28 (29.2)	117 (60.9)
	No	68 (70.8)	75 (39.1)
Do you know child vaccinated number in first year of	Yes	28 (29.2)	117 (60.9)
	No	68 (70.8)	75 (39.1)
Do you know about the side-effects of Vaccines	Yes	41 (42.7)	137 (71.4)
	No	55 (57.3)	55 (28.6)
Do you know the next vaccination date for your child	Yes	14 (14.6)	134 (69.8)
	No	82 (85.4)	58 (30.2)

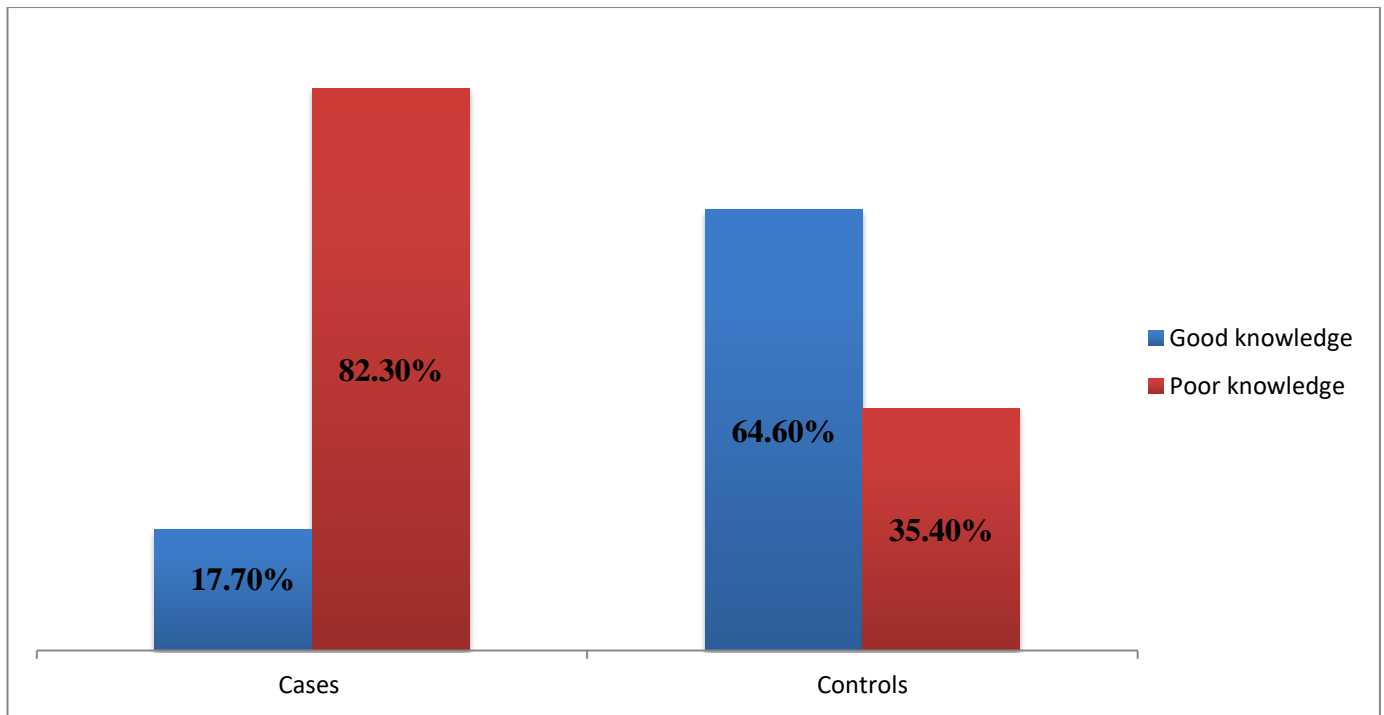


Figure 3: Over all knowledge of mothers /caregivers on determinants of incomplete vaccination among children aged 12–23 months, in the Naeder Woreda, Central Zone, Tigray, Ethiopia, 2024 /2025

Attitude of mothers /caregivers on child vaccinations

From the total participants about 113(58.9%) controls and 41(42.7%) cases was dis agreed on the importance of vaccination compliance schedule. Above three fourth 163(84.9 %) controls and sixty (62.5%) case were disagreed on the vaccination is more beneficial than harmful. Of total participants about 121(63.1 %) controls and 52 (54.2%) cases was dis agreed on the aide vaccination are possible side effects from some vaccines. About 118(61.4%) controls and 41(42.7) cases were disagreed on the aide of all children should be vaccinated About 110(57.3) control and 37(42.7) cases were disagreed for infants took usually too many vaccines. Out of the total, 64 mothers of cases (66.7 %) and 66 (34.4%) controls scored below the mean score $\leq 3.34(\pm.457SD)$ were classified as having poor attitude on child Vaccination (Table6)

Table 6: Attitude of mothers /caregivers on determinants of incomplete vaccination among children aged 12–23 months, in the Naeder Woreda, Central Zone , Tigray,Ethiopia,2024/2025

Variables	Category	Vaccination status	
		Cases (n=96) n (%)	Controls (n=192)n (%)
Do you think compliance of vaccination schedule is important	Agree	43(44.8)	41(21.4)
	Neutral	7(7.3)	8(4.2)
	Dis agree	41(42.7)	113(58.9)
	Strong disagree	5(5.2)	30(15.6)
Do you think Vaccination is more beneficial than harmful	Agree	28(29.2)	22(11.5)
	Neutral	8(8.3)	7(3.6)
	Dis agree	60(62.5)	163(84.9)
Do you think Vaccines protect children from serious and life-threatening diseases	Agree	34(35.4)	30(15.6)
	Dis agree	62(64.6)	162(84.4)
Do you think vaccination are possible side effects from some vaccines	Agree	44(45.8)	71(37)
	Dis agree	52(54.2)	121(63)
Do you think all children Should be vaccinated	Agree	55(57.3)	74(38.6)
	Dis agree	41(42.7)	118(61.4)
Do you think vaccination makes keeps your child healthy	Agree	36(37.5)	53(27.6)
	Dis agree	60(62.5)	139(72.4)
Do you think infants took usually too many vaccines	Agree	55(57.3)	82(42.7)
	Dis agree	37(42.7)	110(57.3)

