

MEASLES VACCINATION DROPOUT RATE AND ASSOCIATED
FACTORS IN CHILDREN AGED 12-23 MONTHS, ANLEMO DISTRICT,
HADIYA ZONE, SOUTHERN ETHIOPIA

BY: TILAHUN BEYENE (BSc)

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By: Tilahun Beyene (BSc)

Advisors: - 1) Mr. Fasil Tessema (MSc, Associate prof.)

2) Mrs. Haimanot Ewnetu (MPHE)

Abstract

Background:-Immunization is a life saving and cost-effective health intervention which reduces childhood morbidity and mortality. There are still millions who are unprotected by immunization. Drop-out rates are measured to determine immunization programme continuity showing the number of the children who start but fail to complete the immunization process.

The objective of this study is to assess measles vaccination dropout rate and associated factors among children aged 12-23 months in 2016.

Methods and materials: community based cross-sectional study design was used. Study was conducted in Anlemo District March 21 to April 21/2016 in 9 randomly selected kebeles. Study population were selected by multi stage stratified, Simple random sampling from health post family folder and census frame. Multivariable logistic regression model was used to control possible effect of confounding. Adjusted odds ratio with corresponding 95% confidence intervals was used to quantify degree of association.

Results: 90 (24.10%) of the children drop out measles vaccination. Measles vaccination drop out was 4.50 times more likely among mother who did not follow ANC visit compared to their counterparts(AOR=4.50;95%CI:(2.1,9.8)), sick child during measles vaccination schedule was 2.68 times more likely to dropout compared to not ill child(AOR=2.68;95%CI:(1.22, 5.88)), Mothers waiting for long time to immunize child after arriving health facility was 6.4 times more likely to dropout than their counterparts(AOR=6.40; 95%CI: (3.07, 13.30)), mothers fail to follow PNC after delivery of index child 2 were times more likely to dropout than mothers who received PNC(AOR=2.13; 95%CI: (1.17, 3.87)) and mothers face postponed measles immunization schedule was 2.73 times more likely to dropout compared to their counterparts (AOR=2.73; 95%CI: (1.53, 4.87)).

Conclusions: Generally, measles dropout rate in the study area is high and factors associated with measles vaccination dropout are ANC visit, PNC visit, child sickness during measles vaccination schedule, postponed measles immunization by care provider and waiting time to immunize child.

Key words: measles, vaccination dropout rate, Anlemo

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List of abbreviations

ANC	Antenatal care
AOR	Adjusted odds ratio
BCG	Bacille Calmette-Gue´rin
DPT-HepB-Hib	Diphtheria Pertussis Tetanus Hepatitis B combination hemophilus influenza vaccine
ERIA	Enhanced Routine Immunization Activities
EPI	Expanded Program on Immunization
EDHS	Ethiopia demographic and health survey
FMoH	Federal Ministry of Health
GVAP	Global Vaccine Action plan
HC	Health Center
HP	Health Post
HF	Health Facility
HMIS	health management information system
MDG	Millennium development goal
MCV1	measles first dose
OPV	Oral Polio Vaccine
PCV	pneumococcal conjugated vaccine
PNC	Postnatal care
RED	Reaching every district
SAGE	Strategic Advisory Group of Experts on Immunization
SIAs	Supplementary Immunization Activities
SNNPRS	South Nation, Nationalities and people’s Regional state
SOS	Sustainable outreach services
SRS	Simple Random Sampling
TT	Tetanus toxoid
UN	United Nations
UNICEF	United Nations children’s Fund
VIF	Variance inflator factor
WHO	World Health Organization

CHAPTER ONE: INTRODUCTION

1.1 Back ground

Immunization is a life saving and cost-effective health intervention which reduces childhood morbidity and mortality. Each year immunization helps to avoid 2 to 3 million child deaths in the world (1). Vaccines have saved the lives of millions of children over the last three decades. But there are still millions more who are unprotected by immunization (2). It is always cheaper to prevent a disease than to treat it. The vaccinated community helps to protect those who are not vaccinated. When less than 90% of children are immunized in a particular community, in case of measles immunization 83-94% herd immunity threshold, these pockets of low vaccination create an environment where infectious diseases can take hold and spread (3).

Measles immunization is one of the most powerful and cost-effective weapons of modern medicine. The expanded program on immunization (EPI) recommends immunization with a single dose of attenuated live measles vaccine at the age of 9 months in developing countries. In developed countries, measles vaccination is delayed to the age of 15 months or later. Therefore, it is crucial to immunize children at the age of 9 months in our context. Vaccination against measles may be given for children as young as 6 months of age in cases of epidemic and famine which is known to increased fatality following measles (4).

Measles dropout rate is found by comparing the number of infants who start the immunization schedule with the number who complete it. Drop-out rates are measured to determine immunization programme continuity showing the number of the children who start but fail to complete the immunization process. There is a very long interval in the EPI schedule in Ethiopia between an infant receiving the first immunization at six weeks old or below, and completing the schedule with the single dose of measles vaccine at 9-12 months of age. A dropout rate of more than 10% indicates that the particular Health facility has a utilization problem i.e. many people are not using the services on offer (5).

The national immunization programme was established in the 1980s, and currently delivers service through static and outreach sites nationwide. The current routine immunization schedules recommend a dose of measles vaccination at 9 months of age (6).

Measles vaccination resulted in a 79% reduction (from an estimated 546 800 in 2000 to 114 900 in 2014) in measles deaths between 2000 and 2014 worldwide (2).

Unvaccinated young children are at highest risk of measles and its complications, including death. In 2010, the World Health Assembly established 3 milestones towards the future eradication of measles would have been achieved by 2015 the first one is increasing routine coverage with the first dose of measles vaccine by $\geq 90\%$ nationally and $\geq 80\%$ in every district or equivalent administrative unit for children aged one year. Based on current trends of measles vaccination coverage and incidence, the WHO Strategic Advisory Group of Experts on Immunization (SAGE) concluded that the 2015 global milestones and measles elimination goals was not achieved on time (7).

Common reasons for measles immunization failure or drop out are obstacles to immunization includes(place of immunization is too far, time of immunization is inconvenient, vaccinator absent, vaccine not available, mother too busy, family problem including illness of mother, child-ill not brought, long waiting time), lack of information on the part of the mothers includes(unaware of need for immunization, place and/or time of immunization unknown, fear of reaction or side effects, wrong ideas about contraindications) and lack of motivation of either health personnel or families/communities includes(postponed until another time, no faith in immunization) (4).

1.2 Statement of the problem

Even though a safe and cost-effective measles vaccine is available Measles is one of the leading causes of permanent disability and death among young children this is associated with low routine measles vaccine utilization (8).

In every country, there are populations who are not immunized and are susceptible to vaccine preventable diseases including measles. In 2007-2010, measles outbreaks were reported in many countries in the western part of Europe, due to pockets of susceptible people who were not immunized against measles. Measles virus continues to spread across Europe, leading to outbreaks in susceptible people who were not immunized (9).

Most of the children currently unreached by immunization live in the least-developed countries, which carry a disproportionate share of the world's disease burden. However, there are unreached populations and immunization system failures in every country. Although immunization services have been strengthened in many countries and succeed in averting many deaths, there is continuing concern at the failure to achieve high immunization coverage in every district (1).

Twenty four million unimmunized or incompletely immunized children live in the poorest countries, where many factors combined in 2012. Other unimmunized children live in countries that can afford, but have not given priority to, acquiring or maintaining the infrastructure and human resources required to deliver immunization (10). Highly infectious nature of measles virus requires maintenance of very high levels of population immunity through high routine coverage and timely implementation of SIAs to address immunity gaps (11).

During 2009-2010, Ethiopia had experienced large measles outbreaks. Primarily the outbreak associated with low routine measles vaccination coverage and with suboptimal or delayed SIAs (12). Immunization is one of the national child survival strategies in Ethiopia to reach DPT3/measles vaccination coverage of 90% in 2010, which planned to decrease mortality under five ages of year by 2%(13) and proportion of children immunized against measles is one of the indicator of health MDG 4 target 4 for decreasing the child mortality and morbidity from measles (14).

In Ethiopia, children are more likely to be vaccinated the first doses of vaccination than the third and the fourth doses in which 60% of children received Bacillus Calmette-Guérin (BCG) and from these only 35% of them receive measles vaccine, which is the last vaccine dose in EPI program of Ethiopian. This shows that there is a high dropout rate from vaccination (15). According to a baseline survey for Last ten kilometers' Routine Immunization Improvement Initiative in selected Ethiopian zones timely vaccination coverage was: more than 80% of children start initial vaccine but among those only 50% completes measles vaccine. This showed that measles is the least taken vaccine due to high dropout (16).

According to 2015/16-2019/20 National Newborn and Child Survival Strategy, measles immunization in 2013/14 was 68%, from this baseline data targeted to achieve 96%, which can be achieved by vaccinating children at all levels of health facilities (17).

Some local causes of dropout are related with service delivery like infrequent sessions, missed opportunity, vaccine shortage, improper contraindication and community related factors like not being informed the immunization date, no active follow up of defaulter, session time conflict with farming/family duties (18).

In Ethiopia many studies were conducted in childhood immunization, these all studies mainly focused on immunization coverage, incomplete immunization, complete immunization, defaulting from immunization, fully immunization and factors associated with these in general. However, these all studies didn't address factors associated with measles drop out and associated factor specifically, since it is long period immunization service utilization and quality indicator. Most of these studies showed that measles was one of the least taken vaccines. But children who started initial vaccine had not been vaccinated for measles was not been studied (19–24).

