ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF PUBLIC HEALTH

Ethiopian Field Epidemiology Training Program(EFELTP)

Compiled Body of Works in Field Epidemiology

By

Brhanu Adhana(Bsc)

Cohort IX

Submitted to School of Graduate Studies of Addis AbabUniversity in Partial Fulfilment for the Degree of Master Public Health in Field Epidemiology

June 2019

Addis Ababa Ethiopia

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Mentors
Mr. Yimer Seid (MPH in Epi and Bio)
Mr. Muluken Gizaw (MPH)

June 2019
Addis Ababa ethiopia

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Approval By Examiner Board

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Chairman, School Graduate Committee

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Advisor

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Examiner

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Acknowledgement

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Finally but not least, I would like to express my great gratitude to Mekelle University science field Epidemiology students and workmates, who gave me constructive comments in the field and thanks to all my close friends and brothers who supported me financially and encourage d me to work hard.

Finally, I would like to thank my lovely wife for her full encouragement for two consecutive years to work hard my body of work.

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Lists of abbreviation/ Acronyms

AFB ----------Acid Fast Bacilli
AOR…….....Adjusted Odds Ratio
ART----------Anti Retroviral Therapy
AURTI----------Acute Upper Respiratory Infection
BCG----------Bacillus Calmette-Guerin
CBN ----------Community Based Nutrition
CBR----------Crude Birth Rate
CDR----------Crude Death Rate
CFR……Case Fatality Rate
CMR----------Crude Mortality Rate
CSA----------Central Statistics Agency
DHS……Demographic Health Survey
DRM----------Disaster Risk Management
EFY----------Ethiopian Fiscal Year
GDP----------Gross Domestic Product
HC----------Health Center
PH----------Primary Hospital
HEW----------Health Extension Workers
HIV---------- Human Immunodeficiency Virus
IDSR---------- Integrated Disease Surveillance Response
IESO---------- Integrated Emergency Surgery Officer
IMR---------- Infant Mortality Rate
ITN----------Insecticide Treated Net
LTFU---------- Lost to Follow Up
MAM----------Moderate Acute Malnutrition
MCH----------Maternal and Child Health
MCV----------Measles Containing Vaccine
MDG----------Millennium Development Goals
MDR TB----------Multi Drug Resistant Tuberculosis
MMWR----------Maternal Mortality Weekly Report

MOT----------Mode of Transmission

NNMR----------Neonatal Mortality Rate

ODF----------Open Defecation Free

OPD----------Outpatient Department

OR----------Odds Ratio

OTP----------Outpatient Therapeutic Program

PCV----------Pneumococcal Conjugate Vaccine

PHEM----------Public Health Emergency Management

PITC ----------Provider Initiated Testing and Counseling

PMTCT----------Prevention of Mother to Child Transmission

PNC----------Post Natal Care

RDT----------Rapid Diagnostic Test

RRT----------Rapid Response Team

SIA----------Supplementary Immunization Activity

SPH----------School of Public Health

TB----------Tuberculosis

TFU----------Targeted supplementary food

TSF----------Therapeutic Supplementary Feeding

TFP ----------Therapeutic Feeding Program

VCT----------Voluntary Counseling and Testing

WAD----------Women Developmental Army

WASH---------- Water Sanitation and Hygiene.

Executive summary

The Ethiopian field epidemiology training (EFETP) is a two year an in-service training program in field epidemiology adapted from the US centers for disease control and prevention epidemic intelligence service given to multidisciplinary health professionals in Ethiopia. It was started in Addis Ababa University in 2001 and expanded to other eight universities to increase trained manpower in field epidemiology in our country to control emergency and reemerging health and health related situations. The program was designed to assist Ministry of health in building health system by training and build the capacity of the professionals. The program is 75% at field base practical attachment in investigating disease occurrence, surveillance evaluation and survey, and 25% class room teaching and learning to share experience from tutors /instructors to award a master of degree (MPH) in field epidemiology. We residents have the opportunity to practice public health in the real place where we have assigned. During the two years' residency stay, we are expected to do the following output, for the partial fulfilment of master's degree in field epidemiology, two diseases outbreak investigation, surveillance secondary data analysis, surveillance system evaluation, woreda health profile description report, summary of disaster situation report, manuscript, abstract, epi project proposal and additional outputs. During two years' residency at Addis Ababa university school of public health and Tigray RHB PHEM and Alamata field base I have done and conducted the following activities and outputs

Chapter 1: outbreak investigation

1.1 Epidemiological linked measles outbreak investigation in Alamata town, January 2019

The outbreak was started on January 14-2019. 31 under 15 year's old children were the victims with one above 15 years old child. We investigate the outbreak, as epidemiologically confirmed since there was an outbreak of measles in woreda Ofla with confirmed cases where it is adjacent woreda the town of Alamata. The main risk factor of the outbreak was history of contact with measles case and being unvaccinated.

1.2 Scabies outbreak investigation among 'Yekolo temari' in Korem town, Tigray, Ethiopia April 2019. The outbreak of this scabies was in 'Yekolo temari' in three churches of korem town, the risk factors identified in this outbreak was contact scabies cases, sharing of coats among the 'Yekolo temari'. The students were living in a small room crowdedly with a maximum of 20 'Yekolo temari' in a single room. We have given education ho how to prevent and control the disease. We recommended to provide water access near the residential area for hand washing.

Chapter 2: Surveillance data analysis

Secondary data analysis on under five pneumonias a three-year data from 2015-2017, Tigray, region, January 2017. Within three years 316821 children under five were affected by pneumonia. The incidence and mortality rate was 140/1000 and 10.8/ 1000 children. This figure shows large amount of children suffer from a vaccine preventable disease. We recommend to TRHB and woredea health offices to inspect vaccine cold chain management at health facilities as the immunization coverage is 89% for pneumococcal vaccine

Chapter 3: Surveillance system evaluation

Surveillance system evaluation in Raya Azebo Woreda, southern Tigray, Ethiopia December 2018. We have conducted surveillance system evaluation in south zone of Tigray, Raya Azebo woreda. All respondents (11) of the agreed that the surveillance system is useful and sensitive to prevent and control disease outbreaks. And it was also representative in which all health facilities report the disease under surveillance, the people under surveillance have good health seeking behaviors towards disease occurrence and report new disease events. There was a gap of training among the health care providers i.e. only 80% of them have got training about surveillance. We recommend to the woreda; they have to be trained.

Chapter 4: Woreda health profile description

Health profiles description in Ganta Afeshum woreda, eastern zone of Tigray, Ethiopia, February, 2017. We have conducted health profile assessment in woreda Ganta Afeshum to assess health and health related issues and to assess basic health service in the woreda. Diarrhea none bloody was the first five top morbidity in under five and plasmodium vivax malaria was the first ten top disease among adults. We also found low contraceptive prevalence rate (32.9%) and low immunization coverage for all antigens. We recommend the woreda to assess why and what are the factors to be low coverage in the in the identified gaps.

Chapter 5: Scientific manuscript for peer reviewed journals

5.1 Epidemiological linked measles outbreak in Alamata town, Januarys, 2019

5.2 Scabies outbreak investigation in Korem town, south Tigray, Ethiopia, April 2019

Chapter 6: Abstract for scientific conference

Two abstracts were prepared on two outbreaks

Chapter 7: Narratives summary of disaster situation report

'Meher' risk assessment in Ofla woreda, south Tigray, Ethiopia November 2019. In this emergency need assessment, the proxy GAM for children under five was 9.3% in which it shows high prevalence

of malnutrition in under five children which is equivalent with the national prevalence studied in EDHS 2016. We recommend to the woreda to assess the nutrition enhanced for action.

Chapter 8: Epi project proposal

Epi project tittle was selected on Prevalence of malnutrition among 6-59 months children in Ofla woreda, south Tigray, Ethiopia 2019. This will be done after graduation on August 10-20-2019. This proposal aimed at the assessment of malnutrition status in 6-59months children and to assess the risk factors contributing to malnutrition so as to identify root cause and to take action in the area where the malnutrition prevalence is high.

Chapter 9: Additional output on Weekly epidemiological bulletin in Tigray regional health bureau

This weekly bulletin is very important to forecast the possibility of disease outbreak and to know the disease burden from which the report is received. This is done in weekly base to identify early and to take action for control.

CHAPTER 1: MEASLES OUTBREAK INVESTIGATION

1.1 EPIDEMIOLOGICAL LINKED MEASLES OUTBREAK INVESTIGATION IN ALAMATA TOWN, SOUTHERN ZONE OF TIGRAY REGION, ETHIOPIA JANUARY 2019.

Abstract

Background: Measles is highly contagious, vaccine preventable viral disease most affecting under five children. In January 14-2019, an index case was detected in Alamata hospital and we investigated the outbreak, to identify possible risk factors and to characterize it interms of person, place and time and to implement public health control measures.

Methods: We conducted unmatched case control study with 32 cases and 96 controls with a ratio of 1:3 methods in terms of their ages, sex and residence area using non-probability purposive sampling from February 14 to March 08-2019. We used line lists and standard questionnaire to collect the data. We conducted the study by defining suspected cases of measles as any person presenting with fever and maculopapular rash and plus one of the three Cs (cough, coryza and conjunctivitis. To decide the significance of the association, we used p-value and 95% confidence interval for odds ratio.

Result: We identified 32 suspected cases of measles. The overall attack rate was 4.9/10000 population and it was high in under five male children. On multivariate analysis measles illness was statistically significant with contact history with active measles case [(AOR=3.584, 95% CI (1.424, 9.024). Being unvaccinated for measles vaccine ((AOR, 3.520, CI, 1.225, 10.111) and becoming sick by other diseases [AOR=3.031, CI (1.114, 8.248)] were identified risk factors associated with measles contraction.

Conclusion and recommendation: History of Contact to suspected measles cases,being diseased by other diseases and being unvaccinated for measles were identified as risk factors and we recommended that isolation of active case and measles vaccination are very necessary and continuous active surveillance should be conducted in the district.

Key word: Measles outbreak, Alamata town, February 2019

Introduction

Measles is highly contagious outbreak-prone acute viral diseases characterized by maculopapular rash. The virus is transmitted via the respiratory route (aerosolized in respiratory droplets) or by direct or indirect contact with nasal and throat secretions of infected persons. Measles virus is particularly contagious, with >90% secondary attack rates among susceptible individuals(1)

Measles remains one of the leading causes of death among children worldwide. It is caused by an RNA virus of the paramyxoviridae family which belongs to the genus morbillivirus. Its incubation period ranges from 7 to 21 days (rash appears after 14 days of exposure). In 2012, an estimated 122 000 deaths caused by measles infections were reported globally(2).

Among childhood diseases measles is a highly contagious disease that can be effectively prevented through vaccination, but it results in a significant public health impact when there are displaced populations, less sanitation and poor nutritional systems due to their characteristic mass population displacement, high population density in camps and low measles vaccination coverage among children(3).

Measles disease is considered endemic especially in the developing countries with a peak of transmission from October to March. Measles carries with it high morbidity and mortality especially when clinical cases are not properly managed(4)

Approximately 30% of reported measles cases have one or more complications. Complications of measles are more common among children less than 5 years and adults over 20 years of age. Relatively common complications of measles include otitis media, laryngo-tracheobronchitis, pneumonia, and transient suppression of cellular immunity(5)

The measles vaccine is one of the most cost-effective health interventions developed. Measles occurred in epidemic cycles and an estimated three to four million persons acquired measles each year (6). Globally, there was an estimated 2.6 million measles death/year in 2000 and 145,700 in 2013(400 deaths/day) decreased by 75% from 2000-2013(7).

Generally, in Africa, the measles case fatality rate ranges from 3 to 5 %, reaching up to 30 % during severe outbreaks and outbreaks in closed communities such as refugee camps. Measles continues to be a major public health problem in Africa, causing an estimated 28,000 deaths each year(8).

In Ethiopia, 348 cases had been confirmed and 40 outbreaks reported in Addis Ababa, Afar, Amhara, Oromia, Southern Nations Nationalities and Peoples, Somali and Tigray regions, as of 31 March 2017. The majority of the cases (39 per cent) have occurred among children under five years. As of week 22, 2017 there have been 1,981 reported cases of measles across the country, including 961 confirmed cases (420 laboratory confirmations, 490 epi-linked and 51 clinically compatible cases)(9).
Studies done on the perception of the rural community on causes of measles revealed that both natural and supernatural forces were mentioned as a cause of measles. The distinction between the two explanations was not clear. Natural explanation of illness is somehow related to a supernatural cause as an ultimate reason. Of the vaccine preventable diseases, measles is more associated with supernatural causes than others(10).