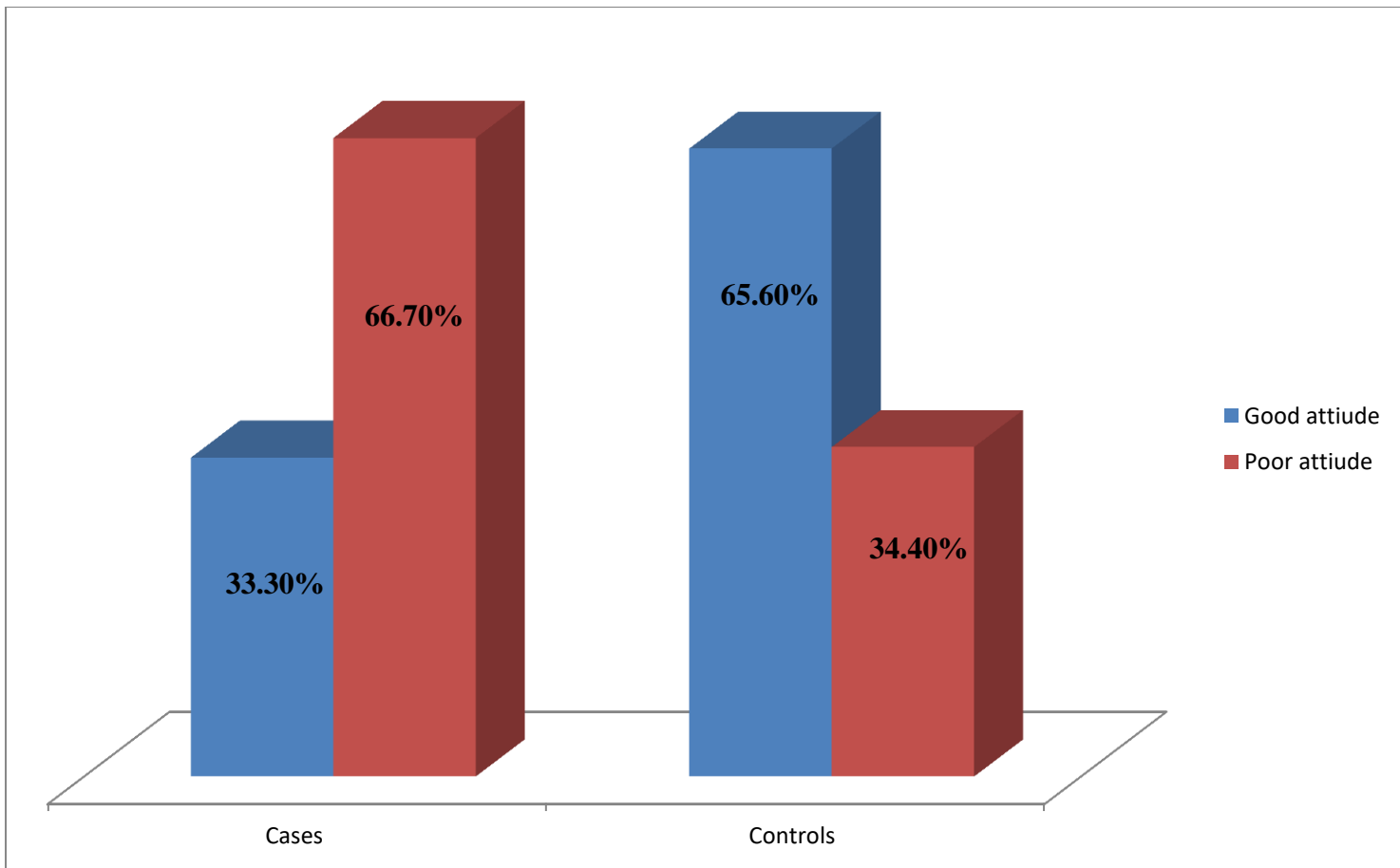


Figure 4: Over all attitude of mothers /caregivers on child vaccinations on determinants of incomplete vaccination among children aged 12–23 months, in the Naeder Woreda , Central Zone ,Tigray, Ethiopia, 2024 /2025

Determinants of incomplete vaccinations

In the bivariable analysis, thirteen variables were identified with a p-value less than 0.25, including: time to reach vaccination services, health worker advice on vaccination types, information on potential side effects, next vaccination schedule information, missed vaccination opportunities, antenatal care (ANC) follow-up, tetanus toxoid (TT) vaccination, delivery location, postnatal care (PNC), home visits, membership in women's development groups, maternal knowledge of vaccination, and maternal attitude towards vaccination.

To identify independent predictors of incomplete vaccination, a multivariable logistic regression model was conducted on variables with a p-value less than 0.25 to adjust for potential confounders and five variables (Lack of prenatal care (ANC) follow-up, no home visits by health workers, no advice on vaccination received, no information on side effects and no information on the next vaccine schedule) were significantly determinants of defaulting from full vaccination, at a significance level of p-value less than 0.05.

Children born to mothers without ANC follow-up were 4.58 times more likely to incomplete on vaccination compared to those born to mothers with ANC follow-up (AOR = 4.58, 95 % CI:1.23-17.1). The odds of vaccination incomplete were 2.5 times higher among children households not visited by health workers compared to those children household visited by health workers (AOR = 2.53,95 % CI:1.23-5.17).