CHAPTER TWO: LITERATURE REVIEW

2.1. Dropout Rate

Dropout rate is an indicator which is used intentionally to evaluate the performance of immunization service. It measures the rate at which children that started vaccination failing to complete the schedule. A dropout rate of more than 10% entails that utilization problem (18).

A community based cross sectional study conducted in Arbaminch zuria district of Southern Ethiopia measles dropout rate was 11.7% (25). A similar study in Jigjiga district of Somali region of Ethiopia measles dropout rate was 40.3% (26). Also, similar study from Parakou district of Benin showed that drop-out rate between BCG and measles immunization was 31.18% (27). A community based cross-sectional study conducted in Sinana district of Southeast Ethiopia shows 19.5% Penta-1 to measles dropout rate and 15.8% overall dropout (BCG to measles) rates (19).

According to a survey conducted in seven zones of Ethiopia, the main reasons for not completing vaccination, the main contributing factors were mother being too busy, being unaware of the need to for vaccination, vaccinator being absent, postponed until another time, being unaware of the need to return for subsequent doses, place and/or time of vaccination unknown, vaccine not available, place of vaccination too far away, and time of vaccination inconvenient, were noted (16).

2.2 Sociodemographic related factor

A cross-sectional study conducted in Lao, South East Asia revealed that child with low level of father education is about 4 times more likely to dropout than high father education (28). A cross-sectional study in A Village Development Committee of a District of Nepal showed that 55.6% of dropout children had fathers involved in agriculture, children whose father was businessman or service holders were dropouts by 38.5% and 31.0% respectively. The dropout rate of the children decreases with increase in mothers' educational level (29). A cross-sectional study findings conducted in Lay Armachiho district North Gonder Zone and similar study in Mecha district showed that urban residing children were more likely to be fully vaccinated compared with rural children (20,30).

A community based case control study in Awassa zuria woreda revealed that, Children born to illiterate mother was 4 times more likely to defaulting vaccination schedules than children who borne from mothers who had completed secondary and above educational level (23).

2.3 Maternal health service utilization related Factor

A cross-sectional study in jigjiga district showed that TT immunization acceptance of mothers and children's immunization were associated. Mothers who did not take any TT vaccine were 4.85 times more likely not to fully vaccinate their children than those who took the TT vaccine. Children born at home were 2 times more likely not to complete vaccination than those born in health institution (26).

A community based case control study in Awassa zuria district showed that home delivery, was 4 times at higher risk for immunization defaulting than children who borne in the health facility. Mothers who had not followed ANC during their last pregnancy was 2 times highly default from immunization schedules than mothers who tried to utilize ANC care for last pregnancy (23).

Study community based case control study in Wonago district shows Mothers who had poor knowledge about the benefit of vaccines were 6 times more likely to have defaulter children than mothers who had good knowledge. Mothers who did not use PNC service after delivery of the child under study were 6 times more likely to have defaulter children than mothers who did use PNC services. Mothers who did know the schedules of vaccine were 3 times more likely to vaccinate their children fully than mother who didn't know vaccine schedule (24).

A community based cross-sectional study conducted in Sinana district of Southeast Ethiopia, revealed mothers who had attended antenatal care visit during pregnancy were more likely to be fully immunized (19).

2.4 Child related factor

A community based cross sectional study in a Village Development community shows Female children were more likely to dropout measles than male children (59.3% versus 43.8%) (29). A community based cross sectional Study conducted in Nyala locality of Kenya, revealed about 1.3% children were not immunized due to illness during immunization schedule one of the main reasons child not to complete vaccination (31). A survey conducted

in 7 selected zones of Ethiopia, showed that 10.8% of children were not immunized due to illness during immunization schedule (16).

2.5 Accessibility of immunization services

A community based cross-sectional study conducted in Parakou district of Benin showed that long waiting time is 1.7 times more risk to dropout Measles immunization (27).

Significance of the study

Since dropout rate is one of the indicators of immunization service utilization, program continuity and accessibility and availability of service, the result of this study is expected to provide baseline data of measles dropout rate and associated factors in the study area. The results obtained from this study will be used for program managers in different levels (kebele, health center, District, zonal and regional) working at immunization services about why children who started immunization services have not been vaccinated for measles. The finding from this study also provides important inputs for stakeholders to set for further intervention strategy to decrease dropout rate and increase vaccination service utilization which in turn increases vaccination coverage.

The result of this study will be used as reference for other researchers.

Conceptual frame work

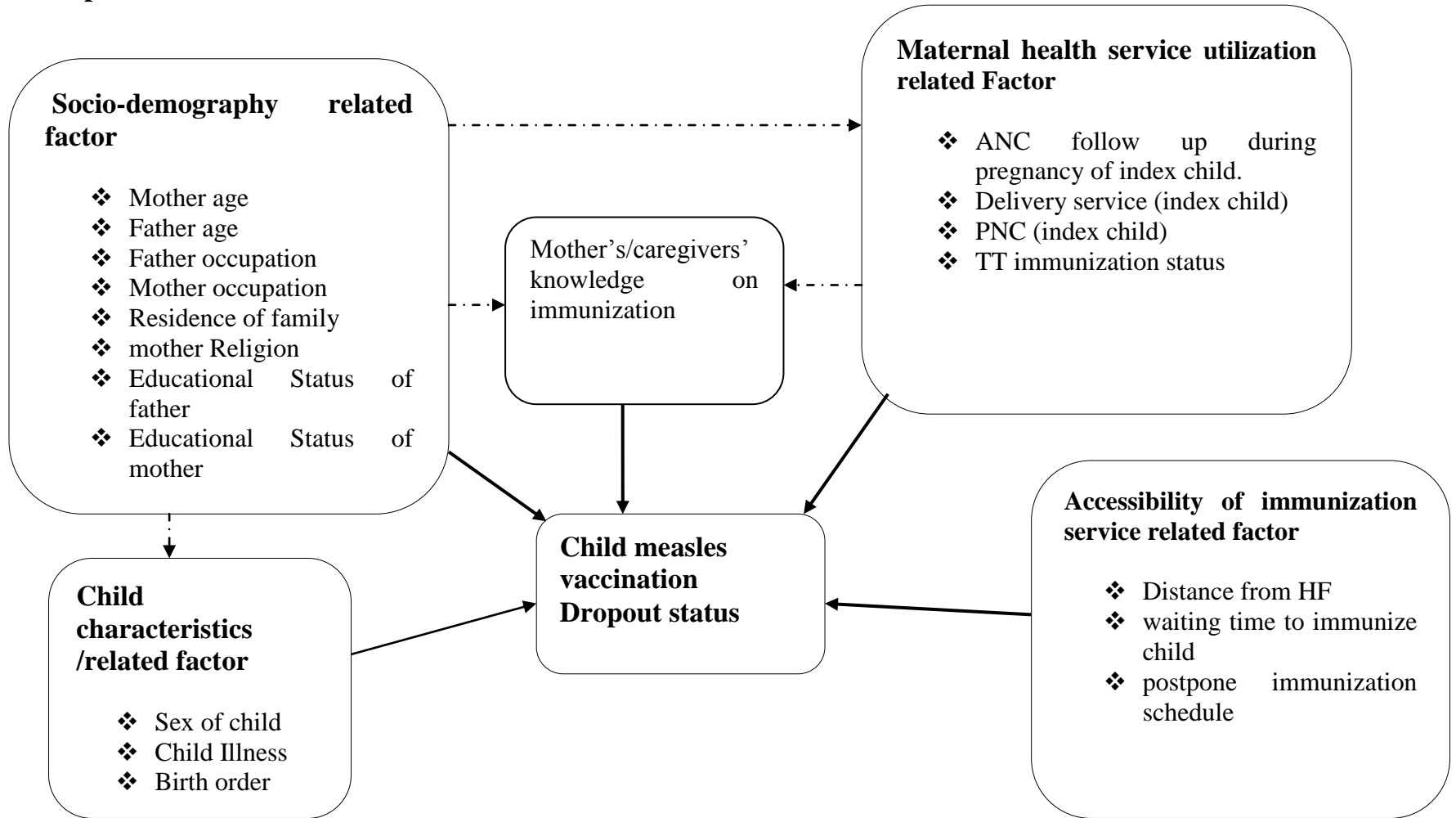


Figure 1: Conceptual framework indicating factors related to measles vaccination dropout, adapted from (27,32,24,23).

CHAPTER THREE: OBJECTIVE

3.1. General objective

To assess Measles vaccination dropout rate and associated factors in children 12-23 months of age, Anlemo District, Hadiya Zone, Southern Ethiopia in 2016

3.2. Specific objectives

To determine measles vaccination dropout rate in children 12-23 months of age in Anlemo District in 2016.

To indentify factors associated with measles vaccination dropout rate in children 12-23 months of age in Anlemo District in 2016.

CHAPTER FOUR: METHODS AND MATERIALS

4.1 Study area and Period

The study was conducted in Anlemo District, one of the 12 Districts in Hadiya zone, SNNPRS, Ethiopia; located at 214Km away from Addis Ababa and 192 km away from Awassa. The District shares boundaries with Lemo District in Southwest and, Shashogo District in Southeast and silte zone in North direction. According to 2007 Ethiopia census projection, the District has estimated total population of 85,237 of which 41,766(49%) males and 43,471(51%) females, 2,719 infants and 1696 are children aged 12-23 months in 2015/2016. The District has 27 rural and only one urban kebeles (33). There are 27 health posts and 5 health centers in the District. All health centers and health posts provide immunization service.