Estimates of measles-related deaths have been considered a crucial indicator to evaluate the progress of any nation towards measles elimination. The global estimates for the year 2013 suggest that close to 0.14 million deaths were attributed to measles, accounting for nearly 16 deaths each hour. Study findings have indicated that more than 50% of the global measles-associated deaths were reported in India alone(11).
Measles vaccination given to susceptible contacts within 72 hours of exposure as post exposure prophylaxis may protect against infection and induces protection against subsequent exposures to measles. Vaccination is the intervention of choice for susceptible individuals older than 12 months of age who are ex- posed to measles and who do not have a contraindication to measles vaccination (12). .Demo- graphic health survey data shows in low and middle income countries that only 50% of the population vaccinated for measles and measles outbreak evidenced in these countries during 2016; 4395, 1500, and 162 measles cases occur in Ethiopia, South Sudan and Kenya, respectively(13). Ethiopia has documented an increase in reported measles cases from 3,332 in 2002 (the year of the first sub-national catch-up measles SIAs) to 17,745 in 2015(14).

Objective

General objective

To investigate an outbreak of suspected measles in Alamata town, Tigray region from January 14 to March 0/2019.

Specific objective

To verify the existence of measles outbreak in the town

To characterize measles outbreak in terms of place, person and time in the town

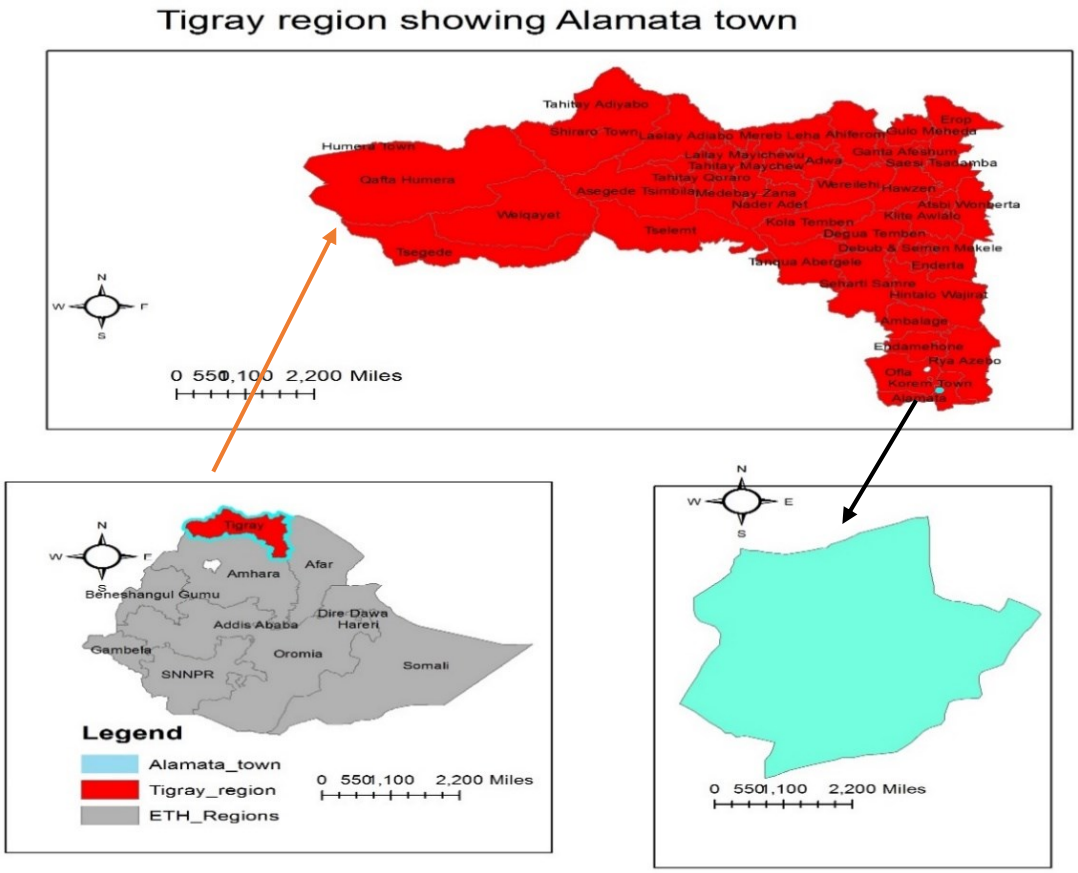
To identify possible factors contributing to the occurrence of the outbreak in the town

To assess the knowledge, attitude and practice of Alamata town community to wards measles

Method and materials

Study area and period

Alamata town is one of the eight woredas found in southern zone of Tigray, 570 km far from Addis Ababa and 181 km from Mekelle, the capital city of the region. Alamata town has a total population of 65687 with four kebelles and bordered to the east by Raya Azebo woreda, to west and south by Raya Alamata woreda and to the north Ofla and korem. We conducted the study from January 11 to March 12/2019.



Map 1**: Map of Alamata town, south Tigray, Ethiopia, February 2019**

Study design and sample size

We conducted community based unmatched case control study with 1:3 ratios to investigate suspected measles outbreak with a sample of 32 cases and 96 controls using non-probability purposive sampling method. All cases were included in the study and we selected controls neighbor to the cases right and left side of the case's home.

Study population

Target population of the investigation was all patients with suspected measles cases in the community or came to health facilities and fulfills the case definition of suspected measles cases in the affected kebelles of Alamata town.

Case definition

Suspected measles case: Any person with fever and maculopapular rash (non-vesicular) rash and cough, coryza or conjunctivitis or any person in whom a clinician suspects measles.

Confirmed measles case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiologically linked to confirm Cases in an outbreak.

Epidemiologically linked cases: A suspected measles case that has not had a specimen taken for serologic confirmation and is linked (place, person and time) to a laboratory confirmed case; i.e., living in the same or in an adjacent district with laboratory confirmed case where there is a likely hood of transmission; onset of rash of the two cases being within 30 days of each other.

Measles associated death: for surveillance purpose, a measles death is defined as any death from an illness that occurs in a confirmed case or epidemiologically linked case of measles within one month of the onset of rash.

Operational definition

Suspected measles outbreak: Is defined as occurrence of five or more suspected cases in one month in a defined geographic area such as village or kebelle or woreda or health facility catchment area.

Index case: case of suspected measles who was detected first in the health facility or community.

Ventilated house: Any residential home/house which has at least one window.

Not ventilated : A house with no window.

Knowledgable :One who scores at least mean of the all scores in the specific variable.

Not knowledgable: One who scores below the mean of all scores for the specific variable.

Data collection

We collected data using standard questionnaires by face to face interviewing from the community with active surveillance home to home visit and from passive surveillance coming in health facilities during the outbreak. Cases were defined according to the WHO standard case definition to take 32 cases and 96 controls, and we conducted discussion with health office PHEM focal how to get the cases in each kebelle through health extension workers and female developmental armies on active search. We informed schools to aware their students about sign and symptoms of measles to report to health facilities in case of case finding.

Data processing and analysis

We entered the collected data in to SPSS version 21 and MS excel 2016 and analysis was done using SPSS and MS excel. Results were depicted using descriptive frequencies, tables, charts and spot map. Attack rate of the disease was also computed. P-value and 95% confidence interval (CI) for odds ratio (OR) was used to determine the significance of the association.

Data quality control

We used case based and line list for describing measles cases in terms of place, person and time. Before analysis we checked for completeness and cleaned the data.

Inclusion criteria

Case: Any resident of Alamata town who have sign and symptoms of measles from January 14 to March 12/2019 and wanted to participate in the study was included.

Control: Any resident of the area where the outbreak is occurred during the study period who didn't have sign and symptoms of measles and agreed to participate and responded the question was included.

Exclusion criteria

Cases: Cases who were not volunteer to participate were excluded.

Controls: Those who did not have sign and symptom of measles refused to participate were excluded as well as family members from same household.

Ethical clearance

A supportive letter was obtained from Tigray regional health to the woreda health office as this was emergency public health importance to give health intervention no approval was obtained. Verbal permission was obtained from participants and parents of the cases after verbal informed consent to participate in the study. Anonymity and confidentiality was ensured.

Result

Descriptive

Socio-demographic characteristics

The mean age for case was 3.7 (SD 2.4) years and for control 3.3 (SD 2.6) years with a rage of seven month of age to 19 years of age in the cases. Majority (78.1%) of the cases were Tigray in ethnic, and 90.6% of the cases and 85.4% of the controls their religion was orthodox.

Table 1: Socio- demographic characteristics, Alamata town, south Tigray February 2019

Variable		**Cases (%) N=32**	**Control (%) N= 96**
Age	Mean	3.7	3.3
	SD	2.4	2.3
	<1 Year	25	0
	<1-4 Years	40.6	20.8
	5-14 Years	31.3	74.0
	15-24 Years	3.1	5.2
Sex	Males	56.3	49
	Females	43.7	51
Ethnicity	Tigray	78.1	63.5
	Amhara	21.9	35.4
	Other	0	1.1
Religion	Orthodox	90.6	85.4
	Muslim	9.4	14.6

Educational Status of the Mother/Father or Other respondent		
Illiterate	9.4	21.9
Able to read and write	31.3	25
Primary (1-8) grade	37.5	26
Secondary (9-12) grade	15.6	16.7
College and above	6.2	1.0

Table 2: Knowledge and attitude assessment of respondents about measles Alamata town February 2019

Questions asked	**Number of respondent's (%)N=128**
DO you know mode of measles transmission?	
Yes	62(48.4%)
No	66(51.6%)
Do you know measles is vaccine preventable?	
Yes	110(85.9%)
No	18(14.1%)
Where did you go first if you get ill for measles?	
Health facility	80(62.5%)
Holy water	4(3.1%)
Traditional healer	3(2.3%)
Stayed home	41(32%)
If the answer is other than HF why?	
Not to be aggravated	29/45(64.4%)
Measles is self-limited	8/45(17.8%)
Holy water is better than others	4/45(8.9%)
Injection kills measles case/complicate eye disease	4/45(8.9%)

Who do you think that can be affected by measles?	
Under 5 children	81(63.3%)
Under 18 children	38(29.7%)
Women of any age	0(0%)
Any age group	9(7%)
How do you think people get measles?	
Contact with measles case	73(57%)
Wrath of God	4(3.1%)
Curse of other people	2(1.6%)
I don't know	49(38.3%)
How do you think measles can be cured?	
Using modern medicine	69(53.9%)
Using modern medicine	3(2.4%)
Holy water	4(3.1%)
Keeping the sick person home and making cultural Practices [xx]	48(37.5%)
I don't know	4(3.1%)

XX: It is celebration made to a child with measles case within the home, neither harmful nor useful cultural practice made locally using 'kolo', soft drink, fruits like orange and green leaves to avoid measles culturally.

Laboratory result

Six blood serum sample were collected from patients in the woreda from 14-13 January 2019 and sent to EPHI for confirmation. All six of the specimen were discarded. As the result delayed we treated them as measles suspected cases and we continued active surveillance.

We identified a total of 32 suspected measles cases from January 14th to March 8th 2019 from four Kebelles of Alamata town ranging from seven-month age child to 19 years old young adolescent. Out of the 32 cases 18(56.3%) of them were males. The overall attack rate was 4.9/10000 population. The

highest attack rate (6.2/10000) population was seen in 01 kebelle followed by kebelle 02 with attack rate of 5.3/10000 population. No admission, no death and no complication was registered during the outbreak investigation.

Description of measles cases by person

Majority (40.6%) of the cases were 1-4 years old children followed by of the age category 5-14 years old Children. The least affected group were above 15 years old. The mean age for cases was 3.7 years (SD 2.4) and for control 3.3 years (SD 2.3). Males were more affected.