The odds of vaccination incomplete were 3.2times higher among mothers /care givers who had no advice about types of vaccination received by health workers during vaccination compared to those mothers /care givers who had advice about types of vaccination received by health workers (AOR=3.209, 95% CI:1.29-8). The odds of vaccination incomplete were 2.92times higher among mothers /care givers who had no information about possible vaccine side effect during vaccination by health workers compared to those mothers /care givers who had information about possible vaccine side effect during vaccination by health workers(AOR= 2.92,95%CI:1.36-6.31). The odds of vaccination incomplete were 3.76 times higher among children mothers /care givers who had no information on next vaccine schedule date by health workers compared to those mothers /care givers who had information on next vaccine schedule by health workers (AOR=3.76, 95%CI:1.8-7.42) (**Table 7**)

Table7: Bivariable and multivariable logistic regression analysis on determinants of incomplete vaccination among children aged 12–23 months, in the Naeder Woreda, Central Zone, Tigray, Ethiopia, 2024/2025

Variables	Category	Vaccination status		COR,95%CI	P-value	AOR,95%CI	P-value
		Cases	Control				
HW advice about types of vaccine received	Yes	50(52.1)	175 (91.1)	1	1	1	
	No	46(47.9)	17 (8.9)	9.47(5-17.9)	<0.001	3.209(1.2-8)	0.012*
Information about possible vaccine side effect	Yes	34(35.4)	159 (82.8)	1	1	1	
	No	62(64.6)	33 (17.2)	8.7(5-14.4)	<0.001	2.92(1.36-6)	0.006*
Information on next vaccine schedule	Yes	27 (28.1)	148 (77.1)	1	1	1	
	No	69(71.9)	44 (22.9)	8.6(4.9-15)	<0.001	3.76(1.8-7.4)	0.001*
Missing vaccination	Yes	53 (55.2)	61 (31.8)	2.64(1.6-4.4)	<0.001	1	
	No	43 (44.8)	131(68.2)	0.3.8(.23-.6)	1	.49(.24-1)	0.05
ANC follow up	Yes	46 (47.9)	175 (91.1)	1	1	1	
	No	50(52.1)	17 (8.9)	11.2(5.9-21)	<0.001	4.58(1.2-10)	0.024*
Did you receive TT during pregnancy	Yes	45 (46.9)	162 (84.4)	1	1	1	
	No	51 (53.1)	30 (15.6)	6.1(3.5-10.7)	<0.001	.45(.13-1.6)	0.21
Place of delivered	Home	39(40.6)	19(9.9)	5.23(2.2-12)	<0.001	1.72(.56-5.2)	0.34
	H/C	46(47.9)	145 (75.5)	0.8(.37-1.75)	0.58	3.34(.9-12.4)	0.07
	Hospital	11(11.5)	28 (14.6)	1	1	1	
Received PNC	Yes	23 (24)	117(60.9)	1	1	1	
	No	73 (76)	75 (39.1)	5 (2.85-8)	<0.001	1.17(.53-2.6)	0.69
Time to reach for the vaccination center in minute	<15	13(13.5)	30 (15.6)	1	1	1	
	15-30	20(20.7)	69 (35.9)	0.67(0.29-1.5)	0.445	.65(.22-1.9)	0.434
	31-60	25 (26)	56 (29.2)	1.03(0.46-2.3)	0.903	.447(.147-1)	0.155
	>60	38(39.8)	37 (19.3)	2.37(1.07-5)	0.023	.878(.294-2)	0.817
Home visit by HW	Yes	44 (45.8)	149 (77.6)	1	1	1	
	No	52 (54.2)	43 (22.4)	4.09(2.4-6.9)	<0.001	2.53(1.23-5)	0.011*
Mother is members of WDA	Yes	47 (49)	133(69.3)	1	1	1	
	No	49 (51)	59 (30.7)	2.3(1.4-3.9)	<0.001	.76(.35-1.65)	.48
Knowledge of mother	Good	17(17.7)	124(64.6)	1	1	1	
	Poor	79(82.3)	68 (35.4)	8.47(4.6-15)	<0.001	1.9(.86-4.15)	.11
Attitude of the mother	Good	32 (33.3)	126 (65.6)	1	1	1	
	Poor	64(66.7)	66(34.4)	3.82(2.3-6.4)	<0.001	1.52(.713-3)	.28

1 Reference category * Statistical significant

6. Discussion

Timely vaccination is key to maintaining population immunity against vaccine-preventable diseases (VPDs), ensuring populations are fully protected against life-threatening illnesses as early as possible, and preventing large outbreaks of VPDs [9]

This study was done in the in Naeder Woreda, Central zone, Tigray, Ethiopia to identify determinants of incomplete vaccination among children aged 12-23 months. The study assessed different factors and found that: maternal lack of antenatal care (ANC) follow-up, absence of home visits by health workers, lack of health worker advice on vaccination types, lack of information on potential vaccine side effects provided by health workers and lack of information on the next vaccination schedule provided by health workers.

Children from households without regular health worker visits were 2.5 times more likely to incomplete vaccinations compared to those whose households were visited by health workers. This finding is similar with studies done in Tigray, Togo, and Worebabo district of Ethiopia [39, 45, 46] respectively. This indicates that health professional household visits especially by health extension workers in Ethiopian settings are an important medium for dissemination of all health-related information via health education including immunization services. This can also provide an opportunity in tracing children who default their vaccination. Household visits contributed to higher rates of immunization, especially in the case of mothers who had no health education on immunization [54].

Mothers who did not receive antenatal care (ANC) follow-up were more likely to incomplete child vaccinations. Children born to mothers without ANC follow-up were 4.58 times more to incomplete vaccination compared to infants who were born from mothers who had antenatal care visit during pregnancy. This finding is sported with studies from West Arsi Zone, Yirga Chefe, Yilmana Densa District, Benchi Maji, and Machakel District in Ethiopia.[47-49, 51, 52] respectively. This could be due to mothers who had a visit to care services of ANC have a better chance of communicating with health care workers and receiving comprehensive maternal and child health services with health education and counseling about the benefit, schedule, and side effect of the vaccination. and creates opportunities for pregnant mothers to obtain adequate information on immunization and vaccine preventable diseases [55].

Children whose mothers/caregivers did not receive information from health workers about the type of vaccine administered during vaccination were 3.2 times more likely to miss some of their vaccinations compared to children whose mothers/caregivers did receive this information. This finding is supported by studies conducted in Sub-Saharan Africa, Yilmana Densa, and North Gonder Zone of Ethiopia [41, 49, 50] respectively. The fact is that mothers or caregivers may forget whether their child received all the necessary vaccines. Additionally, healthcare providers may not adequately counsel on future appointments and the types of vaccines scheduled, leading to missed vaccinations. Providing caregivers with clear and concise information about routine vaccinations is crucial for ensuring they understand the types of vaccines their children receive and, consequently, complete all recommended vaccination schedules [56].