The study was conducted from March 21/2016 to April 21/2016.

4.2 Study design

Community based cross-sectional study design was used to assess Measles vaccination dropout rate and associated factors in children 12-23 months of age.

4.3 Population

4.3.1 Source population

All 12-23 months age children residing in Anlemo District

4.3.2 Study population

All randomly selected children of 12-23 months of age

4.3.3 Study participants

Mothers/caretakers whose Sampled Children of 12-23 months age Selected for the study

4.4 Inclusion and exclusion /Eligibility criteria

4.4.1 Inclusion criteria

Children who had been vaccinated for at least one of the BCG or pentavalent by card or mother /caregivers report and lived at least one year in the study area were included.

4.4.2 Exclusion criteria

Children whose mothers/caregivers do not know measles immunization status

Ill mothers/caregivers who could not respond

4.5 Sample size determination and sampling technique/procedure

4.5.1 Sample size determination

Single population and two population proportion formula were used to calculate sample size.

Single population proportion was used to calculate sample for measles dropout rate with considering the following assumptions; confidence level of 95%, $Z_{\alpha/2}=1.96$ at 95% CI, $d \leq 1/4$ of proportion (34), $p=19.5\%$, $d=4\%$ for pentavalent to measles dropout rate, in Sinana District of South East Ethiopia(19) and $p = 11.7\%$, $d=3\%$ for BCG to measles dropout rate in Arbaminch zuria district of Southern Ethiopia (25).

$$N = (Z_{\alpha/2})^2 * p * q / d^2 = (1.96)^2 * 0.195 * 0.805 / (4\%)^2 = 377 \text{ (Penta to measles dropout rate)}$$

$n = (1.96)^2 * 0.117 * 0.883 / (3\%)^2 = 441$, So BCG to measles dropout rate gives larger sample size for measles dropout rate (for first objective).

Sample size for second objective (associated factors) was calculated using two population formula by considering the assumptions of power 80% and confidence level of 95%; using Epi info version 7 statcalc program, study done in Parakou district of Benin is taken (since no study done in our country on measles drop out associated factors) among many significantly associated factors, Immunization date post pone, long waiting time and mothers' Knowledge on the child immunization status yield sample size of 263, 226 and 24 respectively (27). (Table 1)

Table 1 calculated sample size for associated factors from previous study

S. no	Associated factors	Ratio(unexposed: exposed)	% outcome in unexposed	RR	Sample size
1	Immunization date post poned (yes)	1.77	24.85	1.71	263
2	waiting time (long)	0.629	27.83	1.7	226
3	Knowledge of the child immunization status (poor)	1.51	6.51	10.5	24

From the sample sizes calculated for both specific objectives, the first objective has larger sample size of 441 was taken.

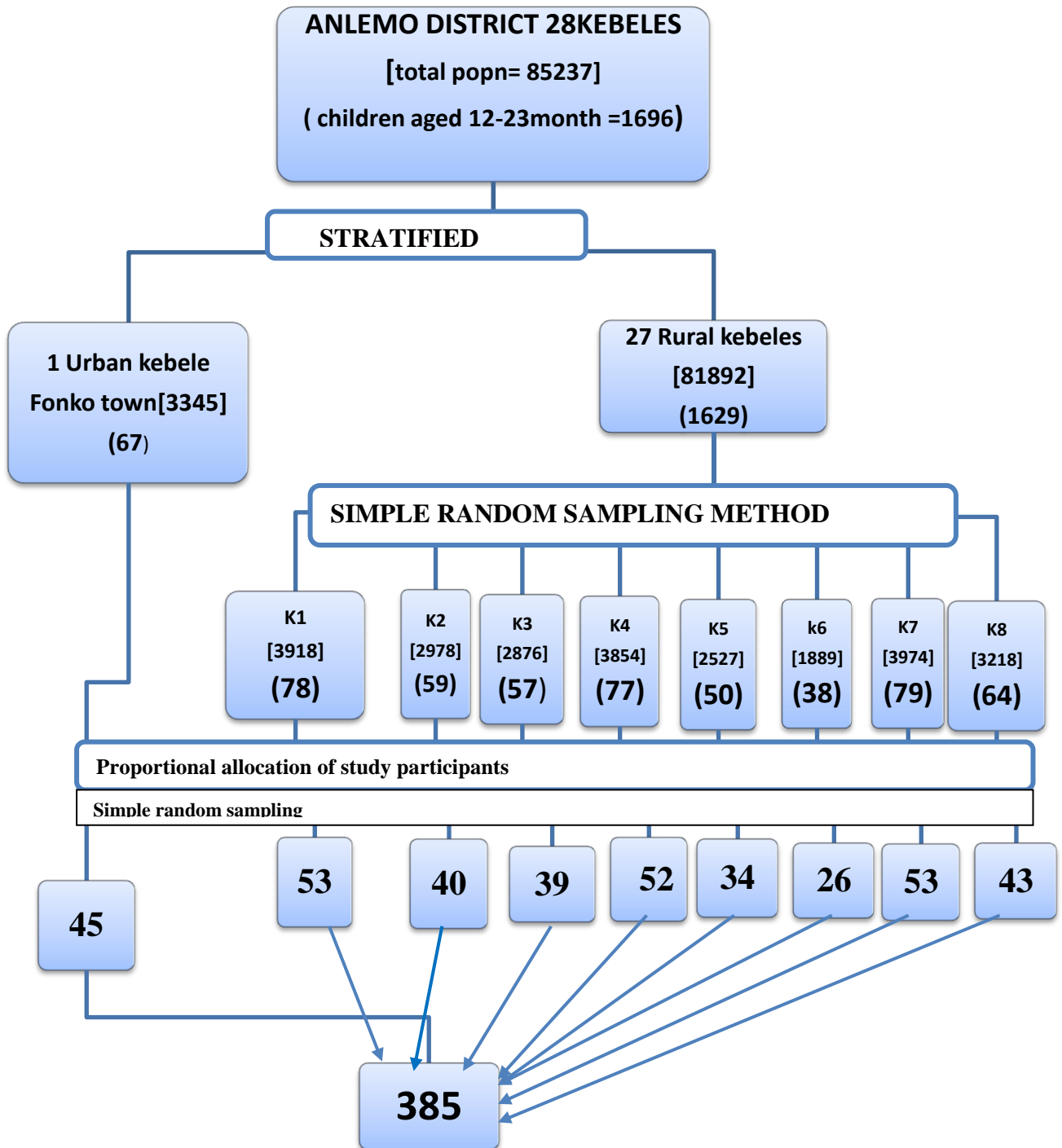
Finite population correction formula was used since children of age 12-23 in Anlemo District is 1696, which is less than 10,000 and $n/N > 5\%$, $n/1+(n/N)$ (35), then by considering non response rate of 10% the final sample size was 385.

4.5.2 Sampling procedures/techniques

Multistage stratified, simple random sampling technique was used. From the total of 28 kebeles, 9 kebeles were selected. First, kebeles were stratified into urban and rural, and then the one urban kebele and 8 rural kebeles were selected by simple random sampling technique (lottery method). The study population for each kebele was determined by population proportional allocation.

The study children were selected by simple random sampling technique (lottery method) using health posts family folder frame with their respective villages and house hold number in rural kebeles. But in urban kebele there was no family folder frame so that census was conducted before the actual data were collected. The census was conducted before actual data collection for identifying and registering households having children aged 12-23months in each village with household number to obtain sampling frame. Then study children were selected by using simple random sampling technique (lottery method).

The nine kebeles included in the study from Anlemo district were: K1=Entolafto lenka, K2=Antigo, K3=Debub darisha, K4=Lay kebecho, K5=MeirabHoma, K6=Bendelicho fate, K7=Demala balbula, K8=Senfewasala and Fonkotown



Key: numbers in () are estimated total population

: Numbers in () are estimated children of aged 12-23months

Figure 2: Schematic presentation of sampling procedures in children of age 12-23 in Anlemo District, 2016

4.6 Variables and Measurement

4.6.1 Dependent variable

Measles vaccination dropout status

4.6.2 Independent variables

Socio-demographic related factor:-mother age, occupation of father, occupation of mother, residence area of the family, mother religion, mother educational Status, father educational Status, family size, marital status of mother, ethnicity of mother.

Maternal health service utilization related Factor:-antenatal care visit during pregnancy of index child, place of delivery (index child), and postnatal care visit (index child), and tetanus toxoid immunization status.

Accessibility of immunization service:-Distance to health facility, waiting time for immunizing child, postponing immunization schedule date/schedule.

Child characteristics:-Sex of child, child illness during measles vaccination schedule, birth order/rank.

Mothers'/caregivers' knowledge on immunization

4.7 Data collection procedure

The data were collected using semi structured pre-tested interviewer administered questionnaire adapted from different literatures by addressing important variables (27,32,24,23). The questionnaire was prepared in English and then translated to local language Hadiyisa and back translated to English to maintain consistency by two different individuals who know local language well. Five diploma nurses supervised by two public health professionals were recruited and trained for two days by principal investigator to collect data. The content of the questionnaire include: socio-demographic variables, child characteristics, accessibility of immunization service and maternal health service utilization related Factor.