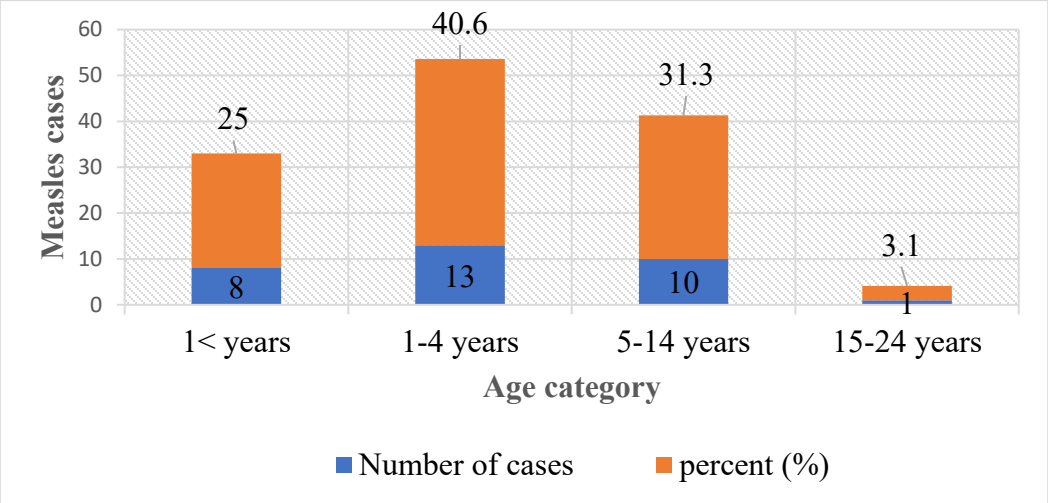


Figure 1: Distribution of measles cases by age category, Alamata town, southern Tigray 2019.

The age specific attack rate of measles was high among children <1 year old followed by the age category of 1-4 years old children in Alamata town. The age specific attack rate for under five children in this town was 21.9/10000.

Table 3: Measles specific age attack rate, Alamata town, South, Tigray, February 2019**.**

Age category	Total population	Number of cases	AR/10000 population
<1 Year	1944	8	41.2
1-4 Years	7640	13	17.02
5-14 Years	19121	10	5.2
15-24 Years	13078	1	0.8

Vaccination status of the cases

Out of the total cases, majority 11(34.4%) of them took one dose for measles at their nine month of age. But 7(21.9%) took two doses of measles vaccine and 4(12.5%) of the total cases took three doses of measles vaccine. The rest 10(31.3%) cases never took measles vaccine i.e. they were defaulters. Even though the vaccine coverage for the town average of four years was 89.1% there were defaulters traced during the outbreak.

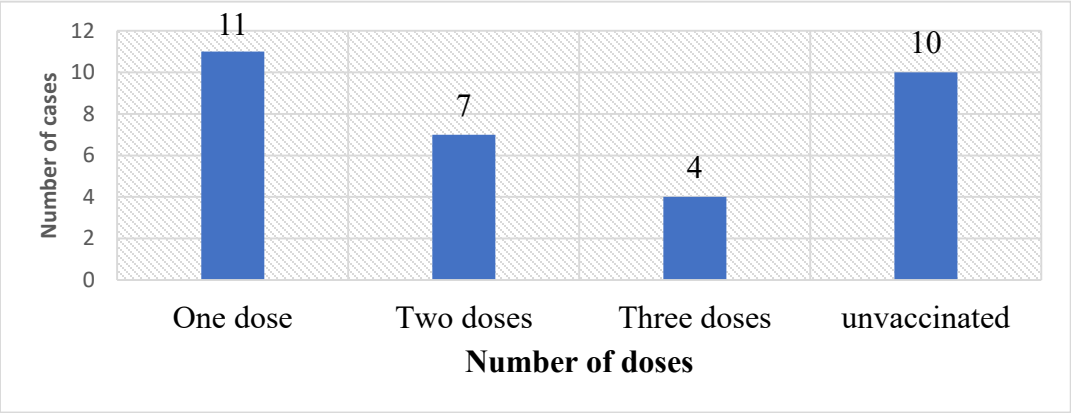


*Figure 2: **Vaccination status of cases, Alamata town, South Tigray, February 2019***

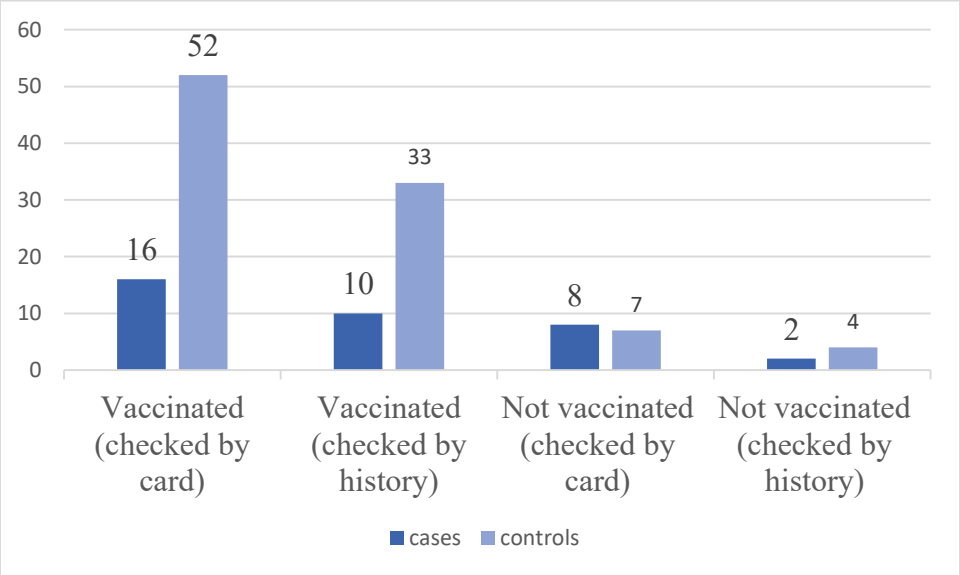


Figure 3: Immunization status of cases and controls for measles, Alamata town February 2019

Under five immunization coverage for Alamata town is good relatively to other regions. But still there were defaulters for the expanded immunization program. This is because of migrants came from other

woredas and regions (Amhara Region-Wag khimra zone and Afar region). During SIA done side to side with the outbreak, 23 children under two years who did not take measles vaccine in the routine immunization schedules were found.

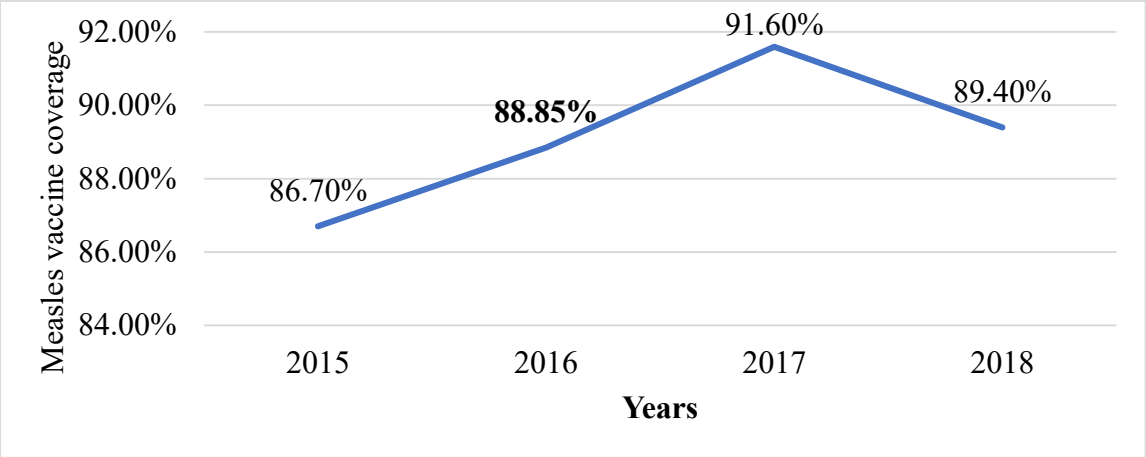
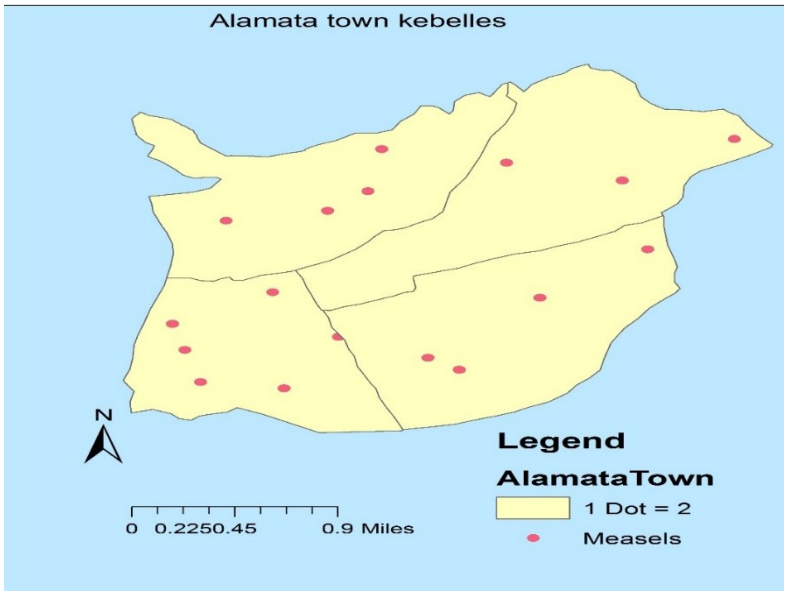


Figure 4: Four years measles immunization coverage, Alamata town, February 2019

Description of measles cases by place

The distribution of suspected measles cases was more in kebelle 02 followed by kebelle 04 in the woreda.



Map 2: Spot map showing measles cases by kebelle, Alamata town, south Tigray February 2019

The outbreak was occurred in four of the kebelles of the district. The more affected kebelle was 01 with attack rate 6.2/10000 population followed by kebelle 02 with attack rate of 5.3/10000 population. The overall attack rate for the district was 4.9/10000 population. The figure below shows attack rate per 10000 populations per kebelle.

*Table 4**:** Measles attack rate Alamata town south Tigray 2019*

S.no	***Alamata town Kebelles***	***Population per***	***Number of measles cases***	***Population affected per 10000***
1	*Kebelle 01*	*11321*	*7*	*6.2*
2	*Kebelle 02*	*22584*	*12*	*5.3*
3	*Kebelle 03*	*12545*	*5*	*4.0*
4	*Kebelle 04*	*19237*	*8*	*4.2*
Crude attack rate		65687	*32*	*4.9*

Description of measles cases by time

Index case

The index case was detected in Alamata hospital on February 14- 2019 and came from Ofla adjacent woreda 18 km far from the town. He was five years old male case with unvaccinated history for measles immunization. It was one week ago laboratory confirmed measles case was reported from the adjacent woreda Ofla before the outbreak occurred in Alamata town. The confirmed case had history travelling to Amhara region, Sekota woreda where an outbreak of measles occurred on January 26-February 18-2019.