Mothers or caregivers who were not informed about potential vaccine side effects by health workers were 2.92 times more likely incomplete of vaccination of their children compared to those who were informed about vaccine side effects during vaccination by health workers . This finding is supported by studies conducted in Sudan, West Arsi Zone, and North Gonder Zone in Ethiopia [43, 47, 50] respectively. This may be due to a lack of health education and awareness campaigns, as well as infrequent home visits by health workers, which can increase maternal fears about vaccine side effects [56]

Mothers or caregivers who were not informed about the next vaccination schedule were 3.76 times more likely to have children who incomplete vaccination. This finding is consistent with studies conducted in Nepal, Ghena, and Benchi Maji in southwest Ethiopia [40, 44, 51] respectively. This may be due to poor counseling or prioritization of other activities over vaccination appointments. When mothers or caregivers arrive for vaccination but there is a vaccine shortage, they may not return for vaccination. Lack of knowledge about vaccination dates can also contribute to missed vaccinations [57]

7. Limitation of the Study

. This leads to lack of objective information about the vaccination status of the child and dependence on the mother's verbal responses that might be liable to recall bias and misclassification of cases and controls. Data related with continuum of maternal care such as antenatal, and postnatal care number of visits for index pregnancy was collected by self-report which might be prone to recall and social desirable bias

8. Conclusion and Recommendation

Conclusion

The key determinants of incomplete child vaccination are mothers ,care givers had no antenatal care (ANC) follow-up, lack of home visits by health workers, insufficient information provided by health workers regarding vaccine types, potential side effects, and the next vaccination schedule.

Recommendation

To Regional Health Bureau

- + plan and monitoring EPI service in the community level
- + Strengthen ANC Services:
- + Increase supportive supervision for health workers, focusing on the quality of immunization services, including communication with caregivers and adherence to vaccination schedules.

To Woreda Health Office

- + Facilitate coordination and collaboration between health facilities, community health workers HWs ,
- + Conduct regular supportive supervision visits to health facilities and CHWs
- + Develop and implement strategies to improve the frequency and effectiveness of home visits by HWs,
- + Implement a system for tracking children who have defaulted on their vaccinations and ensure timely follow-up to bring them back into the vaccination schedule.

To Health Care Professionals

- + Enhance communication skills to effectively convey information to caregivers about the benefits of vaccination, the recommended vaccination schedule, potential side effects, and the importance of completing the vaccination
- + Provide comprehensive counseling to pregnant women during ANC visits about the importance of childhood vaccination and the recommended schedule
- + Conduct regular home visits to monitor the health of children and provide vaccination services to those who have missed their appointments

Furthermore, researchers should conduct further studies to investigate the detailed processes of default from full vaccination to gain a deeper understanding of the factors contributing to default vaccination

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Annex

Mekelle University

College of Health Science School of nursing

Department of pediatrics and child health Nursing

Participant information sheet and consent form

Dear respondent My name is _____ on behalf of G/HER G/SLASSIE , he is a post graduate student at Mekelle University College of Health Sciences school of Nursing, Department of Pediatrics and child health Nursing. Currently he is conducting a research on determinant incomplete vaccination in Naedier Woreda, Central Zone, Tigray, Ethiopia 2024/25 For this study and you need to know all necessary information related to the study detailed as follows.

Purpose: The purpose of the study is to obtain information on determinant of incomplete vaccination in Naedier Woreda, Central Zone, Tigray, Ethiopia. In particular, the study is looking on determinant factors default from fully completion of routine immunization. The questionnaire results will be used to prepare a report on the determinant factors default from fully completion of routine immunization for the design of appropriate recommendations to address the gape.

Benefit: The study may have direct or indirect benefit for the participants. Moreover it will help the researcher to write up his thesis for partial fulfillment of master's degree in Pediatrics and child health Nursing.

Harm: The participants do not have any harm by participating to the study or for not participating to the study, except taking few minute from your time. There wouldn't be any direct payment for participating in this study.

Procedures and duration: The Participants are required to fill all the questions. The questionnaire consisted of five sections (Data regarding personal characteristics, maternal characteristics, child immunization service characteristics knowledge and attitude of the care giver. . The questions may take from 15-30 minutes. So I kindly request you to spare me this time for the completing the questions.

Alternatives to participation: You do not have to take part in this research if you do not wish to do so, and refusing to participate will not affect you. If you have question that is unclear you have a right to ask for

clarification. If you have also a question that you don't want to answer you can skip it. You may stop participating in the research at any time.

Confidentiality: Your answers are completely confidential. Your name will never be used in connection with any information you tell us. The questionnaire will be coded to exclude showing names. All information given by you will be kept confidential. .

Informed consent: I have been well aware of that this research undertaking is for a partial fulfillment of MSc degree which is fully supported and coordinated by the school of nursing, College of health science, and the designate principal investigator is **G/HER G/SLASSIE**. I have been fully informed in the language I understand about the research project objectives.

I have been informed that all the information. I understood that the research has no any risk and no composition. I also knew that I have the right to withhold information, skip questions to answer or to withdraw from the study any time I have acquainted nobody was impose me to explain the reason of withdrawal. I have assured that the right to ask information that is not clear about the research before and or during the research work and to contact.

I understand all conditions stated above. Therefore, I am willing to participate in this study.

Yes (continue to answer the questionnaire),

No (Thanks and stop)

Signature_____ Date_____

Thanks in advance *In case of any questions or more information please contact me on:*

Email: *Gerziherg16* @gmail.com

Mobile= 0914576849

Annex III: Questionnaire English version

Part 1. Socio-demographic characteristics of mothers/caregivers and the child on determinants of Incomplete vaccination among children aged 12–23 months, in Naedier Woreda, Central Zone, Tigray, Ethiopia, 2024 (n=294)

Vaccination status of child 1.full vaccinated 2. Did not full vaccinated; -----

Code	Variables	Category	Skip
01	Respondent relation to child	1. Mother 2. Care giver	
02	Maternal /care giver Age	----- year	
03	Marital status	1. Married 2. Single 3. Divorced 4. Widowed	
04	Place of residence	1. Urban 2. Rural	
05	Religion	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Other	
06	Ethnicity	1. Tigray 2. Amehara 3. Afar 4. Oromo 5. Others	
07	Maternal educational status	1. Illiterate 2. Read and write only 3. Primary (1-8) 4. Secondary(9-12) 5. College and above	
07	Maternal current occupation	1. House wife 2. Farmer 3. Governmental Employee 4. Merchant 5. Student 6. Daily laborer 7. Others	
08	Husband's educational level	1. Illiterate 2. Read and write only 3. Primary (1-8) 4. Secondary (9-12) 5. College and above	