4.8 Data quality assurance

To assure data quality, data collectors and supervisor were trained for two days by principal investigator. The training include purpose of study, ethical issue, confidentiality how to collect data, how to minimize recall bias by facilitating recall type of vaccine, route of administration, how to contact the respondents to collect real data and minimize non-response rate and the data collectors and supervisors to have common understanding. 5% of the sample was pretested prior

to actual data collection out of selected kebeles. Then necessary amendments were made upon identified ambiguities of the tools in the wording, logic and skipping order.

The principal investigator and the supervisor carried out day to day on site supervision during the whole period of data collection. Completeness and consistency of the collected data checked on daily basis during data collection by supervisor and the principal investigator. During data collection, study participants who were not present in residential area to respond were revisited at least three times. The data was coded and then entered into Epidata software.

4.9 Data processing and analysis

Data were entered into Epi data version 3.1 and then exported to SPSS version 16.0 and data were cleaned for inconsistencies and missing values for analysis. Descriptive analysis was carried out for each variable. Then bivariate logistic regression analysis was used primarily to check crude association of independent variables with measles dropout rate. Independent variables with P-value <0.25 with the measles dropout in bivariate analysis were candidate variables and entered into multivariable logistic regression to control the possible effect of confounders among independent variables. The model fitness for variables was assessed by Hosmer-Lemeshow Goodness of fit test.

Multicollinearity among independently associated variables was checked by Multicollinearity diagnostic test VIF but it was not detected. Internal consistency of knowledge related items were Checked (Cronbach's Alpha = 0.74). Stratified Analysis was done on potential suspected confounder variable, residence area of the family (urban and rural strata). Tests of Homogeneity of the Odds Ratio were used between strata to explore the effect of residence on a main association with other independent variables. Interaction of residence with other independent variables was checked but not detected.

Adjusted odds ratio with corresponding 95% confidence intervals were used to quantify the degrees of association between independent variables and measles dropout. Finally, results were presented in summary statistics, text, graph and tables.

4.10 Ethical considerations

Ethical clearance was obtained from the Ethical review Committee of Jimma University College of Health science. Formal letter of cooperation was written from Jimma University to Anlemo

District Health office. Then Permission letter for kebeles and study participants was in hand from Anlemo District health office.

During the data collection process, the data collectors informed the mothers/caretakers about the purpose, anticipated benefits of the research project. The data collectors also informed the study participants that their name will not be mentioned and confidentiality of information will be kept, participation in the study is absolutely based on their free willingness and as they have full right to refuse, withdraw their participation at any time. Oral consent obtained for their willingness for participation. After doing so, study participants were asked if they have well understood the whole idea regarding study. Any questions raised were more clarified and their voluntariness to participation was asked.

4.11 Dissemination plan of the study finding

The results of this study was submitted and presented to Jimma University College of Health Sciences and a summary result was communicated to Anlemo District health office and Hadiya zone health department. Findings will also be presented in different professional, local, and national meetings. Finally, efforts will be made to publication in peer reviewed journals.

4.12 Operational definition

Measles vaccination dropout rate: refers to the rate of children who start (BCG or pantavalent₁) and fail to complete measles vaccine or the difference between initial vaccine (BCG /pentavalent first dose) and final vaccine (measles).

Maternal knowledge on immunization: in this study from total of eight dichotomized questions, 1 for incorrect/no and 2 for correct/yes answer about immunization who answer median score and above are taken as having good knowledge and below median poor knowledge.

Caregiver: is the most responsible person that provides child care for the 12 to 23 months old child whose biological mother couldn't provide the intimate care.

Index child: refers to 12 to 23 months child that is included randomly in the study from a household.

Child Illness during immunization schedule: refers to when mother intends to immunize against measles her child become ill before and during schedule from 9-23months.

Tetanus toxoid immunization status: refers to Tetanus toxoid immunization given to mothers at least once any time in her reproductive age life reported by mother/by TT immunization card said to be immunized unless not.

Distance to nearest health facility: In this study distance to Health facility refers to the distance between service user's residence area and immunization provision site takes >30 minutes in foot walking classified far and 30minutes and below is classified as acceptable(not far) distance (36).

Waiting time for immunizing child: in this study refers mother who come health facility to vaccinate her child against after arrival waits >30 minutes is long waiting time and \leq 30minutes is acceptable waiting time

Postponed measles Immunization date/schedule: refers to the date on which immunization service given is known by mothers/care givers and service providers and service provision is changed after arriving health facility for another time/day to comeback (36).

Antenatal care follow up: at least one antenatal care follow up visit during pregnancy of index child.

Institutional delivery: delivery attended by health professionals like health extension workers, nurses, midwives, health officers, doctors and others at health facilities.

Postnatal care visit: mother who get any sort of health information from health care provider with 1st 45 days after delivery either at health facility or at home at least once

CHAPTER FIVE: RESULTS

From the total of 385 sampled children aged between 12-23 months, 374 of their mothers were interviewed with response rate of 97.14%.

5.1 Socio-demographic characteristics

The age of the mothers/caregivers lie between 19 and 49 years with median age of 30 years (SD=5.12). Of 374 participants, 361(96.5%) were married, 3(0.8%) were single, 4(1.1%) were divorced, 4(1.1%) were widowed and 2(0.5) were separated. More than half of the study participants, 251(67.1 %) were illiterate. Regarding ethnicity of the study participants Hadiya accounts 337(90.1%), Silte 31(8.3%), others 6(1.6%). Concerning religion of the study participants, 179(47.9%) were Muslims, 169(45.2%) were protestant, 23(6.1%) were orthodox and 3(0.8%) were others in the study area. When we see occupation of mothers/caregivers, 333(89%) were housewives, 26(7%) were merchant, 11(2.9%) were government employees, 4(1.1%) was daily laborer. Majority of the children, 329(88.2%) were from rural area.

From socio-demographic characteristics; Educational status of mother, Educational status of father, age of the mother and Residence area of the family revealed significant association with measles vaccination dropout at p-value of 0.25(candidate for multivariable logistic regression). (Table 2).

Table 2 Socio-demographic characteristics of the study population in Anlemo District, Southern Ethiopia, 2016. (N)=374

Variables	Category	N (%)	Measles vaccination		COR(95%CI)	p-value
			dropout Yes n(%)	No n (%)		
Age of mother(in year)	<30	172(46)	49(28.5%)	123(71.5%)	1.56(0.97, 2.52)	0.06
	≥30	202(54)	41(20.3%)	161(79.7%)	1	
Educational status of mother	Unable to read and write	157(42)	33(21%)	124(79%)	1	
	Read and write	94(25.1)	26(27.7%)	68(72.3%)	1.437(0.79, 2.6)	0.231*
	Grade 1-8	86(23)	24(27.9%)	62(72.1%)	1.45(0.79, 2.67)	0.227*
	Grade 9-12	27(7.2)	4(14.8%)	23(85.2%)	0.65(0.21, 2.02)	0.460
	College	10(2.7)	3(30%)	7(70%)	1.61(0.4, 6.6)	0.507
Residence area of family	Rural	329(88.2)	73(22.2%)	256(77.8%)	1	
	Urban	44(11.8)	17(38.6%)	27(61.4%)	2.21(1.14,4.27)	0.019*
Family size	≤5	180(48.1)	43(23.9%)	137(76.1%)	0.98(0.61, 1.56)	0.94
	>5	194(51.9)	47(24.2%)	147(75.8%)	1	
Father occupation	Farmer	257(68.9)	63(24.5%)	194(75.5%)	1	
	Merchant	61(16.4)	14(23%)	47(77%)	0.917(0.47, 1.7)	0.798
	Daily laborer	20(5.4)	6(30%)	14(70%)	1.32(0.48, 3.579)	0.586
	Government employee	26(7)	5(19.2%)	21(80.8%)	0.73(0.26, 2.02)	0.549
	Others	9(2.4)	2(22.2%)	7(77.8%)	0.88(0.18, 4.34)	0.875
Educational status of father	Unable to read and write	97(25.9)	20(20.6%)	77(79.4%)	0.64(0.34, 1.20)	0.165*
	Read and write	88(23.6)	22(25%)	66(75%)	0.82(0.44, 1.53)	0.540
	Elementary school	125(33.5)	36(28.8%)	89(71.2%)	1	
	High school	39(10.5)	6(15.4%)	33(84.6%)	0.45(0.17, 1.16)	0.100*
	College and above	24(6.4)	6(25%)	18(75%)	0.82(0.30, 2.24)	0.705

*Candidate variables for multivariable logistic regression (at p<0.25)

5.2 Maternal health service utilization related Factor and maternal knowledge

Of the total participants, 330(88.2%) mothers visited ANC during pregnancy of index child, 333(89%) vaccinated for at least one dose of TT vaccination, about half of the index children 191(51.1%) delivered at health institution, 272(72.9%) of the mothers received at least one PNC visit with in first 45 days after delivery of the index child of which and 193(51.6%) of the mothers had good immunization related knowledge. From Maternal health service utilization and knowledge related factor; Antenatal care visit, Tetanus toxoid vaccination status of mothers,

Place of delivery, Postnatal care visit and Knowledge status of mothers are variables significant at p-value <0.25(candidate for multivariable logistic regression).(Table 3).