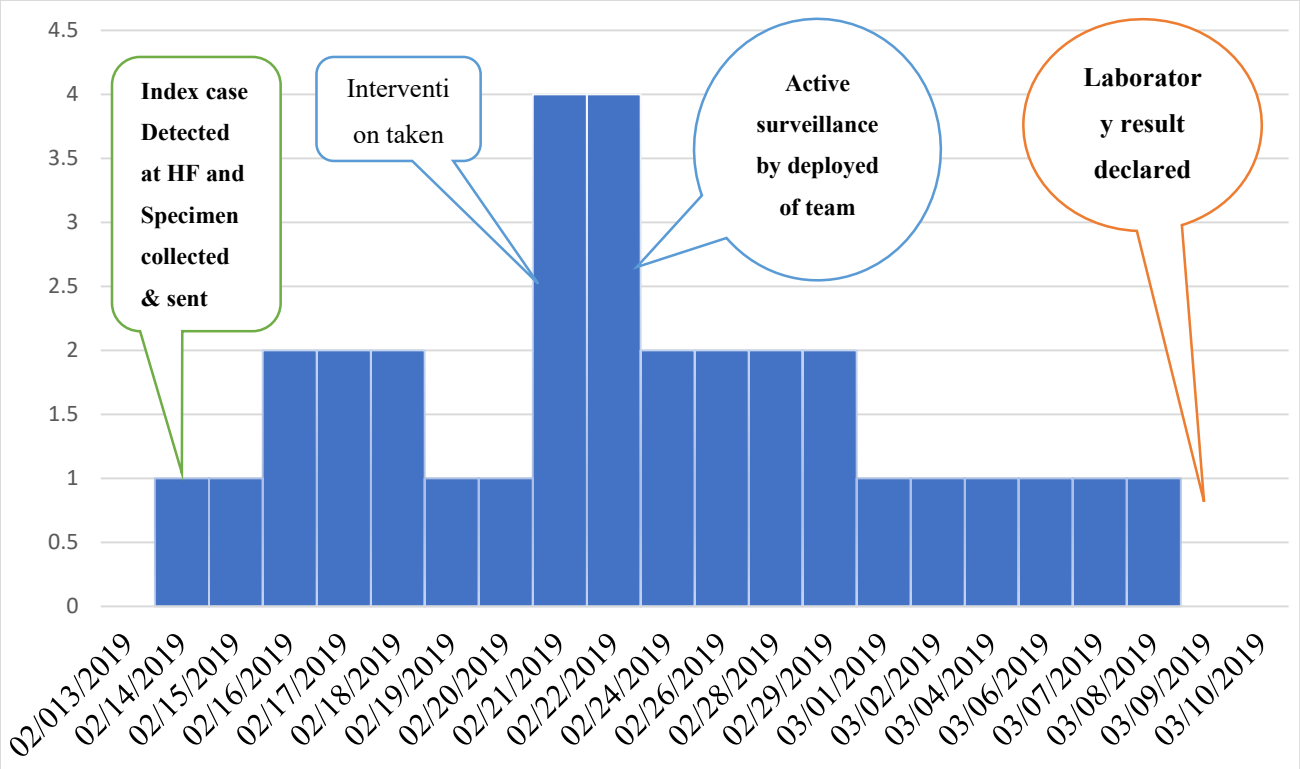


Figure 5: Distribution of measles cases based on onset of rash Alamata town, February 2019

The outbreak started between February 14 and March 08/2019 with some peaks and remained for about three weeks with some intervals. After the index case detected at health facility (Alamata hospital) all health professions, health extension workers and women developmental armies aware about the occurrence the disease so as to do active surveillance in each kebelle and actively aware at OPD.

Analytic Epidemiology

Table 5: Univariate analysis to Identified Socio-demography factors and risk factors for measles outbreak Alamata town, south Tigray, February 2019**.**

Variables		Case status		COR(CI	CI	p-value
		case	Control			
Have you contact history with active measles?	No	18	76	2.956	1.257, 6.947	0.013[xx]
	Yes[1]	14	20			

MUAC	<12113 cm	5	1	0.360	0.102, 1.272	0.113
	>12 cm[1]	27	95			
Housing condition:	Not ventilated	13	35	0.839	0.370, 1.1902	0.673
	Ventilated[1]	19	61			
Have you ever vaccinated for measles?		10	11	3.512	1.323, 9.324	0.012[xx]
No		22	85			
Yes[1]						
Do you know mode of measles transmission?		17	40	1.457	0.653, 3.252	0.278
No		15	56			
Yes[1]						
Do you know measles is vaccine preventable?	No	17	42	1.457	0.653, 3.252	0.358
	Yes[1]	15	54			
Was the control or case diseased by other diseases in the last 7-8 days back?		21	82	3.068	1.218, 7.728	0.017[xx]
No[1]		11	14			
Yes						

NB[1]=Reference we have used in the binary logistic regression

XX: Significant at p-value<0.05

A total of 32 cases with mean age 3.7(SD 2.4) years and 96 control with mean age 3.3 (SD 2.3) years were included in the study. 96.9% of the cases had maculopapular rash, 93.7% fever, 62.5% of them had coryza and cough and 59.4% of them had conjunctivitis. On multivariate analysis measles illness was statistically significant with contact history with active measles case [(AOR=3.584, 95% CI (1.424, 9.024). being unvaccinated to measles (AOR, 3.520, CI, 1. 225, 10.111) and becoming sick by other diseases prior to the outbreak [OR=3.031, CI (1.114, 8.248)] were risk factors associated with measles contraction.

Table 6: Multivariate analysis to identified risk factors for measles outbreak Alamata town, south Tigray, February 2019.

Variables		Case status		COR	CI	P-Value	AOR	CI
		Cases	Controls					
Have you ever vaccinated for measles?	No	10	11	**3.512**	1.323	**0.012**	**3.520**	**1.225**
	Yes[1]	22	85		9.324			**10.111**
Have you contact history with active measles?	No[1]	18	76		1.257	**0.013**	**3.584**	**1.424**
	Yes	14	20	**2.956**	6.947			**9.024**
Was the control or case sick before the outbreak occurred?	No[1]	21	82		1.218	**0.017**	**3.031**	**1.114**
	Yes	11	14	**3.068**	7.728			**8.248**

Multivariate analysis shows, Contact history with active case of measles, becoming sick prior to the outbreak 7-8 days back and being not vaccinated were risk factors associated with contracting of measles infection in Alamata town, south Tigray, February 2019.

Public health intervention taken to control the measles outbreak

Active cases of measles were treated with antibiotics, antipyretics, TTC ointment and vitamin A supplement to prevent measles caused complications according to their status at health facilities so as to prevent measles attributed morbidity and mortality and to control further transmissions for other children. The routine surveillance was critically enhanced and active surveillance was on daily bases to control the outbreak.

Health education was given to the community to aware the presence of measles outbreak in the town at all kebelles. Kindergartens and primary schools have been actively surveyed and there were continuous communications with school directors about to report measles case to PHEM of the district. Side to side the outbreak, SIA was done according to its schedule and 746 children from age 13-23 months old were vaccinated according to the FOMH recommendation.

Discussion

We identified a total of 32 measles cases from February 14-2019 to March 08-2019 with mean age 3.7 years (SD 2.4) years within a range of seven months to 19 years old child. 56.3% of the cases were males. Majority (40.6%) of cases were 1-4 years old, followed by 31.3% in the age category 5-14 years. And infants were more affected next to 5-14 years old children. The age specific attack rate was high among children 1-4 years old. And the least affected group were 15-24 years old. The overall age specific attack rate for under five children in the district was 21.9/10000 population. 11(34.4%) of the cases were vaccinated for measles vaccine at their nine months old at routine immunization schedule and the rest 7(21.9%) and 4(12.5%) took two doses and three doses of measles vaccine at their nine months and after. But 10(31.3%) of the cases never took measles vaccine. A study conducted by WHO in Ethiopia in 2017 showed that 39% of the outbreak was on under five that is slightly higher than our study. (9) This might be due to the study was nationwide.
No admission and death were registered in the town. The overall attack rate was 4.9/10000, this is lower than a study conducted in Jarar Zone of Ethiopian Somali regional state, eastern Ethiopia with attack rate of 28.2/10000. (18) The difference might be in displaced population and the vaccination coverage in Jarar zone was lower than vaccination coverage in Alamata.

The age specific attack rate was high among children <1 year old with attack rate of 41.2/10000. This is different from a study conducted in Jarar zone of Ethiopian Somali regional state, eastern with attack rate of 127.1/10000. (18) and the magnitude is higher in Jarar zone of Ethiopian Somali might be due to low immunization coverage. As mentioned above the age specific attack rate for less than one year in our study was 41.2/10000 population which is higher than a study conducted in Guji zone Oromia region in 2015. (19)

48.4% of the respondents didn't know the mode of measles transmission and 37.5% of them didn't go to health facilities when their child affected by measles. History of contact with active measles case was identified as the risk factor for measles contacting. This study isinline with a study conducted in kebridehar with odds ratio of 5.6(22).

Limitations

- Absence of child immunization card in the family and unable to recall whether immunized or not for measles vaccine.

Conclusion and recommendation

- ✓ Epidemiologically linked measles outbreak was occurred in Alamata town in February 2019
- ✓ The disease primarily affected under one year children.
- ✓ History of contact to measles cases, becoming sick one week prior to the outbreak and being unvaccinated for measles were risk factors identified in Alamata town.
- ✓ We recommend to have strong active surveillance on febrile rash cases, and
- ✓ Health education on measles prevention and control measures to the community.
- ✓ There is low awareness towards mode of measles transmission in the community, so health extension workers should strengthen health education on how to transmit, control and the benefit to go health facilities when their child has measles infected.

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1.2. SCABIES OUTBREAK INVESTIGATION

1.2 Scabies outbreak investigation among 'Yekolo temari' in three churches of korem town, April 2019

Abstract

Background: *Scabies is a neglected an ecto-parasitic disease that is a major public health problem worldwide, particularly in resource-poor regions.* Dermatologists estimate that more than 300 million cases of scabies occur worldwide every year. The objective of the investigation was to confirm scabies outbreak, identify risk factors and to suggest control measures of decrease burden among the 'Yekolo temari'.

Method: Unmatched case control study with a ratio of 1:2 (31 cases and 61 controls), epi- info stat calculation was used to determine the sample size and we used a structured questionnaire to collect the data.

Result: A total of 61 cases were identified from three churches within the town. There was no death reported. The mean age was 17 years (Standard deviation 3.3) years. The overall attack rate was 45.9%. On multivariate logistic regression analysis history of contact with scabies case **(**AOR**=**4.873**,** CI **(**1.525, 15.567**)** and lack of knowledge about scabies disease transmission **(**AOR=4.465, CI=1.210, 16.468**)** were the two variables associated with contracting of scabies among 'Yekolo temari' in three churches of korem town.

Conclusion: Scabies outbreak occurred in three churches of korem town, south Tigray among 'Yekolo temari'. 15-24 years old students were more affected. Contact history with active scabies and lack of knowledge about scabies transmission and treatment were the risk factor for transmission of scabies among the students. We recommended that continuous health education on how to prevent and control scabies, should be given and strong active surveillance should be conducted routinely by PHEM expert in the town.

Keyword: scabies outbreak, risk factor, korem town April 2019

Introduction

Scabies is an ecto-parasitic, highly contagious skin disease caused by infestation of the skin by the human itch mite, Sarcoptes scabies var. hominis. Dermatologists estimate that more than 300 million cases of scabies occur worldwide every year. In Ethiopia, according to national survey conducted in 2008, there were 6.2% of school children and 5.6% of orphan school children affected with scabies(1). Scabies affects all age groups and both sexes but the most vulnerable age groups are young children and the elderly in resource-poor communities who are especially susceptible to scabies as well as to the secondary complications of infestation. The scabies mites usually spread by prolonged direct skin to skin contact with a person who has scabies. It can also spread easily to sexual partners and household members. Sometimes scabies can spread indirectly by sharing clothes, towels, or bedding used by infested individuals(2).

Scabies is an important public health problem in residential care homes. Delayed diagnosis contributes to outbreaks, which may be prolonged and difficult to control(3). In high income countries scabies outbreaks have been reported in long term care facilities and hospitals, often originated after a single undiagnosed or incompletely treated case(4).

The clinical presentation includes pruritus and a variety of dermatological lesions ranging from papules, pustules, burrows, nodules, and wheals. In epidermal parasitic diseases (EPD), host-parasite interactions are restricted to the stratum corneum, the upper layer of the epidermis, where the ecto-parasites complete their life-cycle, in part or entirely. Lesions are commonly found on the wrists, finger webs, antecubital fossae, axillae, areolae, periumbilical region, lower abdomen, genitals, and buttocks(5).

Treatment of scabies on individuals and reduction of skin-to-skin contact with infected individuals is recommended as the primary means of eliminating the infestation. Although transmission via fomites is possible, regular housekeeping and hygienic measures such as changing and washing of bedding in hot water followed by drying materials in a mechanical dryer at the highest temperature setting (preferably 120º F or hotter) should be adequate to prevent further spread(6). Scabietic patients characteristically suffer from intense pruritus and scratching which occasionally lead to hyperkeratosis forms and secondary bacterial skin lesions. The worse itching at night due to nocturnal activity of

mites causes insomnia and restlessness which has negative impact on daily regular activities of patients(7). Risk factors for scabies among low-income countries include

young age, illiteracy, low socioeconomic status, shared clothing and beds, and household overcrowding.(8)

Scabies has a different epidemiological distribution among different communities due to its various management patterns and different healthcare policies. In developed communities, scabies primarily occurs in institutional settings such as prisons and long-term care facilities such as nursing homes and hospitals. Besides, the prevalence rate of this infection seems to be higher in developing countries because of its improper management, the presence of predisposing conditions such as natural disasters, wars, and poverty leading overcrowding and increased rates of its transmission(9). The diagnosis should be suspected in any patient with a clinical history of itch, worse at night, affecting other family members or close contacts, and can be made on the clinical distribution and appearance of skin lesions(10). Epidemiological studies indicated that the prevalence of scabies is not affected by sex, race, or age, and that the primary contributing factors in contracting scabies seem to be poverty and overcrowded living conditions(11).