09	Husband's occupation	1. Farmer 2. Governmental Employee 3. Merchant 4. Student 5. Daily laborer 6. Others	
10	Family size		
11	Monthly family income in birr	----- Birr	
12	Sex of Child	1. Male 2. Female	
13	Age of the child	_____ months	
14	Birth order of the child	1. First 2. Second 3. Three and above	

Part 2. Child Vaccination Service Delivery related characteristics on determinants of defaulter from Incomplete vaccination among children aged from 12 to 23 Naedier Woreda, Central Zone, ,Tigray, Ethiopia, 2024 (n=294)

Code	Variables	Category	Skip
20	Types of health facility for service of vaccination	1. P. hospital 2. Health center 3. Health post	
21	Means of transport to the service vaccination	1. On foot 2. Public transport	
22	Time to reach for the service vaccination	----- mint	
23	Waiting time for the vaccination	----- mint	
24	Health worker advice about types of vaccination received	1. Yes 2. No	
25	Information about possible vaccine side effect by HW	1. Yes 2. No	
26	Information on next vaccine schedule by HW	1. Yes 2. No	
27	Missing vaccination opportunity	1. Yes 2. No	
28	If missing why	1. No provider at that day 2. Vaccination stock out 3. Vaccination day postponed	

Part3. Maternal Health care utilization of mothers/care givers characteristics on determinants of Incomplete vaccination among children aged 12 to 23 months in Naedier Woreda ,central zone , Tigray, Ethiopia, 2024 (n=294)

Code	Variables	Category	Skip
30	Parity	_____	
31	ANC follow up during her last pregnancy?	1. No 2. Yes	If no pass to N0 33
32	How many times ANC attended	1.One times 2. Two times 3 Three times 4. Four and above	
33	Did you receive TT vaccination during pregnancy?	1. No 2. Yes	
34	Place where the child was delivered	1. At home 2. Health post 3. Health center 4. Hospitals	
35	Received PNC after delivery of the child?	1. No 2. Yes	If no pass to N0 35
36	How many times PNC attended	1.One times 2. Two times 3. Three and above times	
37	Home visit by HEW/HW	1. No 2. Yes	
38	Mother /care giver is member of women's developmental army	1. No 2. Yes	

Part4. Knowledge of mother/caregiver regarding child vaccination characteristics on determinants of Incomplete vaccination among children aged from 12 to 23 months in Naedier Woreda ,central zone , Tigray, Ethiopia, 2024 (n=294)

Code	Variables	Category	Skip
40	Have you heard of the EPI target diseases?	1. Yes 2. No	
41	If the answer for Question No 40 is yes source of information	1. From health worker 2. From media 3. From relatives	
42	What are the benefits of vaccination to your child?	1. Prevent from disease 2. Cure from disease 3. Don't know	
43	Age Starting vaccination	1. Just after birth 2. four week after birth 3. Six week after birth 4. I don't know	
44	Age completing vaccination	1. In 6-8 Month 2. In 9-12 month 3. Gerter than 12 month 4. I don't know	
45	How many times should a child vaccinated	1. One times 2. Two times 3. Three times 4. Four times 5. five times 6. Six times 7. Don't know	
46	Do you know about the side-effects of Vaccines?	1. No 2. Yes	
47	Do you know when the next vaccination date is for your infant?	1. No 2. Yes	

Part 5, Attitude of respondent regarding infants' immunization characteristics on determinants Incomplete vaccination among children aged from 12 to 23 months in Naedier Woreda ,central zone , Tigray, Ethiopia, 2024 (n=294)

Code	Variables	Category
50	Do you think compliance with the immunization schedule is important	Strong agree Agree Neutral Dis agree Strong dis agree
51	Do you think Vaccination is more beneficial than harmful	Strong agree Agree

		Neutral Dis agree Strong dis agree
52	Vaccines protect children from serious and life-threatening diseases	Strong agree Agree Neutral Dis agree Strong dis agree
53	Do you think vaccination are possible side effects from some vaccines	Strong agree Agree Neutral Dis agree Strong dis agree
54	Do you think all children Should be vaccinated?	Strong agree Agree Neutral Dis agree Strong dis agree
55	Do you think vaccination makes keeps your child healthy	Strong agree Agree Neutral Dis agree Strong dis agree
56	Do you think infants took usually too many vaccines	Strong agree Agree Neutral Dis agree Strong dis agree

ሕዛል፡ ትግርኛ መሕተት

መቐለ ዩኒቨርሲቲ

ጥዕና ሳይንስ ኮሌጅ

ነርሲንግ ትምህርት ክፍል

ሕዛል ሓይል፡ ዉልቀ ሓበሬታ

ናይቲ መፅናዕቲ በዓል ዋና፡ ገብረዚሄር ገብረስላሴ

ርእሲ እቲ መፅናዕቲ፣ ኣብ2016ዓ/ም ኣብ ክልል ትግራይ ማእከላይ ዘባ ወረዳ ናዕዴር ካብ 12 ክሳብ 23 ወርሒ ዕድሙ ዝርከቡ ህፃናት ሙሉእ ክተበት ዘይምክተቦም ዘለዉ ምክንያታት ንምፅናዕ ዝግበር ዳህሰሳ እዩ።

መግለጺ ሓበሬታ ቅጥዒ

ጥዕና ይህበለይ፡ ስመይ-----ይባሃል። ኣነ መረዳእታ ሰብሳቢ ኮይነ እዚ መረዳእታ ዝእክቦ ኣቶ **ገብረዚሄር ገብረስላሴ** ኣብ መቐለ ዩኒቨርሲቲ ጥዕና ሳይንስ ኮሌጅ ነርሲንግ ትምህርት ክፍል ናይ ድሕረ ምረቓ ትምህርት ናይ ህፃናት ን ኣባፅሕን 2^ይ ዲግሪ ተመራቂ ተማሃሪ ናይ መመረቂ ፅሕፎም ንምድላው እዩ። ንሶም/ንሰን ኣብዚ ጽንዓት እዚ ንክሳተፉ/ፋ ብክብሪ ተሓርዮም/ን እዩም/ን። ቅድሚ ፍቓደኝንቶም ብዘዕባ እዚ ዳህሰሳ ጽንዓት ክፍልጥዎ ዝደልዩ ነገር እንተሃልዩ ነዚ ዝስዕብ ይመስል።