Table 3 Maternal health service utilization related Factor of study participants in Anlemo District, Southern Ethiopia, 2016 (n=374)

Variables	Category	N (%)	Measles Dropout Yes n(%)	vaccination No n(%)	COR(95%CI)	p-value
ANC visit	Yes	330(88.2)	64(19.4%)	266(80.6%)	1	
	No	44(11.8)	26(59.1%)	18(40.9%)	6(3.10, 11.61)	<0.001*
TT vaccination	Yes	333(89)	70(21%)	263(79%)	1	
	No	41(11)	20(48.8%)	21(51.2%)	3.578(1.8, 6.9)	<0.001*
Place of delivery	Home	183(48.9)	57(31.1%)	126(68.9%)	2.16(1.32, 3.53)	0.002*
	Health institution	191(51.1)	33(17.3%)	158(82.7%)	1	
PNC visit	Yes	272(72.9)	51(18.8%)	221(81.2%)	1	
	No	101(27.1)	39(28.6%)	62(71.4%)	2.73(1.65, 4.51)	<0.001*
Knowledge status	Good	193(51.6)	56(30.9%)	125(69.1%)	1	0.003*
	Poor	181(48.4)	34(17.6%)	159(82.4%)	2.1(1.29, 3.40)	

* Candidate variables for multivariable logistic regression (at p<0.25)

5.3 Child characteristics/child related factor

It is indicated that the median age of the children was 16 months (SD =3.9) and more than half 203 (54.3%) of the studied children were males, 201 (53.7%) children were within the range of second and fourth birth order and 42(11.2%) were sick at the time of measles vaccination. From Child characteristics; child illness during measles vaccination and sex of child are variables that have significant association with measles vaccination dropout at p-value of 0.25(candidate for multivariable logistic regression). (Table 4).

Table 4 Child characteristics/child related factor of study participants in Anlemo District, Southern Ethiopia, 2016 (n=374)

Variables	Category	N (%)	Measles vaccination Dropout		COR(95%CI)	p-value
			Yes n (%)	No n (%)		
Child sex	Male	203(54.3)	41(20.2%)	162(79.8%)	1	0.058*
	Female	171(45.7)	49(28.7%)	122(71.2%)	1.58(0.98, 2.55)	
Birth order or Rank	1 st	51(13.6)	11(21.6%)	40(78.4%)	0.87(0.41, 1.84)	0.73
	2 nd -4 th	201(53.7)	48(23.9%)	153(76.1%)	1	
Child illness during measles vaccination	≥5 th	122(32.6)	31(25.4%)	91(74.6%)	1.1(0.64, 1.82)	0.757
	Yes	42(11.2)	18(42.9%)	24(57.1%)	2.70(1.4, 5.26)	
	No	332(88.8)	72(21.7%)	260(78.3%)	1	

* Candidate variables for multivariable logistic regression (at p<0.25)

5.4. Accessibility of immunization services

Among the total study participants, majority 341(91.2%) of them were from near distance and 328(87.7%) of the mothers get immunization service within 30 minute after arriving immunization provision site during last recent vaccination session. Waiting time mothers to get immunization service after arriving immunization service provision site ranges between 0 to 120 minutes with median of 15 minutes (SD=16.1) in the study area. Distance to health facility takes in foot walking to arrive health facility was lie between 2 to 60 minutes with median of 16 minutes (SD=11.6) in the study area. 105 (28. 1%) of the mothers face postponed measles vaccination schedule by service provider.

Among accessibility of immunization services related factors; distance to health facility, Waiting time to immunize child and Postponed measles vaccination schedule by service provider have significant association with vaccination dropout at p-value of 0.25.(Table 5)

Table 5 Accessibility of immunization services of the study participants, Anlemo District, Southern Ethiopia, 2016.

Variables	Category	N (%)	Measles vaccination Dropout		COR(95%CI)	p-value
			Yes n (%)	No n(%)		
Distance to health facility	Acceptable	341(91.2)	76(22.3%)	265(77.7%)	1	0.012*
	Far	33(8.8)	14(42.4%)	19(57.6%)	2.57(1.23, 5.36)	
Waiting time	Acceptable	328((87.7)	60(18.3%)	268(81.7%)	1	<0.00*
	Long	46(12.3)	30(65.2%)	16(34.8%)	8.37(4.29, 16.3)	
Postponed schedule	Yes	105(28.1)	37(35.2%)	68(64.8%)	2.22(1.34, 3.65)	0.002*
	No	269(71.9)	53(19.7%)	216(80.3%)	1	

*candidate variables for multivariable logistic regression (at $p < 0.25$)

5.5. Dropout status

Among the total of the 374 children who started initial vaccines (BCG and/or PENTAVALENT₁), 90(24.1%), (CI: 20.1, 28.2) children dropout measles vaccination (in rural measles dropout was 73(22.2%) and in urban dropout was 17(38.6%). Of the total children who started initial vaccine, 240(62.2%) of the mothers had immunization card as a source of information during study period. Among those children who dropout measles vaccination 34.8% them missed opportunity of they can be vaccinated. From children who were vaccinated for BCG, 71.4% had BCG scar.

5.6 Reasons for Measles dropout

Mothers whose child dropout measles vaccination reported that the main reasons for drop out measles vaccination were: vaccinator absence 22(24.7%), Family illness (Child/mother sickness) 11(12.4%), Vaccine absence 12(13.5%), no information on vaccination schedule 12(13.5%) and not enough children to open vial 11(12.4%). (fig. 3)

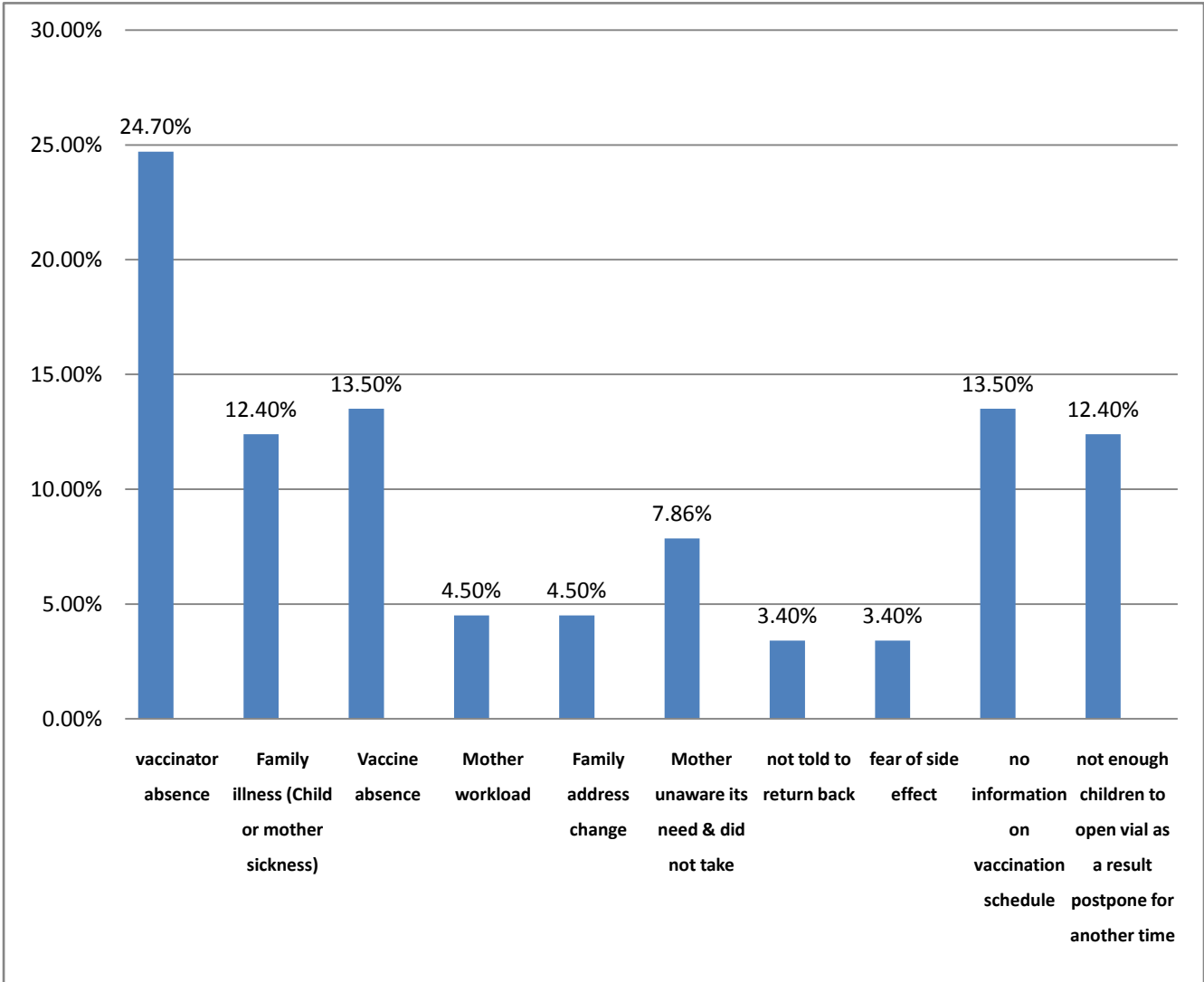


Figure 3: Reasons for measles vaccination dropout among children aged 12-23 months in Anlemo District, Southern Ethiopia, 2016 (n=90)

5.6 Factors independently associated with measles dropout

The Variables which has independently significant association with measles vaccination dropout among children aged 12-23 were antenatal care during pregnancy of index child, postnatal care visit in index child delivery, child sickness during measles vaccination schedule, postponed measles immunization by care provider and waiting time to immunize child.(Table 6)

Measles vaccination drop out was 4.5times more likely among mothers who did not follow antenatal care during pregnancy of index child compared to mothers visited antenatal care (AOR=4.5, 95%CI: 2.1, 9.8).