Objective

General objective

To investigate an outbreak of scabies in korem town, among 'Yekolo temari' at three churches from April 04-11/2019

Specific objectives

To verify the existence of scabies outbreak among Yekolo temari' in the churches

To characterize the outbreak by time, place and person

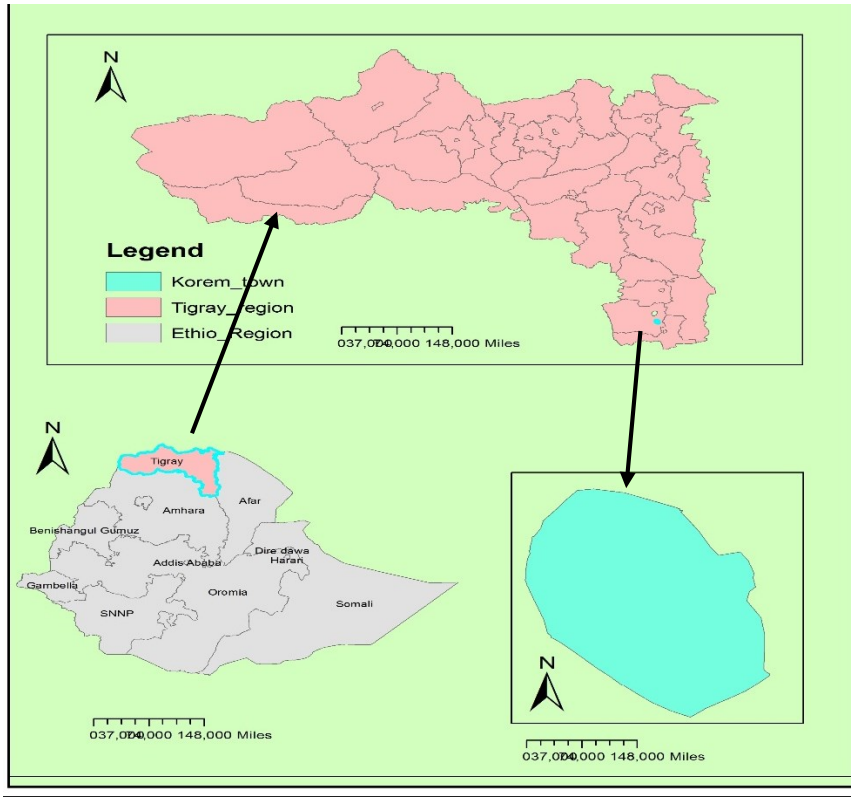
To identify possible risk factors contributing to the occurrence of the outbreak

To assess the prevention and control intervention to scabies.

Methods and materials

Study area and periods

Korem town is one of the eight woredas found in southern zone of Tigray, located at latitude of 12 º.30'N, longitude 39 º.31' E and an elevation of 2539 meter above sea level and surrounded by Ofla woreda with scabies endemic area adjacent rural woreda to it. It is 588 km far from Addis Ababa and 167 km from Mekelle, the capital city of Tigray region. It is highland area with a 'Dega' air condition. We conducted the study from April o4-11/2019.



*Map 3**:** Map of Ethiopian regions showing korem town, south Tigray, Ethiopia April 2019*

Study design

We conducted unmatched cases control study with 1:2 ratios to investigate scabies outbreak investigation, among 'Yekolo temari' in korem town. We selected unmatched case control because we could not get the same age among 'Yekolo temari' 133 in the three churches. We selected the cases from line listing by randomly selecting using lottery method among the students. And controls were selected similarly from the apparently healthy individuals using lottery method.

Sample size determination

We used a sample of 31 cases and 61 controls with 1:2 ratio selected using Epi info 7.1 version stat calc two sided confidence interval of 95%, power 80% and the assuption of the percentage of controls exposed to flood 75% with odds ratio 22 taken from a study conduct in Badewacho district, south Ethiopia in 2016. We gathered all cases and non case students , we draw lots of 31 cases 61 controls using lottery method.

Study population

In Ethiopia religious students who study Ethiopian Ge'ez language (the classical liturgical language) are called Yekolo Temari. In the local terms, the school has different names such as Yekes temehirt,Ye'abinet timihirt, and yebetekihinet temehirt. The classical liturgical language) and on the other of the Orthodox identity of the younger generations. Many prominent priests from different parts of the country were instructed there, today active in the field of commentary and the study of the Bible.

These groups of people, "Yekolo temari" are treated as a special group of children because of different social,cultural, religious/traditional and educational factors which makes them different from other group of people in Ethiopia. They have their own life style, livelihood strategy, social life and religious commitment which might not be observed in the majority of other same age people in the country. Some of the schools of orthodox churches found in korem town are, saint Gabriel church, saint marry Hayalo and saint Abune Aregawi church where the 'Yekolo temari'found.

Case definition

Suspected case: A person with sign and symptoms consistent with scabies. The characteristic symptoms of a scabies infection include superficial burrows, intense pruritus (itching) especially at night.

Confirmed case: A person who has a skin scraping in which mites, mite eggs or mite faces have been identified by a trained health care professional**.**

Contact: *Is defined as a person without sign and symptoms consistent with scabies who has had direct contact (particularly) prolonged direct skin to skin contact) with suspected or confirmed.*

Inclusion and exclusion criteria

Inclusion criteria

Case: Any 'Yekolo temari' of the churches in the town with sign and symptoms, specially (itching and rash) of scabies was selected for investigation and agreed to participate in the study during the

investigation period. Diagnosis was made clinical based up on typical symptoms usually pruritus itching at night.

Control: Any 'Yekolo temari' resident in the churches found in the town without sign and symptoms of scabies and voluntary to participate in the investigation was selected**.**

Exclusion criteria

Case: One who refused to participate or any person with the disease who is not Yekolo temari' in the church during the investigation period was excluded.

Control: Healthy 'Yekolo temari' in the church refused to participate in the investigation was excluded.

Data collection methods and tools

We used a structured questionnaires adapted from different literatures to collect information including socio-demographic characteristics, clinical features and management of the cases and the possible risk factors. We collected through face to face interview with individual participants. We selected two unmatched controls for each case. We collected line listing of cases from church by active surveillance from three adjacent churches in the town.

Data analysis procedures and quality control

We entered and cleaned Line listed data using MS office excel 2016 for descriptive analysis, and SPSS version 21 statistical software for risk factor identification and analysis. We also checked all line listed and interviewed dada for completeness before entry and we cleaned and analyzed.

Ethical clearance

A supportive letter was obtained from Tigray regional health bureau to the woreda health office as this was emergency public health importance to give health intervention no approval was obtained. Verbal permission was obtained from participants after verbal informed consent to participate in the study and we discussed with religious teachers in the importance and confidentiality. Anonymity and confidentiality was ensured.

Result

Socio-demography

There were 133 'Yekolo temari' in three churches found in Korem town. Out of the total 61(45.9%) of them were infected by scabies disease. The mean age of the students was 16.7 with standard deviation 3.3 years. All were male Christian orthodox and single. Except 3(9.7%) the rest were Tigray in ethnicity.

Table 7: Age category of scabies cases, Korem town, south Tigray, Ethiopia, April 201

S.no	Age category	Frequency distribution	Percent (%)
1	5-14	15	24.6
2	15-24	44	72.1
3	25-44	2	3.3
Total		61	100

Most of the respondents (48.4%) of them were primary educated students and the least (6.5%) were neither able to read nor able to write children. 72.1% of cases and 46.6% controls of the study subjects were 15-24 years old. And 52.5%) of the students were from St. Gabriel church followed by St. Abunearegawi church (37.7%).

*Table 8**: shows the socio demographic characteristics of cases and controls in korem town, Tigray, Ethiopia, April 2019***

Variable		Cases status	
		Case (%)	Control (%)
Age category	5-14	24.6	36.1
	15-24	72.1	46.6
	25-44	3.3	17.3
Group size of the Yekolo temari')			
	<5	56.1	34.4
	≥5	41.9	65.6
Ethnicity	Tigray	90.3	91.8
	Amhara	9.7	8.2
Educational status			
	Illiterate	0	9.8
	Only able to read	16.1	11.8
	Able to read and write	25.8	16.4
	Primary	48.4	49.2
	Secondary	9.7	9.8

The age specific attack rate was higher among 15-24 years age group with attack rate of 71% .and it was 31.3% among the age group of 5-14 years old.

*Table 9**: Shows age specific attack rate of scabies in korem, churches, April 2019**.*

S.no	Age category	Total 'Yekolo temari'	Total cases	AR/100 'Yekolo temari'
1	**5-14**	**48**	**15**	**31.3**
2	**15-24**	**62**	**44**	**71**
3	**25-44**	**23**	**2**	**8.7**
Crude attack rate		133	**61**	**100**

Table 10: clinical presentation of scabies, Korem town, south Tigray April 2019

Clinical presentation	Number of cases(N=61)	Percent(%)
Persistent Itching	54	88.5
Skin Rash	61	100
Tiny red burrows	38	62.3
Red bumps and blister	26	42.6
Pus drainage wound	27	44.3

Site of scabies infection

75.4% of the cases the site of the infection was in their hands followed by 11.5 % on their abdomen. 30/61(49.2%) of the cases had mild skin lesion (<5 skin lesions), 21(34.4%) cases had moderate skin lesions (6-10 skin lesion) and 9(14.8%) cases had severe skin lesions (11-49 skin lesion). 78.7% of the cases had skin itching during night time and 7(11.5%) of the students responded that they had skin itching during day time and the rest 6(9.8%) students had skin itching all the time.

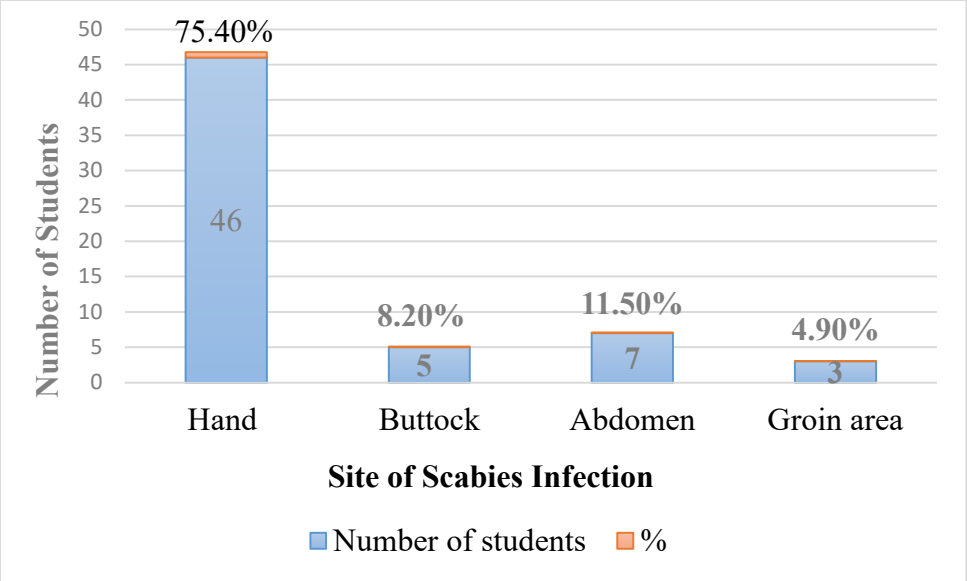


Figure 6: Site of scabies infection among 'Yekolo temari', Korem town April 2019

Description by plac

When we compare the attack rate by place, the students in St. Abune Aregawi church were more affected than the other students living in the churches. The least affected 'Yekolo temari' were in St. Mary Hayalo church. The students had a habit of living together crowdedly in a small room

There was no under-five case detected in each church. And no death reported. All cases had skin rash. 88.5% had persistent skin itching. A mass treatment was given to all students. Health education about scabies prevention and control methods, mode of transmission and what to do if a student has a scabies disease.