ናይዚ ፅንዓት ዕላማ

ኣብ ክልል ትግራይ ማእከላይ ዘባ ወረዳ ናዕዴር ካብ 12 ክሳብ 23 ወርሒ ዕድሙ ዝርከቡ ህፃናት ሙሉእ ክተበት ዘይምክተቦም ዘለዉ ምክንያታት ንምፅናዕ ዝግበር ዳህሰሳ እዩ።

ጥቅሚ ናይዚ መፅናዕቲ

ኣብዚ መፅናዕቲ ምስታፍ ዋላ ሓንቲ ክፍሊት ዘይብሉ ወይ ከዓ ንዓኹም ፍሉይ ጥቅሚ ኣይሃብኩም ነገር ግን ኣብዚ መፅናዕቲ ምስታፍ ከምኡውን ንዝትሓተቱ ሕቶታት መልሲ ምሃብ ሓደሽቲ ፖሊሲታት ንምድላው ዓቢ ኣስተዋጽኦ ከምኡውን ተወሳኺ ምክንያታትን ይህብ።

ጎናዊ ጉድኣት

እዚ መፅናዕቲ ዝካየድሉ ንስኹም ቀዳሙ ዝተዳለዉ ከምኡውን ዝተሃነፅ ሕቶታት ብምሕታት እዩ ። ናይ ኣገባብ መስርሖ ወልሓንቲ ኣካላዊ ኹነ ስነ ኣእምራውን ቅልውላው ዩብሉን . ብተወሳኺ ዘይተረደኦም ሕቶ ሓበሬታ ንክህቡ ኣይግደዱኑ።ብዘይካ ንከባቢ 15 ክሳብ 30 ደቂቓ ዝከውን ግዜ ምጥፋእ ኣብዚ መፅናዕቲ ብምስታፍ ዝመፅእ ምንም ጉድኣት የለን።

ምሰጢር ምሕላው

ስለዚህ ሐሳብም ብነፃነትን ንምግላፅ ንክእሉ/ላ ሰሞም/ሙን ምፅሓፍ ኣደድልን። ነገር ግን ስለናቶም/ን ሓቀኛ ዝኮነ መልሲ ኣድላዪ እዩ። ኩሉ ንዝህበዎ ሓበሬታ ሚስጥራዊነቱ ዝተሓለወ እዩ።

መሰል ተሳተፍቲ

እዚ ቃለመሕትት ዝምልኣሉ ፍቓደኛታት ንዝኮኑ ሰባት ጥራሕ እዩ። ፍቓደኛ ብዘይምኻኖም/ነን ቅጽዓት ወይ ውን ዝስእንዎ ጥቕሚ የለን። ንምስታፍ ፍቓደኛ እንተዘይኮይኖም/ነን ኣብ ዝኾነ ግዜ ምቁራፅ ትክእሉ/ላ ኢኹም/ኸን። ፅንዓቱ ዝምልከት ሕቶ እንተሃልይዎም በዓል ዋና ኣማኸርቲ እዚ ፅንዓት ዝኾኑ በዚ ስለኪ ቁፅሪ ደዊሎም ምጥያቕ ይክእሉ እዮም/የን።

1) ገበረዚኄር ገብረስላሴ Email: Gerziherg16 @gmail.com ስልኪ ቁፅሪ= 0914576849

ሕዛል ክልተ፡ ቅጥዒ ስምምዕነት

እዚ መፅናዕቲ ኣብ ኣብ2016ዓ/ም ኣብ ክልል ትግራይ ማእከላይ ዘባ ወረዳ ናዕዴር ካብ 12 ክሳብ 23 ወርሒ ዕድሙ ዝርከቡ ህፃናት ሙሉእ ክተበት ዘይምክተቦም ዘለዉ ምክንያታት ንምፅናዕ ዝግበር ዳህሰሳ እዩ። ንናይ “ናይ ህፃናትን ኣባፅሕን” ካልኣይ ዲግሪ መመረቂ ቅሑፍ ንምስራሕ ምኪኑ ፈሊጦ እዚ ከዓ ብኮለጅ ጥዕና ሳይንስ ዓይደር ነርሲንግ ቤት ትምህርት ናይ ህፃናትን ኣባፅሕን ጥዕና ክፍሊን ዝድገፍ ምኪኑ፤ናይዚ መፅናዕቲ ዋና ተመራማሪኡ ከዓ ኣይተ **ገብረዚህር ገብረስላሴ** ከም ዝኮነ ዓላማ እቲ ፅንዓት እውን ብዝፈልጦ ቋንቋ ተነፂሩለይ እዩ።

መሕትት ንዝገብረላይ ኣካል ዝህበ ኩሉ ዓይነት ሓበሬታ ብምስጢር ክተሓዝ እዩ። ከም ዝተረዳእክዎ ኣብዚ ፅንዓት ብምስታፈይ ዘምፀኣለይ ጉድኣት የለን፤ከምኡ እውን ኣብ ዝደለክዎ ግዜ ሓበሬታ ዘይምሃብ፣ሕቶ ዘይክምልስ ወይ ከዓ ክቋርፆ መሰል ኣለን፤ንምንታይ ከም ዘቋርፅ ንማንም ክገልፀሉ ዘገድደኒ ኣይህሉን። ካብዚ መፅናዕቲ ዝረክቦ ቀጥታዊ ዝኮነ ጥዕናዊ ወይከዓ ምምሕዳራዊ ጥቕሚ የለን።

ብዛዕባ እዚ ፅንዓት ዘይተረዳኣኒ ነገር እንተሃላዩ ኣብ ዝኮነ ግዜ እዞም ዝስዕቡ ኣካላት ክሓትት መሰል ከም ዘለኒ ተገንዚቦ ኣለኩ።