Mothers who fail to visit postnatal care during index child delivery were about two times more likely to dropout measles vaccination (AOR=2.13;95%CI: 1.17, 3.87). A Child who was sick during measles vaccination schedule was 29 times more likely to dropout measles vaccination (AOR=2.68 (1.22, 5.88)). Mothers who waiting for long time to immunize child after arriving health facility were about 6.4 times more likely to drop out measles vaccination compared with their counterparts (AOR=6.4, 95%CI :3.1, 13.30). Mothers who faced postponed measles immunization schedule for other time by service provider were 2.73 times more likely to dropout compared to their counterparts (AOR=2.73, 95% CI :1.53, 4.87)

Table:6 Factors independently associated with measles vaccination dropout among children aged 12-23 in Anlemo District, Southern Ethiopia, 2016

Variables	Category	Measles vaccination dropout status			COR (95%CI)	AOR (95%CI)	p-value
		Dropout N (%)	Not dropout N (%)				
ANC follow up	Yes	64(19.4%)	266(80.6%)	1	1	<0.001	
	No	26(59.1%)	18(40.9%)	6(3.10, 11.61)	4.5(2.1, 9.8)*		
PNC visit	Yes	51(18.8%)	221(81.2%)	1	1	0.013	
	No	39(28.6%)	62(71.4%)	2.73(1.65, 4.51)	2.13(1.17, 3.87)*		
Child sickness	Yes	18(20%)	24(8.5%)	2.70(1.4, 5.26)	2.68 (1.22, 5.88)*	0.014	
	No	72(80%)	260(91.5)	1	1		
Waiting time	Acceptable	60(66.7%)	268(94.4%)	1	1	<0.001	
	Long	30(33.3%)	16(5.6%)	8.37(4.29, 16.3)	6.4 (3.1, 13.30)*		
Postponed schedule	Yes	37(35.2%)	68(64.8%)	2.22(1.34, 3.65)	2.73(1.53, 4.87)*	0.001	
	No	53(19.7%)	216(80.3%)	1	1		
Knowledge status	Good	193(51.6)	56(30.9%)	125(69.1%)	1	0.082	
	Poor	181(48.4)	34(17.6%)	159(82.4%)	1.65(0.94, 2.92)		

Stratified Analysis was done on suspected potential confounder, residence area of the family (urban and rural strata). This analysis was done to explore independent variables confounded by

residence and the effect on a main association. From stratified analysis, residence area was confounder variable with Antenatal care visit, postnatal care visit, postponed measles vaccination schedule and waiting time to immunize child. So AOR were reported. (Table 7)

Table 7: Stratified analysis in rural and urban residence in Anlemo district, Southern Ethiopia, 2016

Variables with		category	Measles dropout		Observed change	Homogeneity test
			Yes	No		
Urban	ANC	Yes	9(26.5%)	25(73.5%)	33.3%	0.38
		No	8(80%)	2(20%)		
Rural	ANC	Yes	55(18.6%)	240(81.4%)		
		No	18(52.9%)	16(47.1%)		
Urban	PNC	Yes	10(32.3%)	21(67.7%)	28.2%	0.86
		No	7(53.8%)	6(46.2%)		
Rural	PNC	Yes	41(17.1%)	199(82.9%)		
		No	32(36.4%)	56(63.6%)		
Urban	Child sickness	Yes	9(90%)	1(10%)	0.7%	
		No	8(23.5%)	26(76.5%)		
Rural	Child sickness	Yes	9(28.1%)	23(71.9%)		
		No	64(21.5%)	233(78.5%)		
Urban	Waiting time	Acceptable	2(10%)	18(90%)	31%	0.61
		Long	15(62.5%)	9(37.5%)		
Rural	Waiting time	Acceptable	58(18.9%)	249(81.1%)		
		Long	15(68.2%)	7(31.8%)		
Urban	Postponed schedule	Yes	3(37.5)	5(62.5%)	18.6%	0.20
		No	14(38.9%)	22(61.1%)		
Rural	Postponed schedule	Yes	34(35.4%)	62(64.6%)		
		No	39(16.7%)	194(83.3%)		

CHAPTER SIX: DISCUSSION

Dropout rate is an indicator which is used intentionally to evaluate the performance of immunization service. It measures the rate at which children that started vaccination failing to complete the schedule.

6.1 Measles vaccination Dropout status

This study showed that measles vaccination dropout rate in children aged 12-23 months in Anlemo District was 24.1% (CI: 20.1%, 28.2%). This rate is higher than recommended by WHO (<10%) (5) And it indicates that utilization problem in immunization service in the study area and many people are not using the services on offer. In this study measles vaccination dropout rate is higher than study conducted in Sinana district of Southeast Ethiopia(19.5%) (19) and Arbaminch zuria district of Southern Ethiopia(11.7%) (25). Whereas measles dropout rate in this study is lower than study conducted in Parakou district of Benin(31.18%) (27) and Jigjiga district of Somali region of Ethiopia(40.3%) (26).

This difference could be due to access to immunization service, providers' commitment, program implementation strategy differ from one area to another.

This study found that, main reasons for measles vaccination dropout are vaccinator absence, family illness (child and/or mother), vaccine absence, mother workload, Family address change, mother did not take and unaware its need, not told to return back for to complete immunization, fear of side effect, no information on vaccination schedule and no enough children to open vial (postpone for another time). This findings is in agreement with study done in Nyala locality of South Darfur State, Sudan (31),vaccinator absent, vaccine not available , mother too busy, family problem including illness of mother and child ill-not brought were found to be the highest significant reasons behind non- immunization and incomplete immunization, unaware of need immunization, unaware to return for second or third dose, fear of side reactions, wrong ideas about contraindications and other and postponed until another time were the main reasons behind incomplete immunization.

Similar reasons reported from a study conducted in 7 selected zones of Ethiopia, showed that the main reasons child not to complete vaccination were: mother being too busy, being unaware of the need to for vaccination, vaccinator being absent, postponed until another time, being unaware of the need to return for subsequent doses, place and/or time of vaccination unknown,

vaccine not available and time of vaccination inconvenient (16). This could be due to the above mentioned reasons for dropout favor child to dropout measles vaccine by being obstacles child not to complete vaccination and discourage mothers/caregivers.

6.2 Maternal health service utilization related Factor

The result of this study showed that a child whose mothers fail to attend antenatal care visit during pregnancy of index child was about 4.5 times more likely to dropout measles vaccination compared to mothers followed ANC (AOR=4.5, 95%CI: (2.1, 9.8)). This finding is in line with a study conducted in Awassa zuria district, Mothers who had not followed ANC during their last pregnancy highly default from immunization schedules than mothers who utilize ANC care for last pregnancy (23). Also, this finding is in agreement with study conducted in Sinana district of Southeast Ethiopia and Arbaminch zuria district, identified that mothers who had attended antenatal care visit during pregnancy were more likely to be fully immunized (19,25).

The reason behind this could be due to when mothers had no ANC follow up; they miss information about immunization related knowledge and reminder which could be obtained from repeated education and information during ANC follow up and antenatal follow up give opportunity to educate mothers/care givers on benefit of vaccination.

This study revealed that mothers postnatal care visit during the delivery of index child have significant association with measles vaccination dropout. Mothers who fail to visit postnatal care during index child delivery were 2 times more likely to dropout measles vaccination (AOR=2.13, 95%CI: 1.17,3.87). This study is consistent with study conducted in Wonago district of south Ethiopia, identified mothers who did not use PNC service after delivery of the child under study were times more likely to have dropout children than mothers who did use PNC services (24).

But study conducted in Lay Armachiho District of Northwest Ethiopia and Sinana district, showed that there was no significant association between immunization completion and postnatal care visit and number of postnatal care visit received by mothers during index child delivery (20,19). Possible explanation could be those who received postnatal care visit within first 45 days starts their vaccination as early as possible and their mothers/care givers got adequate information on importance of vaccination and will be encouraged to complete.

6.3 Child related factor

This study revealed that, child sickness during measles vaccination schedule had association with measles vaccination dropout. Sick child during measles vaccination schedule was 2.68 times more likely to dropout compared to not sick child (AOR=2.68 (1.22, 5.88)). Association was not studied for this variable anywhere else but this finding is supported by descriptive result reported from studies conducted in Nyala locality and seven selected zones of Ethiopia, identified child sickness during vaccination schedule was one of the main reasons child to dropout immunization (31,16). This association could be due to mothers living in urban area during child sickness give more attention on medical care rather than immunizing sick child.

6.4 Accessibility of immunization services

In current study, waiting time to immunize child after arriving vaccination site has significantly associated with measles dropout. Mothers who waited long time to immunize their child after arriving health facility were 6.4 times more likely to drop out compared to mothers who did not wait long time (AOR=6.4, 95%CI: (3.1, 13.30)). This finding is similar with study conducted in Parakou district of Benin showed; long waiting time was more likely to dropout Measles vaccination compared to mothers who waited acceptable waiting time to immunize child (27). This could be due to mothers/caregivers who wait long time after arriving health facility to immunize their child would not be encouraged to use immunization services on a regular basis as a result children dropout immunization.