Table 11: Attack rate of scabies per 100 population by church, korem town, Tigray April 2019

S.no	***Korem town*** ***Church name***	***Number of students in the Churches***	***Number of scabies cases***	***%(Percent)***
1	*St. Gabriel*	*71*	*32*	*45.1*
2	*St. Abune Aregawi*	*40*	*23*	*57.5*
3	*St. Marry Hayalo*	*22*	*6*	*27.3*
	Total (overall AR/100)	*133*	*61*	*45.9*

Description by time

The index case was 17 years old male came from Ofla rural neighbor woreda specifically from Mymaedo kebelle. All 61 of them were active cases on active surveillance. As shown in the figure below the epi-curve has indicated propagated pattern of outbreak with its peak on week 16.

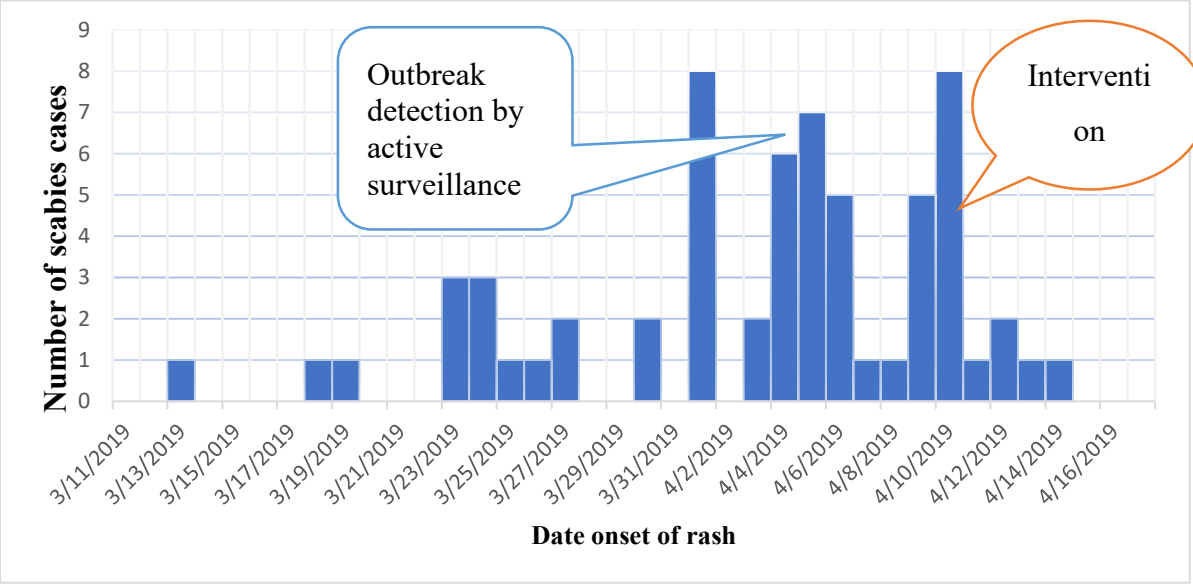


Figure 7: ***Epi curve showing scabies outbreak investigation korem south Tigray April 2019***

Analytical description/risk assessment

Table 12: Univariate risk factor analysis of scabies outbreak, korem town, Tigray Ethiopia April 2019

Independent variables	Case status		COR	CI	P-value
	Cases(31)%	Controls(61)%			
Have you put on some one's clothes who had scabies diseased six weeks back? No[1]	15	45	2.358	**0.970 5.7.334**	**0.059**
Yes	16	19			
Have you contact history with scabies case? No[1]	13	41	2.838	**1.164 6.922**	**0.022**
Yes	18	20			

Have you ever heard about scabies disease prevention treatment and transmission? No Yes[1]	14 17	43 18	**2.901**	**1.184** **7.107**	**0.020**
Number of students living per single room <5[1] ≥5	7 24	37 24	5.286	**1.971** **14.172**	**0.001**
Did you Share of matts/bed sheet? No[1] Yes	10 21	34 27	2.664	1.068 6.549	0.036
Did you sleep with scabies case in the last two weeks? No[1]	19 12	31 30	1.879	0.771 4.578	0.165
How often do you take shower? Weekly[1] Every two weeks	18 13	29 32	0.655	0.273 1.566	0.341
Have you bathed some one with scabies? No[1] Yes	15 16	36 25	1.536	0.530 3.007	0.599

NB: Yes[1] and No[1] indicate reference when we used logistic regression analysis

Table 13: Multivariate risk factor analysis of scabies outbreak, korem town, Tigray Ethiopia April 2019

Variables	Case status		COR CI 95%	p-value	AOR	CI
	Case(31)	Control(61)				
Have you contact history with scabies case? No[1] Yes	13 18	41 20	2.838 (1.164 6.922)	**0.022**	4.873	1.525 15.567

Did you share matts/ bed sheets?			2.664			0.026
No[1]	10	34	(1.068,	**0.036**	0.105	0.418
Yes	21	27	6.549)			
Have you ever heard about scabies disease prevention treatment and transmission?			2.901			
No	14	43	(1.184,7.	**0.020**	4.465	1.210
Yes[1]	17	18	107)			16.468
Number of students living per single room	24	24	5.286	**0.001**	0.139	0.041
≥5	7	37	(1.971,1			0.469
<5[1]			4.172)			

NB: Yes[1] and No[1] indicate reference when we used logistic regression analysis.

Risk factors Assessment

We conducted unmatched case control study by recruiting 31 cases and 61 controls with 1:2 ratios randomly selected by lottery methods from line listing. Using multivariate analysis, we found that history of contact with scabies case (AOR =4.873, CI, 1.525, 15.567) and lack of knowledge about scabies transmission and treatment were the two risk factors associated with contracting of scabies disease among 'Yekolo temari' in korem town south Tigray.

Environmental investigation

We conducted environmental investigations with woreda health office PHEM expert and health extension workers. We didn't find access of hand washing in the residential area of the 'Yekolo tamari'. They travelled around 45 minutes to get water to take shower and washing their clothes from rivers and spring sources. They live crowded in a small room with a maximum of 20 students per room.

Public health intervention

We gave health education about what is scabies, MOT, how to occurred and how to prevent in three churches sites together. Each religious' teachers helped us to gather them. In collaboration with woreda health office, local concerned bodies, and society of 'mahbere kudsan' hand washing access was made and we found a fund of excess detergents for personal hygiene. By communicating with korem general

hospital, the students have been treated on mass according to the severity with BBL and antibiotics. We discussed with the religious leaders to report a scabies case to nearby health institution and to treat.

Discussion

From 133 'Yekolo temari' in three churches, namely St. Abune Aregawi, St. Gabriel and St. Marry Hayalo, in Korem town, south Tigray,61(45.9%) of the students had infected by scabies disease. The mean age of the cases was 16.7 years with a standard deviation of 3.3. All cases and controls were males, due to the fact that all 'Yekolo temari' (students) in Ethiopia are males. This study agrees with a study conducted in north Gondar town (1).The majority (72.2%) of the cases were 15-24 years old. This is higher than a study conducted in Dembiya district, north Gondar zone (23%) (12). The age category from 25-44 years old students were least affected. 48.4% of the 'Yekolo temari' had primary education background and the least (6.5%) were neither read nor able to write children.

Most (52.5%) of the cases were from St. Gabriel church and 37.7% of them were from St. Abune Aregawi church. The age specific attack rate was high among the age category 15-24 year's old students.

88.5% of the cases had persistent itching with 100% skin rash from mild to moderate skin lesion and in 75.4% of the cases the site of infection was in their hands and 11.5% in their abdomen. 34.4% and 14.8% of the cases had moderate and severe skin lesion respectively.

The attack rate was high in St. Abune Aregawi church followed by St. Gabriel church. The outbreak was propagated type of epi-curve which shows the transmission continued (from the sign and symptoms of the index case Seen-April 14-2019) for one month among the ('Yekolo temari') students.

'Yekolo temary' who had history of contact with active case of scabies were 4.9 times at high risk to develop scabies disease than those did not have exposure to scabies disease. This is similar with a study conducted in north Gondar town (1) and Dembiya district north Gondar zone. (12)

Limitation of the study

Unavailability of literature review in Africa particularly in Ethiopia about scabies among 'Yekolo temari'.

Conclusion

- The source of outbreak for this study was 17 years old adolescent 'Yekolo temari' came from Ofla rural neighbor woreda.

- The scabies outbreak was propagated type in which transmission continued among the students for one month
- The age specific attack rate was high among the age group 15-24 years old cases
- The attack rate was high in St. Abune Aregawi church.
- The overall attack rate was 45.9%.
- Contact history with active scabies and lack of knowledge about scabies transmission and treatment were significant risk factor for transmission of the disease in korem town in the three churches.

Recommendation

- To church leaders/teachers
    - There should be water supply for hand washing to increase hygiene and sanitation
    - There should be continuous supervision to 'Yekolo temari' on hygiene and sanitation
- To woreda health office
    - Active case search and routine surveillance should be strengthened.
    - Health education should be strongly given to the students routinely
    - Regular inspection to the churches on hygiene and sanitation should be routinely done on the 'Yekolo temari'.

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CHAPTER 2: SURVEILLANCE DATA ANALYSIS

2.1 SURVIELLANCE DATA ANALYSIS ON UNDER FIVE PNEUMONIAS IN TIGRAY REGION FEBRUARY 10-20/2018

Abstract

Introduction: Every class of microorganisms causes pneumonia defined as inflammation of lung parenchyma, virtually and a specific etiologic diagnosis is often difficult in children. Globally, Pneumonia is the leading communicable disease, which is the reason of fatality in children. During 2013, it was reported that approximately 935 000 children less than 5 years old died due to Pneumonia, which was 15% of all the deaths in children. In Ethiopia, pneumonia is a leading single disease killing under-five children. It is estimated that 3,370,000 children encounter pneumonia annually which contributes to 20 % of all causes of deaths killing over 40,000 under-five children every year.

Objective: The objective of this surveillance data analysis was to determine the incidence rate mortality and case fatality rate of pneumonia in under-five children in Tigray, from 2015-2017.

Methods: Data was collected from HMIS case team of the regional health bureau consisting a three-year (2015-2017) of pneumonia by time and person. It was based on the secondary data reported from all health facilities. We used a Microsoft office excel 2016 to analyze the frequency of pneumonia cases from IPD and OPD and deaths due to pneumonia by age and sex category within three years.

Results: The overall incidence rate of pneumonia morbidity in Tigray region in under five children was 14%. Moreover, the CFR and mortality rate of pneumonia was 0.07% and 9.7/1000 respectively. The incidence rate of pneumonia in Tigray region in under-five children increased from 12.5% to 15.5% and mortality rate decreased from 10.8/1000 to 8.7/1000 children.

Conclusion: From this surveillance data analysis, males were more affected than females. And the annual mortality rate was high in 2015(10.8/1000, but incidence rate was high in 2017(15.5%)

Key word: Pneumonia, under five, Tigray, 2017

Introduction

Every class of microorganisms because pneumonia defined as inflammation of lung parenchyma, virtually and a specific etiologic diagnosis is often difficult in children. Viruses and mycoplasma pneumonia are the primary agents causing pneumonia followed by bacteria(1). The clinical presentation of pneumonia and the etiology vary greatly depending on the age of the patient, the infecting organism, the site/s the infection has involved, the immune status of the patient and the place of acquisition of infection(2). Pneumonia is a significant problem worldwide and remains one of the major causes of death among children younger than 5 years old. In 2010, it was estimated that there were 120 million episodes of pneumonia globally, and 1.3 million episodes led to death among children in this age group in 2011. In contrast to community- acquired pneumonia (CAP), hospital-acquired pneumonia (HAP) occurs more than 48 h after a hospital admission without any antecedent signs at the time of admission(3).

Reduction of indoor air pollution (IAP) exposure from solid fuel use is a potentially important intervention for childhood pneumonia prevention(4). It is responsible for 19% of all deaths in children less than 5 years in the world, with over 70% of this mortality occurring in sub-Saharan Africa and South East Asia(**5**). More than half of the world's annual new pneumonia cases are concentrated in just five countries where 44% of the world's children aged less than 5years live- India (43million), China (21.1million), Pakistan (9.8million), 2-5 Bangladesh (6.4million), and Nigeria (6.1million)(6). It is known that the bacterial pathogen Streptococcus pneumonia is the leading cause of severe pneumonia among children across the developing world. Bacteria also contribute to non-severe pneumonia cases, but to a lesser extent, and more cases are probably of viral origin. Another major cause is the bacterial pathogen Haemophilus influenza type b (Hib)(**7**).