የኒቨርስቲ መቐለ ኮለጅ ጥዕና ሳይንስ ዓይደር ትካላዊ ናይ ምርምርን መፅናዕትን ቦርድ

ሽም ዋና ተመራማሪ : **ገብረዚህር ገብረስላሴ**

ቴሌፎን ቁ.: 0914576849

እዚ ኣብ ላዕሊ ዝተጠቀሰ ቅጥዒ ኣንቢቦዮን ብዝርደኦ ቋንቋ ዝተፀሓፈን ብቀሊሉ ዝተረዳእክዎን እዩ፤በዚ መሰረት ንክሳተፍ ፍቓደኛ እዩ።

ክሳተፍ/ፋ ፍቓደኛ ድዮም: እው -----

ኣይኮንኩን-----

ፊርማ ተሳታፊ _____

ክፍለ-ላይ: ማሕበራዊ ኩነታት አድን ህፃንን ዝምልከት መጠይቅ

ኩነታት ክተበት ህፃን

ሙሉእ ዝተከተበ: _____

ሙሉእ ዘይተከተበ: _____

ታ.ቁ	ሕቶ	መልሲ	ናብተ.ቁስገርሪ
01	መልሲ ዝህብ ኣካልን ህፃንን ዘለዎም ዝምድና	1 አዶ 2. ሓብሓቢ	
02	ዕድመ አዶ/ሓብሓቢ	-----ዓመት	
03	ኩነታት ሓዳር አዶ	1 በዓልቲ ሓዳር 2 ዘይተመርጠዎት 3 ዝተፋተሐት 4 በዓልገዛኣ ዝሞታ	
04	ትንብረሉ ቦታ	1. ከተማ 2. ገጠር	
05	ሃይማኖት	1. ተዋህዶኦርቶዶክስ 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት 5. ካልእ ዘርዘር	
06	ቢሄር	1 ትግራይ 2 አምሓራይ 3 ዓፋር 4 ኦሮሞ 5 ካሊኦ	
07	ደረጃ ትምህርቲ ናይ አዶ	1. ዘይተምሃረት 2. ምንባብን ምጽሓፍን ጥራሕ 3. 1 ^ይ ደረጃ (1 - 8) 4. ካልኣይ ደረጃ (9 - 12) 5. ከለጅን ልዕሊኡን	
08	ኩነታት ስራሕ ናይ አዶ	1. ናይ ገዛእ መቤት 2. ሓረስታይቲ 3. መንግስቲ ስራሕተኛ 4. ነጋዴ 5. ተምሃሪት 6. መዓልታዊት ስራሕተኛ	
09	ትምህርቲ ደረጃ በዓልቤትኪ	1. ዘይተምሃረ 2. ምንባብን ምጽሓፍን ጥራሕ 3. 1 ^ይ ደረጃ (1-8) 4. ካልኣይ ደረጃ (9-12) 5. ከለጅን ልዕሊኡን	
10	ኩነታት ስራሕ ናይ ባዓል ገዛኪ	1. ሓረስታይ 2. መንግስቲ ስራሕተኛ 3. ነጋዴ 4. ተምሃሪይ 5. መዓልታዊት ስራሕተኛ	

11	በዝሒ ስድራ ክንደይ ኢኩም	-----	
12	ወርቀታዊ አታዊ ስድራቤት ክንደይ ይከውን	-----ብር	
13	ፆታ ህፃን	1 ተባ 2 አነስታይ	
14	ዕድሜ ህፃን	-----ወርሒ	
15	እቲ ህፃን መበል ክንደይ እዩ	1. ቀዳማይ 2. ካልኣይ 3. ሳልሳይን ልዕሊኡን	

ክፋል ክልተ; ናይ ህፃናት ኣዋሃህባ ግልጋሎት ክታበት ዝጥምት መጠይቅ

ታቂ	ሕቶ	መልሲ	ናብተ.ቁስገር/ሪ
02	ግልጋሎት ትረክቡሉ ጥዕና ትካል	1. መበእታዊ ሆ/ ል 2. ጥዕና ጣብያ 3 ጥዕና ኬላ	
03	ናብ ክተበት ቦታ ብምንታይ ትጋዓዙ	1. ብእግሪ 2. ናይ ህዝቢ መጋዕዝያ	
04	ክታበት ዝዋህቡሉ ቦታ ንምብፃሕ ዝወሰደሉኩም ግዝ	-----ደቂቃ	
05	ኣብ ጥዕና ትካል ክታበተ ንምርካብ ክንዳይ ግዜ ይወሰደልኩም	-----ደቂቃ	
06	ዝተውሃበኩም ግልጋሎት ክተበት እንታይ ምካነ ሰብ ሞያ ጥዕና ይነግሩኩም ዶ	1.ኣይፋል 2. እወ	
07	ድሕሪ ክተበት ከጋጡሙ ዝክእሉ ሳዕቤናት ሰብ ሞያ ጥዕና ይነግሩኩም ዶ	1.ኣይፋል 2. እወ	
08	ስለ ቀፃላይ ክተበት መዓዘ ምካነ ሰብ ሞያ ጥዕና ይነግሩኩም ዶ	1.ኣይፋል 2. እወ	
09	ንክተበት ግልጋሎት እልኪ ኪይደኪ ዘይክተበኩሉ ገዜ ኣሎ ዶ	1.ኣይፋል 2. እወ	
10	ቁፅሪ 09 እወ እንተኮይኑ ምኸኒያቱ	1.ብዓልሞያ ኣበቲ ዕለትዘይምንባሩ 2.ክታበት ስለ ዝተወደአ 3. ናይ ክታበት መዓልቲ ስለ ዝተቀየረ	

ክፋል ስለስተ; ግልጋሎት ጥዕና ኣዶ ዝምልከቱ መጠይቃ

ታቂ	ሕቶ	መልሲ	ናብተ.ቁስገር/ሪ
30	በዝሒ ዝወለድኪዮም ቆሎዑ	-----	
31	ኣብ እዋን ጥንሲኪ ቅድመ ወሊድ ክትትል ትገብሪ ነይረኪ ዶ	1. ኣይፋል 2. እወ	መልሲ ኣይፋል እንተኮይኑናብ ቁፅሪ34 ይስገሩ
32	ቁፅሪ 32 እወ እንተኮይኑ ክንደይ ግዜ	1. ሓደ ግዜ 2. ክልተ ግዜ 3. ስለስተ ግዜ 4. ኣርባዕተን ልዕሊኡን	
33	ኣብ እዋን ጥንሲኪ ናይ ቲታነስ ተከተበኪ ዶ ነይረኪ	1. ኣይፋል 2. እወ	
34	እዚ ህፃንኪ ኣበይ ወሊደኪዮ	1. ኣብ ገዛ 2. ኣብ ጥዕና ኬላ 3. ኣብ ጥዕና ጣብያ	