The result of this study found that, postponed measles vaccination schedule by service provider has significant association with measles vaccination dropout. Mothers who faced postponed measles immunization schedule for other time by service provider were about 2.73 times more likely to dropout compared to their counterparts (AOR=2.73, 95% CI :1.53, 4.87)). This study is in agreement with study conducted in Wonago district of south Ethiopia, showed that postponing child immunization schedule was a predictor of completion of child immunization; mothers who did not face postponed immunization schedule were less likely to drop out (24).

But study findings in Kombolcha district of East Oromia and Arbegona district of south Ethiopia showed that postponed immunization schedule for another time had no significant association with incomplete immunization and immunization dropout (37,21). This could be due to mothers/caregivers would be discouraged to return back when schedule postponed and the

appointment time might be preoccupied by other programs and daily activities this enable them to dropout.

Limitation of the study

- ❖ This study measured drop out status by using both mother/caregiver report and immunization card, as a result mother report may under/overestimate population parameter due to recall bias and social desirability bias.
- ❖ In this study health post family folder was used as sampling frame for rural kebeles. So there may be unregistered child in health post family folder which may under/overestimate.
- ❖ This study did not address validity of the doses of vaccines child takes and cold chain functionality.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

7.1 Conclusion

Generally, the measles dropout rate in the study area is high and factors associated with measles vaccination dropout were antenatal care during pregnancy of index child, postnatal care visit in index child delivery, child sickness during measles vaccination schedule, postponed measles immunization by care provider and waiting time to immunize child. The main reasons child to dropout measles vaccinations were vaccinator absence, Family illness (Child/mother sickness), Vaccine absence, no information on vaccination schedule and not enough children to open vial were the main reasons for child to drop out measles vaccination.

7.2 Recommendation

To Health workers working at health facilities

- ❖ Health workers should be always at health facility so that mothers/care givers able to immunize their child.
- ❖ Mothers/caregivers should get immunization service immediately when they arrive vaccination site to immunize their child.
- ❖ Service providers should not postpone vaccination schedule and should arrange program.
- ❖ Awareness creation to the community on immunizing sick child should be done
- ❖ Maternal health care services like antenatal care and postnatal care provision should be improved.

Vaccine Manufacturers

- ❖ Currently one measles vaccine vial contains ten doses; this should be prepared one vial of measles vaccine for one/two children this decreases waiting time to immunize child and postponing schedule.

Researchers

- ❖ Conducting a prospective longitudinal study will give a better estimation of factors associated with measles vaccination.
- ❖ Logistics supply stock level, human resources available, validity of the doses of vaccines child takes and cold chain functionality should be researched.

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QUESTIONNAIRES

English version tool to assess measles vaccination dropout rate and associated factors in children aged 12-23 months

Hello! My name is _____ we are collecting data on children of 12-23months measles immunization and related issue. The study is being conducted by student of masters of public health in Epidemiology to assess measles vaccination dropout rate and associated factors among children 12-23 months in this woreda. This study tries to identify which factors are contributed to measles dropout of your child and if the child not immunized for measles why your child is not immunized. Your child is selected for the study. I am one of the data collectors and I am asking you some questions regarding your and your child's immunization status and related issues.

Your participation indirectly contributes in improving the problem solving of immunization in your communities and your children's.

Your response never will be exposed to any party without your consent and it is possible not to tell your name and the interview takes only 20 minutes. There is no obligation to participate in the study. We hope you will agree to answer the questions since your views are important .You have full right to refuse participation, refrain during interview and decline from answering to some or more of the question if you don't like to answer them. Do you have any questions?

If you have any question that I can't answer regarding the study, you can get the researcher Tilahun Beyene by tel. **+251916356889** or e-mail address **tilahunbeyene44@gmail.com**

Signature of interviewer: Date:

Consent form

I have been briefly informed about the study and clearly understood the objective of the study. So I here approve my consent with my signature to take part in the study.

Signature _____ Date _____

Kebele_____ village_____ house no_ _____ code_____

Part one: socio-demographic related factors			
S.n	Questions	Response	Remark
101	Age of child in months	_____	
102	Sex of the child	1. Male 2.Female	
103	No_ of children's older siblings <5	_____	
104	Family size including father and mother	_____	
105	Mother's / CT age	_____	
106	Residential area of family	1.urban 2.Rural	
107	Mother's marital status	1.Single 2.married 3.separated 4.divorced 5. Widowed	
108	Mothers educational status	1.unable to write & read 2.read and write 3.grade 1-8 4.grade 9-12 5.college/university	
109	Order(rank) of the Child in the family	_____	
110	Father's Education	1.Unable to read & write 2.read and write 3.grade 1-8 4.grade 9-12 5.college/university	

111	What is occupation of the father	1.Farmer 2.Merchant 3.daily laborer 4.government employee 5.Others, specify.....	
112	What is occupation of the mother	1.House wife 2.Merchant 3.daily laborer 4.government employee 5. Others, specify.....	
113	Mother Ethnicity	1.Hadiya 2.Silte 3.Gurage 4.Amhara 5.Others, specify----- -----	
114	Mather religion	1. Muslim 2. protestant 3. orthodox 4. catholic 5.other specify_____	

115	Family average monthly income in ETB _____		
Part two: Mother related factor			
201	Have you attended antenatal care during your last pregnancy?	1.Yes 2.No	<i>If no, skip to Q203</i>
202	If yes for above Q, how many times did you attend?	_____	
203	Have you ever been vaccinated TT?	1.Yes 2.No	<i>If no, skip to Q205</i>
204	If yes, for the above Q how many times?	_____	
205	Where did you deliver your last baby?	1. at home 2. at health institution 3.other _____	
206	Have you visited PNC visit?	1.yes 2.no	<i>If no, skip to Q 208</i>
207	If yes how many time?	_____	
208	Are using modern contraceptive method currently?	1.yes 2. no	<i>If no, skip to Q210</i>
209	If yes, which method?	1. Pills 2.injectables 3.Long acting 4.condom 5. Others ,specify _____	
210	Was your child sick on measles vaccination schedule?	1.yes 2. no	
211	Maternal/caretakers knowledge		
	a) Have you Heard about immunization?	1.No 2. Yes	
	b) Do you know vaccination?	1. No 2. Yes	
	c) Do you know Immunization prevents childhood disease?	1.No 2.Yes	
	d)Tell vaccine preventable diseases?(tell at least 3) pneumonia, diarrhea ,TB, measles, tetanus, pertusis, hepatitis, diphtheria, meningitis, polio	1.Incorrect& do not know 2.Correct answer	
	e)Do you know the objective of vaccinating a child ?,tell me	1.Incorrect & do not know 2.Correct answer	
	f) How many vaccination sessions needed for a child to be fully protected?	1.Incorrect & do not know 2.Correct answer	4 or 5 is correct

	g) Do you Know at what age the child begins immunization? tell me	1.Incorrect & do not know 2.Correct answer	At birth or within 45 days
	h)Do you Know At what age the child should complete immunization?, tell me	1.Incorrect & do not know 2.Correct answer	

Part three: Availability and access to health service

301	Which health facility which provide vaccination service near to you?	1. health center 2. hospital 3. Healthpost 4. no HF	
302	If yes,how many minutes it takes in foot you to reach there?	_____min	
303	How long you did you wait during last vaccination session?	_____min	
304	Was there Postponed measles immunization schedule of child?	1.yes 2.no	
305	Have you ever faced measles vaccinator(s) absence when you go HF for immunizing your child and returned without being immunized?	1.yes 2.no	HF=healthfacility
306	Have you ever faced measles vaccine absence when you go HF for immunizing your child and returned without being immunized?	1.yes 2.no	HF=healthfacility
307	Have you ever gone to HF for immunizing measles your child and have not been vaccinated your child, Rather than vaccine & vaccinator absence and returned without immunized?	1.yes 2.no	
308	If yes, what was the reason?	_____	

Part four: Drop out status

401	Do you have a card where vaccinations are written down?	1. Yes 2. No	If no, by history fill the following with the corresponding vaccine. Why no card_____			
	Vaccine taken		Month	Place		
A	BCG	1.Yes 2.no			1.Yes 2.no	Scar?
B	OPV0	1.Yes 2.no			1.Yes 2.no	
C	OPV1	1.Yes 2.no			1.Yes 2.no	
D	OPV2	1.Yes 2.no			1.Yes 2.no	
E	OPV3	1.Yes 2.no			1.Yes 2.no	
F	PCV1	1.Yes 2.no			1.Yes 2.no	
G	PCV2	1.Yes 2.no			1.Yes 2.no	
H	PCV ₃	1.Yes 2.no			1.Yes 2.no	

I	Rota 1	1.Yes 2.no			1.Yes 2.no	
J	Rota 2	1.Yes 2.no			1.Yes 2.no	
K	Pentavalent1	1.Yes 2.no			1.Yes 2.no	
L	Pentavalent2	1.Yes 2.no			1.Yes 2.no	
M	Pentavalent3	1.Yes 2.no			1.Yes 2.no	
O	Measles	1.Yes 2.no			1.Yes 2.no	For what opportunity
403	If not immunized, Was there any opportunity that you have visited HF for any purpose and outreach immunization service providing area with your child that you could vaccinate your child measles vaccine?		1. Yes 2.no			
404	If not immunized for measles, why?/Reason for not immunized		-----			

Hadiyisa version

Shifixxi kittibaato hinka'n 12-23 aga'n cilluwwi aa'oo'n gatuda'ee mahina aa'oo'n gatuda'ee edamoo mashka'uwwaa sorobimminaa saarayvimminaa gudaakoo xammichchuwwa

Xumma, fayya'a! Isummi-----neese wallummok Jimmi unverte'inne la'm digre'e(maasterasa) losaanchchi shifixxi kittibaato hinka'n 12-23 agan umur yoo ciilluwwi aa'oo'n gatuda'ee mahina aa'oo'n gatuda'ee sorobo'o baxoolla/saarayyoolla. Ku sorobo'i mahina ciilluwwi shifit kittibaato aa'oo'n gatuda'ee masshka'a annanni issookko. Eebikkina at kasoroboina naqaasha uwwitona doo'lamtaatto. An odim ka sorobo'i naqaasha wixxaa'okeeni mato. At ka sorobo'o naqaasha uwwimi edimmi mulligoogine ka kululetane yookki ciilluwwi kitibatao aa'immi duuha'a erallaanii ellisookko. At uwitoo naqaashi ki eeyitbee'e ayenam higginsaa uwwinomoyo odim kisumma keyene kitambomoyo. Ka naqaasha uwwiteebe'e xale'I 20 daqiiqa massookko. Malaayyinne/giddine wonshinoommoyyo ki eeyitinete bagaan. Ka xammichchuwwa dabatootto yaamma neeyato issoommo. Kasorobo'one naqaasha uwwimine anga edeenaa, edima sabeenaa lambe'ene uulliseenaa wo'mmi xanat yookko.