Progress in child survival worldwide is described as one of the greatest success stories of international development, with child deaths became almost halved over the last two decades compared to the 1990 MDG base- line. Between 1990 and 2013 under-five mortality rates declined by 49%, falling from an estimated 90 deaths per 1000 live births to 46 deaths per 1000 live births(8).

The integrated Global Action Plan for the Prevention and Control of Pneumonia and Diarrhea (GAPPD) proposes a cohesive approach to ending preventable pneumonia and diarrhea deaths. It brings together critical services and interventions to create healthy environments, promotes practices known to protect children from disease and ensures that every child has access to proven and appropriate preventive and treatment measures(9).

Pneumonia is a leading cause of death among children under five years of age (U5s), causing roughly 1.6 million deaths per year and is one of the biggest barriers to the attainment of the Millennium Development Goal (MDG) 4 –reduce child mortality by two thirds by 2015(10).

Globally, Pneumonia is the leading communicable disease, which is the reason of fatality in children. During 2013, it was reported that approximately 935 000 children less than 5 years old died due to Pneumonia, which was 15% of all the deaths in children. The scenario is more or less same in sub-Saharan Africa and South Asia(11).

Every year, nearly 11 million children die before reaching their fifth birthday. In response to this challenge, WHO and UNICEF in the early 1990s developed Integrated Management of Childhood Illness (IMCI), a strategy designed to reduce child mortality and morbidity in developing countries(12). The African Region has the highest burden of global child mortality. Although it comprises about 20% of the world's population of children aged less than 5 years, it has about 45% of global under-5 deaths and 50% of worldwide deaths from pneumonia in this age group. More than 90% of all deaths due to pneumonia in children aged less than 5 years take place in 40 countries.

Even more striking is the fact that, according to the official estimates from WHO for the year 2000, two-thirds of all these deaths are concentrated in just 10 countries. India (408 000 deaths), Nigeria (204 000), the Democratic Republic of the Congo (126 000), Ethiopia (112 000), Pakistan (91 000), Afghanistan (87 000), China (74 000), Bangladesh (50 000), Angola (47 000) and Niger (46 000). In China the mortality is about 8.6 per 10 000, whereas several countries have rates above 100 per 10 000(13).

The slow rate of decline in the burden of pneumonia in SSA is largely attributed to the persistence of the specific risk factors associated with the likelihood of contracting and developing pneumonia. The most important reason is the late introduction and slow pace of coverage of Hib and

Pneumococcal conjugate vaccines in the routine immunization programs in Africa. These vaccines provide the most cost-effective approach for protection and prevention of severe forms of pneumonia particularly in the context where healthcare disparity and inequality are prevalent(14) .

The World Health Organization (WHO) and UNICEF estimate that through implementation of several key interventions, a substantial proportion of childhood pneumonia deaths could be averted. (15) Ethiopia has recorded significant reduction in childhood mortality and had achieved the MDG4 target in 2012. Several factors are believed to contribute to the reduction in under five mortalities including the improvement in overall socio-economic status and the significant increase in access to primary health care services, however still many children die before their 5th birth day (59/1000 live births in 2015). Over two-thirds of these children deaths are caused by Pneumonia (18%)(16).

The global burden of pneumococcal pneumonia among young children has been well characterized, with the highest incidence of disease and death occurring in low- and middle- income countries(17). Out of fifteen countries that have the highest death rate from clinical pneumonia in children younger than five-year-old, Ethiopia ranks as number four in the world (84.6 deaths per 10,000 under five population)(18).

RATIONAL OF THE STUDY

Globally, Pneumonia is the leading cause of death among children under 5 years of age, accounting for 16% of all deaths of children under 5 years old killing approximately 2,400 children a day in 2015 and killing 920 136 children. There are 120 million episodes of pneumonia per year in children under 5, over 10% of which (14 million) progress to severe episodes.

There were an estimated 880,000 deaths from pneumonia in children under the age of five in 2016. (WHO fact sheet on pneumonia, 2018)

World Health Organization (WHO) estimated pneumonia as the number one cause of death in children, accounting for 16% of all deaths under five years old, killing 920 136 children in 2015. It has been clearly demonstrated that the introduction of specific vaccines against Streptococcus pneumonia and haemophilus influenza type B in high-income countries has substantially reduced the attributed mortality. In Ethiopia, pneumonia is a leading single disease killing under-five children. It is estimated

that 3,370,000 children encounter pneumonia annually which contributes to 20 % of all causes of deaths killing over 40,000 under-five children every year (UNICEF report 2014).

In Tigray, pneumonia in under five children is the first five top cause of morbidity and mortality reported in 2016 (Tigray regional health bureau bulletin 2016)

OBJECTIVE

General objective

To describe the magnitude and distribution of pneumonia morbidity and mortality among under children in Tigray region, Ethiopia. From 2015-2017

Specific objectives

To describe the morbidity and mortality of pneumonia by person an time

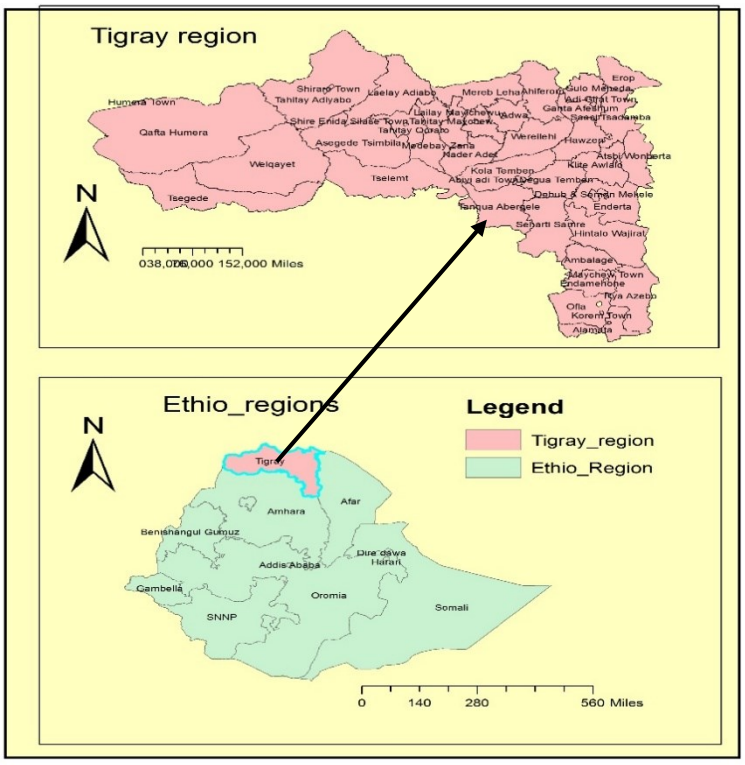
To estimate the incidence of pneumonia in the region

To describe the trend of the disease in the region within three years

Methods and Materials

Study area and period

This surveillance data analysis was conducted in Tigray region on February 5-15 2018. Tigray is one of the nine national regional states of Ethiopia. It is bordered in the north by Eritrea, in the south by Amhara region, in the East by Afar region and in the west by Sudan. The region is administratively divided into 7 Zones (one special zone), 52 Woredas (34 rural and 18 urban) and 814 Kebeles (753 Rural and 61 Urban). Tigray has an amazing landscape with the Tekeze Gorge at 550 meters above sea level and the mountains like Tsibet peaking at 3935 meters. Tigray region is found in northern part of Ethiopia, which is about 783 km far from the Addis Ababa. Public health care services in Tigray are delivered through one specialized hospital, 15 general hospitals, 20 primary hospitals, 204 health centers and 712 health posts.



Map 4: *Map of Ethiopian* ***regions showing, Tigray region February 2018***

Population under surveillance: *All pneumonia cases from 2015-2017 in Tigray*

Study design: cross-sectional secondary data review was conducted.

Source of population: The population living in Tigray from 2015-2017

Study population: The study population in this case were all under five children with pneumonia diseases in Tigray

Variables specification

The monthly and quarterly annual report consists pneumonia cases at OPD and IPD level and death by sex (male and female) and age.

Data collection procedures and Instruments

Every available data was collected from the regional health bureau, HMIS case team that provided monthly and quarterly report.

Data quality control

To ensure data quality the collected data from HMIS unit from Excel was cleaned repeatedly.

Data analysis and interpretation

We summarized the data by descriptive statistics of percent and frequency and was depicted in different types of graphs and tables by using MS excel 2016.

Operational Definition

Incidence rate: a measure of the frequency with which new cases of pneumonia, expressed explicitly per a period. Incidence rate is calculated as the number of new cases of pneumonia Over a specified period divided either by the average by the cumulative person-time the population was at risk.

Prevalence rate: The proportion of a population that has a particular disease, injury, other health Condition, or attribute at a specified point in time (point prevalence) or during a specified period (Period prevalence).

Hospitalization: The period a patient stayed in hospital due to a serious illness in order to be treated parenterally

Admission rate: The proportion of pneumonia cases admitted divided by the number of total pneumonia cases expressed by percent.

Case-fatality rate (also called **case-fatality ratio)** the proportion of persons with pneumonia Who die from that pneumonia? The denominator is the number of persons with the pneumonia; the numerator is the number of pneumonia-specific deaths among those persons.

Ethical consideration

A legal letter was written from Tigray regional health bureau PHEM to HMIS unit to get official permission from the HMIS unit to collect the required data of pneumonia from 2015-2017.

Dissemination of the result

The result of this study will be submitted to Addis Ababa University College of health science, school of public health, department of field epidemiology in partial fulfillment of Master of Science in field Epidemiology. Moreover, it will be disseminated to Tigray regional health bureau and to the concerned bodies accordingly.

RESULT

Frequency distribution of cases by person

316781 cases and 220 deaths due to pneumonia were reported to the region from 2015-2017 Morbidity and mortality of pneumonia was high among males of under five children.

Table 14: Distribution proportion of under-five pneumonia cases by sex Tigray, Ethiopia 2015-2017

Variable	cases (n=316781 of pneumonia)		No of death (n=220	
Sex	Number	Percent (%)	Number	Percent (%)
Males	179584	56.7	146	66.4
Females	137191	43.3	74	33.6

Out of 316781 pneumonia cases reported to the region 14996(4.7%) of them were admitted and 301785 (95.3%) of them were treated at OPD level. From 14996 children admitted 61.5% of them were males of under five children. From this analysis, males are severely affected by pneumonia than females and from 301785 children treated at outpatient department 56.4% of them were males.

Table 15: Distribution of under-five pneumonia treated at OPD and IPD, Tigray, 2015-2017

Variable	Total IPD cases (n=14996)		Total OPD cases (n=301785)	
Sex	Number	Percent (%)	Number	Percent (%)
Males	9230	61.5	170354	56.4
Females	5766	38.5	131431	43.6

Frequency distribution of cases by time

Pneumonia continued as public health problem in Tigray in under five children in similar fashion. Incidence of pneumonia in under five continued similarly for three consecutive years from 2015-2017 in this region. However, it was high in 2017(15.5%). The incidence rate was increases from year to year because notifying pneumonia cases increased due to increased high-level trained professionals and increased private clinics to report the cases to the regional health bureau from time to time.

Table 16: Incidence and mortality rate of under-five pneumonia cases by year from 2015-2017, in Tigray, Ethiopia.

Year	Total under five population	Total cases of pneumonia	Incidence rate (%)	Mortality r ate per 100000	
				Death	Rate
2015	737569	92436	12.5	80	10.8
2016	751722	105716	14.1	73	9.7
2017	765584	118629	15.5	67	8.8
Crude attack rate			14.1	220	9.8

Admission rate of pneumonia

From 2015-2017, 316781 under five children pneumonia cases were reported. Out of this 14996(4.7% that is the average annual hospitalization) of them admitted to be treated at hospital since they required to be admitted. The admission rate was high in 2016(5%).The admission rate in the three consecutive years from 2015-2017 was 4.9%, 5% and 4.3% respectively.