		4. ሆስፒታላት	
35	ድሕረ ወሊድ ክትትል ትገብረ ዶ ነይረኪ	1. አይፋል 2. እወ	መልሲ አይፋል እንተኮይኑናብ ቁፅረ38 ይስገሩ
36	ቁፅረ 36 እወ እንተኮይኑ ክንደይ ግዜ	1. ሓደ ግዜ 2. ክልተ ግዜ 3. ሰለስተ ልዕሊኡን	
37	ሰብ ሞያ ጥዕና ኣብ ገዛኩም ዑደት ዶ ይገብሩ	1. አይፋል 2. እወ	
38	ኣባል ልምዓት ጉጅለ ዲኪ / ካ	1. አይፋል 2. እወ	

ክፋል ኣርባዕተ; ናይ ኣዶ /ሓበሓቢ ኣፍልጦ ኣብ ክተበት ህፃናት ዝምልከት መጠይቅ

ታቂ	ሕቶ	መልሲ	ናብተ.ቁስ ገር/ሪ
40	ብክታበት ሕማማት ከም ዝካላከል ሰሚዒኪ ትፈልጢ ዶ	1. እወ 2. አይፋል	
41	መልሲ ቁፅረ 40 እወ እንተኮይኑ ካብ ምን	1.ካብ ሰብ ሞያ 2.ካብ መረከቢ ሓፋሽ 3.ካብ ቤተሰብ	
42	ክተበት ምክታብ ጥቅሙ እንታይ እዩ	1.ሕማማት ምክልካል 2.ሕማም ንምሕካም 3.አይፈልጦን	
43	ህፃናት ክተበት መዓዘ ይጅምር	1. ምስተወለዱ ወድያውኑ 2. ምስተወለዱ ኣብ 4ይ ሰሙን 3. ምስተወለዱ ኣብ 6ይ ሰሙን 4. አይፈልጦን	
44	ህፃናት ክተበት መዓዘ ይውድኡ	1.ካብ 6 - 8 ወርሒ 6 ካብ 9 – 12 ወርሒ 3. ልዕሊ ሓደ ዓመት 4 አይፈልጦን	
45	ሓደ ህፃን ጠቅላላ ክንደይ ግዘ ይክተብ	1.ሓደ ግዘ 2. ክልተ ግዘ 3. ሰለስተ ግዘ 4.ኣርባዕተ ግዘ 5.ሓምሽተ ግዘ 6.አይፈልጦን	
46	ኣብ እዋን ክተበት ዝፍጠሩ ሰዕቤናት ትፈልጢ ዶ	1. አይፋል 2. እወ	
47	መዓዝ ከም ተክተቦሮ ቀፃሊይ ዕለት ትፈልጢ ዶ	1. አይፋል 2. እወ	

ክፋል ሓሙሽተ ናይ ኣዶ /ሓበሓቢ ኣማላካክታ ኣብ ክተበት ህፃናት ዝምልከት መጠይቅ

ታቂ	ሕቶ	መልሲ	ናብተ. ቁስገር/ ሪ
50	ን ህፃናት ክተበት መሊእካ ምክታብ ጠቓሚ እዩ ኢልኪ/ ካ ትኣምን/ ኒ ዶ ?	1. ኣዚዮ ይስማዕማዕ 2. ይስማዕማዕ 3. መንጎኛ 4. ኣይስማዕማዕን 5. ኣዚዮ ኣይስማዕማዕን	
51	ክታበት ምክታብ ካብ ጉድኣቱ ጥቅሙ ይዓቢ ኢልኪ/ ካ ትኣምን/ ኒ ዶ ?	1. ኣዚዮ ይስማዕማዕ 2. ይስማዕማዕ 3. መንጎኛ 4. ኣይስማዕማዕን 5. ኣዚዮ ኣይስማዕማዕን	
52	ን ህፃናት ክተበት ምክታብ ን ሓደጋኛ ን ሃንደበታዊ ሕማማትን ይካላከል ኢልኪ/ ካ ትኣምን/ ኒ ዶ ?	1. ኣዚዮ ይስማዕማዕ 2. ይስማዕማዕ 3. መንጎኛ 4. ኣይስማዕማዕን 5. ኣዚዮ ኣይስማዕማዕን	
53	ክተበት ምክታብ ን ህፃናት ጎናዊ ሰዕቤን የምፅእኢልኪ/ ካ ትኣምን/ ኒ ዶ ?	1. ኣዚዮ ይስማዕማዕ 2. ይስማዕማዕ 3. መንጎኛ 4. ኣይስማዕማዕን 5. ኣዚዮ ኣይስማዕማዕን	
54	ኩሎም ህፃናት ክክተቡ ኣለዎም ኢልኪ/ ካ ትኣምን/ ኒ ዶ ?	1. ኣዚዮ ይስማዕማዕ 2. ይስማዕማዕ 3. መንጎኛ 4. ኣይስማዕማዕን 5. ኣዚዮ ኣይስማዕማዕን	
55	ክተበት ምክታብ ህፃናት ጥዕንኣም ሕሉው ክከውን ይገብረ እዩ ኢል ኪ/ ካ ትኣምን/ ኒ ዶ ?	1. ኣዚዮ ይስማዕማዕ 2. ይስማዕማዕ 3. መንጎኛ 4. ኣይስማዕማዕን 5. ኣዚዮ ኣይስማዕማዕን	
56	ህፃናት ኣብ ሓደ ግዜ ቡዙሕ ዓይነታት ክታበት ክክተቡ ይክእሉ እዮም ኢልኪ/ ካ ትኣምን/ ኒ ዶ	1. ኣዚዮ ይስማዕማዕ 2. ይስማዕማዕ 3. መንጎኛ 4. ኣይስማዕማዕን 5. ኣዚዮ ኣይስማዕማዕን	

ንዝሃብኩኒ ሓበሬታ የቀንየለይ