Ayyi Xa'mmichchim yoolas xa'mmehe

Ka sorobo'i saarayyaanchchi siiddeena hassoo neese daballeena xannoommibee'I ayyi ka sorobo'o moo'o quuxxim yoolas, Saarayyaanchchi Xilaahun Bayyana ka silklkinne **0916356889** te'im e-mail ga'nna **tilahunbeyene44@gmail.com** Siiddimmi xanamookko..

Xammaanchi firma'a _____

Eeyixxi forma

Iina sorobo'I horoor sawite erisa cakkisaka washi caakkakko, Eebikkina kabeyyone sorobo'one anga eddena I eeyite firma'ine caakkisoommo.

Firma'a _____ balli _____

Qabale'i _____ Gooxi _____ mi'n xig _____ kooddi _____

Baxxanchchi mato: Abaroos heechchi duuha'a

101	Ciilichchi umur aganinne	_____	
102	Ciilichchi albachchi	1. Gooncho 2. Landicho	
103	Onti hiinchii woroon yoo ka ciilii lophphoo ciilluwwi dutoom mee'o?	_____	
104	Amaa annaa exxaa abaroos dutoom	_____	
105	Am umur	_____	
106	Abaroos ga'nni	1.Hax uula 2. Beero'o	
107	Am aagish duuha'i	1. Aagisobeane 2 Aagiso'ohane 3.annanni iko'ohane 4.Tito'ohane 5. Manchi lehakohane	
108	Ama guullito'i losa'n gabal	1.kitabmma qananaa'imma xantamoyo 2. kitabmma qananaa'imma xantamo 3. 1-8 4. 9-12 5. Collega/unverste'e	
109	Abaroos worone kuk mee'i cilia	_____	
110	Anni guullukki losa'n gabal	1.kitabmma qananaa'imma xantamoyo 2. kitabmma qananaa'imma xantamo 3. 1-8 4. 9-12 5. College/unverste'e	

111	Ciil Anni/li'isanchchi bax	1.abuullancho 2. Dadaraancho 3.balli baxaancho 4.adi'l baxaancho 5.Mullan _____ ihulas kitaabe_____	
112	Ciil Am/ li'isaanchchi bax	1. Min amate 2. Dadaraancho. 3. balli baxaancho 4. adi'l baxaancho 5.Mullan ihulas_____	
113	Am giir	1.Hadiya 2.Silxe'e 3.Guraage'e 4.Amhaara 5.Mullan ihulas_____	
114	Am/li'isaanchchi amma'nnat	1. Islaama 2. Protestaanta 3.katoolika 4.ortodoksa 5. Mullan ihulas_____	
115	Abaroos aga'n aago'i ITB	_____	
Amane ciil edamoo duuha'a			
201	Ka ciila qateena Lamfoor hee'li amane kilinika awonta laqoo?	1.eeyya 2.aa'e	aa'e yitlas X203nne hige
202	Eeyya yitlas mee'I kore awonta	_____	
203	TT kitibaato alla laqoo?	1.eeyya 2.aa'e	aa'e yitlas X 205nne hige
204	Eeyya yitlas mee'I kore aa'llaa?	_____	
205	Kaciila hanneone qattitok?	1.minene 2. Fayya'oo'm xaaxxite 3.Mullan	

		ihulas _____	
206	Ka ciila qattaa laso 45 balli worone fayya'oo'm baxaano atoorasittaa laqoo?	1.eeyya 2.aa'e	aa'e yitlas X 208ne Xophihe
207	Eeyya yitlas mee'I kore?	_____	
208	Doollab qarimma horakkam googo awwaaxxita laqoo?	1.eeyya 2.aa'e	aa'e yitlas X 210ne Xophihe
209	Eeyya yitlas hinka googo?	1. kiniina 2.marfi uwwakamoka 3.anga qeera'l ammanina waamakamoka 4.condoma 5. Mullan ihulas _____	
210	Kittibaato uwwakam ammanene ciillich xissaa hee'ukko?	1.eeyya 2.aa'e	
211	AM kitibaaxxi lachcha		
	a) Kittibaaxxi bikkina macceessa laqoo?	1. Aa'e 2.eeyya	
	b)Kittibaato laqoo?	1. Aa'e 2.eeyya	
	c)Kittibaato cillooma'n jabbii egerooisa laqoo?	1. Aa'e 2.eeyya	
	d)Kittibaato hoorakeena xanakkam jabbuwwika kure(qadafa'l michcha, aado'l jabbo, Tb(suqqo'o),shifita, teetaanuusa, siteqophpha, afa'l jabbo, gaanje boqiso(angatgattir)	1.Qophphano dabarukeenoo laubeekeeno 2. La'ukeeno	
	e)Ciilluwwa kitibaato aa'issimmi horoor sawite laqoo? Mahina kure?	1. Qophphano dabarukeenoo laubeekeeno 2. La'ukeeno	
	f)Mat ciillichchi Kittibaato guullaa jabbii egeramona mee'i kor hasisoo?	1.Qophphano dabarukeenoo laubeekeeno 2. La'ukeeno	
	g)Ciillichchi kitibaato mee'i aganane asheerimmi hasisoo?	1. Qophphano dabarukeenoo laubeekeeno 2. La'ukeeno	
	h)Ciillich kitibaato mee'I aganane guullimmi hasisoo?	1. Qophphano dabarukeenoo laubeekeeno 2. La'ukeeno	
	Bxxanchchi saso Kittibaato awwaad heechchi duuha'a		
301	Hink kittibaato uwwukkam xaaxxit kihincite yookok?	1. Xeena xaba'a 2. Hospitala 3. Xeenakella 4. bee'e	
	Yoolas, lokkine afakeena mee'i daqiiqa massoo?	_____ daqiiqa	

303	Higu ammane kitibaatto aa'iseena mattaa hinkaa'n ammane egetito?	_____daqqiqa		
304	Shifixxi kittibaato uwwukkam ayyaamo egetakka'a lasone mulli ayaamo dabarakko'i amman yoo?	1.eeyya 2.aa'e		
305	Fayya'oo'm xaaxite matta Kittibato uwwoo manna hoogi balli yoo?	1.eeyya 2.aa'e		
306	Fayya'oo'm xaaxite matta Kittibato hoogi balli yoo?	1.eeyya 2.aa'e		
307	Fayya'oo'm xaaxite matta Kittibato uwwoo manna hoogimiinse kittibato hoogimmiinse mulli mashkainne ciilicho Kittibatoaa'isoo'n waatti balli yoo?	1.eeyya 2.aa'e		
308	Yoolas mah mashkainne?	_____ _____ _____		
Bxxanchchi sooro:Shifixxi Kittibaatto aa'akoo'n urrimma				
401	Kittibaaxxi kaard yoo? 1.eeyya 2.aa'e	Kaard beelas kure		
	Beelas mahina_____			
	Cillichchi aa'ukki kittibaaxxi hagara	Agan	Beyyi	
			Hsp, HC, HP, OR	
	a)BCG	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	qoonci yoo? 1.eeyya 2.aa'e
	b)OPV0	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	c)OPV1	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	d)OPV2	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	e)OPV3	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	f)PCV1	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	g)PCV2	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	h)PCV ₃	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	i)Rota 1	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	j)Rota 2	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	
	k)Pentavalent1	1.Aa'aakko 2.aa'ukkoyyo	1.Aa'aakko 2.aa'ukkoyyo	

	l)Pentavalent2	1.Aa'aakko 2.aa'ukkoyyo			1.Aa'aakko 2.aa'ukkoyyo	
	m)Pentavalent3	1.Aa'aakko 2.aa'ukkoyyo			1.Aa'aakko 2.aa'ukkoyyo	
	o)Measles	1.Aa'aakko 2.aa'ukkoyyo			1.Aa'aakko 2.aa'ukkoyyo	Mahina mattaate aaisitok? _____ _____
403	Shifixxi kittibaato aa'issibeelas, kittibaato aa'issimma xantoo ciilicho amdaa faya'ooma xaxxite mattitti teim mulli ayyi gambayyaatim hee'ukko?		1.eeyya 2.aa'e			
404	Shifixxi kittibaato aa'issibeelas mah mashkainette?		_____			