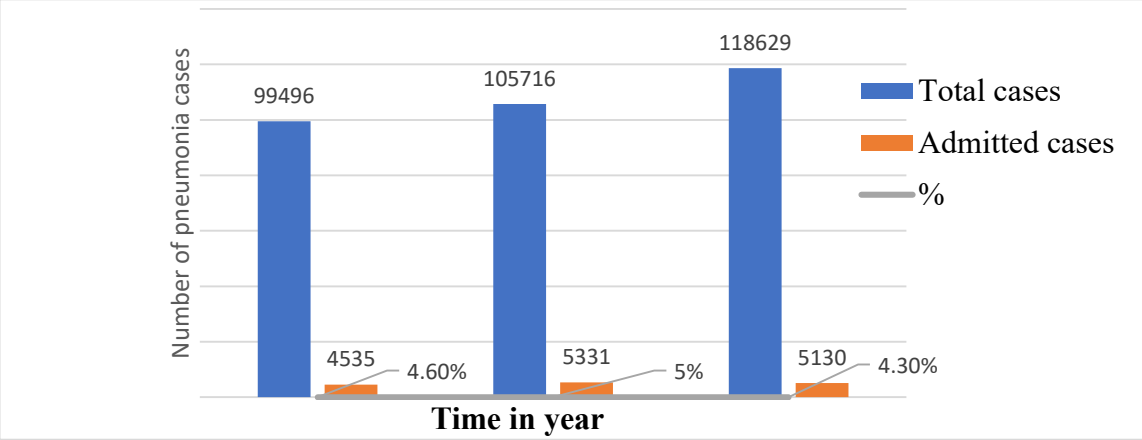


Figure 8: **Admission rate of pneumonia in under five children in Tigray, Ethiopia from 2015-2017.**

Case fatality rate of pneumonia

The case fatality rate of pneumonia among under five children in Tigray was slightly similar in three years from 2015-2017 with a slightly decreasing. The highest death rate was in 2015. The overall case fatality rate of pneumonia in under five children within three years was 0.07%.

***Table 17*: CFR of pneumonia in Tigray, Ethiopia from 2015-2017**

Year	Total cases	Total Death	Case fatality rate (%)
2015	92436	80	0.09
2016	105716	73	0.07
2017	118629	67	0.06
Overall			0.07

Pneumonia trend in under five children

The pattern of pneumonia case in under five children in Tigray region increased from 2015-2017 consecutively but the trend of death decreased from year to year, this due to increasing the medical care seeking behaviour of the community and increased private clinics started to report to the regional health bureau from time to time. The overall incidence rate of pneumonia in under five children was 140/1000 and the mortality rate was 1/10000 population of under five children.

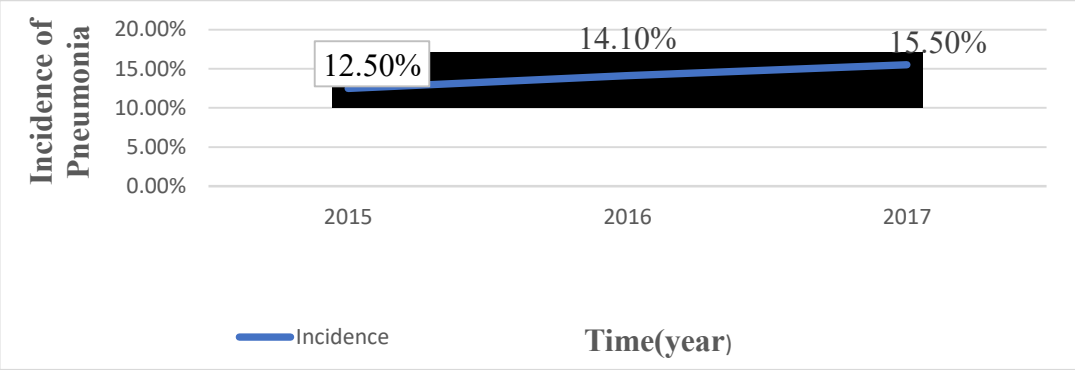


Figure 9: The pattern of pneumonia cases in under five children in Tigray, Ethiopia from 2015-2017

Discussion

From the total 316781 cases of pneumonia reported to Tigray regional health bureau, male patients contain high percentage relative to female patents. And out of the total deaths reported 66.4% of them were males. Even out of the admitted under five pneumonia cases males contained high percentage (61. 5%).similarly defined at OPD, i.e. high number of male cases were treated at OPD.

Incidence of pneumonia in under five continued similarly for three consecutive years from 2015-2017 in this region. However, it was high in 2017. The incidence rate was increasing from year to year as a result of increasing notifying the disease and increasing of private clinic report. The overall incidence rate in the region was 14.1%. Population-based surveillance study conducted in Manhica district- rural, Mozambique in Under treatment of pneumonia among children under 5 years of age in 2008-2011 showed that the incidence of pneumonia was 37.8%(2) higher than our study. This difference might be due to access to medical care. To the opposite the mortality rate was decreasing from 10.8/100000 population in 2015 to 8.8/100000 population in 2017. This is also due to increasing of quality of care in health facilities. The admission rate was high in 2016 relatively to the other years.

The case fatality rate of pneumonia was in decreasing status from year to year. Even though high it was high in 2015. The overall case fatality rate of pneumonia was 0.07%. A cross sectional study conducted in Mukono district Uganda from 2010/2011 in under five children shows the case fatality of pneumonia was 5%, which is higher than the study we conducted in Tigray region from 2015-2017. (9)

LIMITATION OF THE STUDY

- The necessary variable place was incomplete. Due to the fact that we could not show the distribution of pneumonia by place.
- Unavailability of literature review

CONCLUSION

- The incidence rate of pneumonia increases from year to year on average 141/1000 population.
- Case fatality rate of pneumonia in the region was 0.07%
- Overall mortality rate was 9.8/1000 Population
- Pneumonia, which is still prevalent in under-fives in Tigray, is associated with significant morbidity and mortality.

RECOMMENDATION

To Tigray regional health bureau

Even though the immunization coverage for pneumococcal vaccine of three yeas was 89%, 14.1% children under five were affected by pneumonia, which is vaccine preventable diseases. Therefore, TRHB should check the cold chain management of the pneumococcal vaccine in under one year in all woredas to assess the vaccine potency.

To Woreda health offices

- Each woreda health offices in the region should check each health facilities under the woredas about cold chain management of vaccines especially in health centers with power supply shortage.

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CHAPTER 3: SURVEILLANCE SYSTEM EVALUATION

3.1 MALARIA SURVEILLANCE SYSTEM EVALUATION, RAYA AZEBO WOREDA, DECEMBER, 2018.

Abstract

Background: Malaria is caused by plasmodium parasites that are spread to people through the bites of infected anopheles' mosquito vectors. Nearly half of the world's population is at risk of malaria. In Ethiopia, malaria is one of the leading cause of morbidity and mortality and it is endemic area in most part of the nation at an altitude of 2000 meter below sea level. Approximately 75% of the land mass in Ethiopia is potentially malarious area and about 40 million people are at high risk of malaria infection. Malaria surveillance system has been useful in providing information malaria trends and provides magnitude of morbidity and mortality in the Woreda.

Objective: To assess key attributes of malaria surveillance system and performance of the system in line with the set objectives and operation of the system to generate evidence based information for better improvement of the surveillance system.

Methodology: We conducted a descriptive cross sectional system evaluation from 06-15 December 2018 in Raya Azebo woreda. We collected data, entered and analyzed using excel and presented by graphs tables.

Result: It was found that malaria is the first ten top disease in the woreda and endemic in 21 Kebeles of the woreda. Out of the total cases reported 69.8% of them were confirmed for plasmodium falciparum.

Conclusion and recommendation: The system is useful, simple, acceptable, flexible, and representative. However, the timeliness and report completeness of the woreda was 86.34 % and 91.6 % respectively. The epidemic committee is not functional and did not allocate budget, so it should be allocated and participated at all times.

Keyword: surveillance, evaluation, Raya Azebo woreda December 2018

Introduction

Public health surveillance is the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health. Data disseminated by a public health surveillance system can be used for immediate public health action, program planning and evaluation, and formulating research hypotheses(1).

Disease surveillance has been recognized as an effective strategy in the control and prevention of most especially communicable diseases. An effective surveillance system allows early intervention for the prevention and reduction of the morbidity and mortality that may result from epidemics of communicable diseases. Effective surveillance is the key to control disease in the community. However, the knowledge of reporting requirements and responsibilities among health personnel has not been examined adequately as a cause of under reporting (2).

Malaria is caused by plasmodium parasites that are spread to people through the bites of infected anopheles' mosquito vectors. Of the five parasite species that cause malaria in humans. Plasmodium falciparum is the deadliest(3).

Nearly half of the world's population is at risk of malaria. In 2015, there were roughly 212 million malaria cases and an estimated 429 000-malaria deaths. Increased prevention and control measures have led to a 29% reduction in malaria mortality rates globally since 2010. Sub-Saharan Africa continues to carry a disproportionately high share of the global malaria burden. In 2015, the region was home to 90% of malaria cases and 92% of malaria deaths(4,7).

According to the World Health Organization (WHO), in 2012 malaria caused 207 million episodes of disease and 627 000 deaths. About 85% of illness and 90% of deaths attributable to malaria occur in sub-Saharan Africa, with young children being most affected(5).

Malaria infection during pregnancy leads to adverse health outcomes for both mothers and infants. Intermittent preventive treatment during pregnancy of at least two doses of sulphadoxine-pyrimethamine, administered at antenatal care visits, is an effective prevention intervention in malaria-endemic areas(6). The major targets for HSDP III in malaria prevention and control were

to distribute 20 million ITNs to households in malarious areas, increase the proportion of under 5 children utilizing ITNs from 2% to 63%; and pregnant women utilizing ITNs from 2% to 49%, reduction in the malaria morbidity from 22% to 10% and malaria case fatality rate in age groups of 5 years and above from 4.5% to 2% and in the under 5 children from 5% to 2%. The achievement so far show that distribution of ITNs has successfully reached around 22.2 million in 2008/09 that makes Ethiopia the third highest bed net coverage achiever in Sub-Saharan Africa after Togo and Sierra Leone(7).

Malaria has significant economic impacts. When peak transmission occurs just before harvest, the disease can cause sizable productivity losses (8).

Infection by P. falciparum, which is the predominant cause of malaria in Africa, accounts for most cases of severe disease and almost all malaria-related deaths. The incubation period for malaria due to P. falciparum is typically less than 1 month, and most patients present with onset of symptoms within 1 or 2 months of exposure(9).

Free delivery of an ITN at the first ANC visit is an incentive to attend antenatal care and provides the pregnant woman with a lifesaving tool for herself and her baby. Sleeping under the ITN will also protect her baby during the first year of life. As malaria prevalence in a country declines, the clinical manifestations of malaria infection in pregnant women become more severe due to reduced immunity. Having strong public and private health systems in place to rapidly detect and treat malaria in pregnancy becomes increasingly important as malaria transmission levels fall(10).

World Health Organization insecticide susceptibility tests and molecular analyses showed A. arabinoses was more susceptible to pyrethroids (both deltamethrin and permethrin) than A. gambiae S.S. in Uganda. A. arabiensis and A. gambiae S.S. were susceptible to the carbamate insecticide bendiocarb and the organophosphate insecticide pirimiphosmethyl(11).

Approximately 52 million people (68%) live in malaria risk areas in Ethiopia, primarily at altitudes below 2,000 meters. Malaria is mainly seasonal with unstable transmission in the highland fringe areas and of relatively longer transmission duration in lowland areas, river basins and valleys. On average, 60%-70% of malaria cases have been due to P. falciparum, with the remainder caused by

P. vivax. Anopheles arabinoses is the main malaria vector; An. pharoensis, An. funestus and An. nili play a role as secondary vectors(12).

Tigray region has many malaria hot spot areas which are affected repeatedly by malaria episode such as western zone, southern and the central zones of the region. Hence, this evaluation is conducted to evaluate the gap and the attributes and purposes of the surveillance system.

The evaluation should assess how well the public health surveillance system is integrated with other surveillance and health information system e.g., data exchange and sharing in multiple formats, and transformation of data. The purpose of the system indicates why the system exists, where as its objectives relate to how the data are used for public health action. The objective of public health surveillance system is, addressing immediate public health action, program planning and evaluation, and formation of research hypotheses including the planned uses of its data; establish a frame of reference for evaluating specific components.

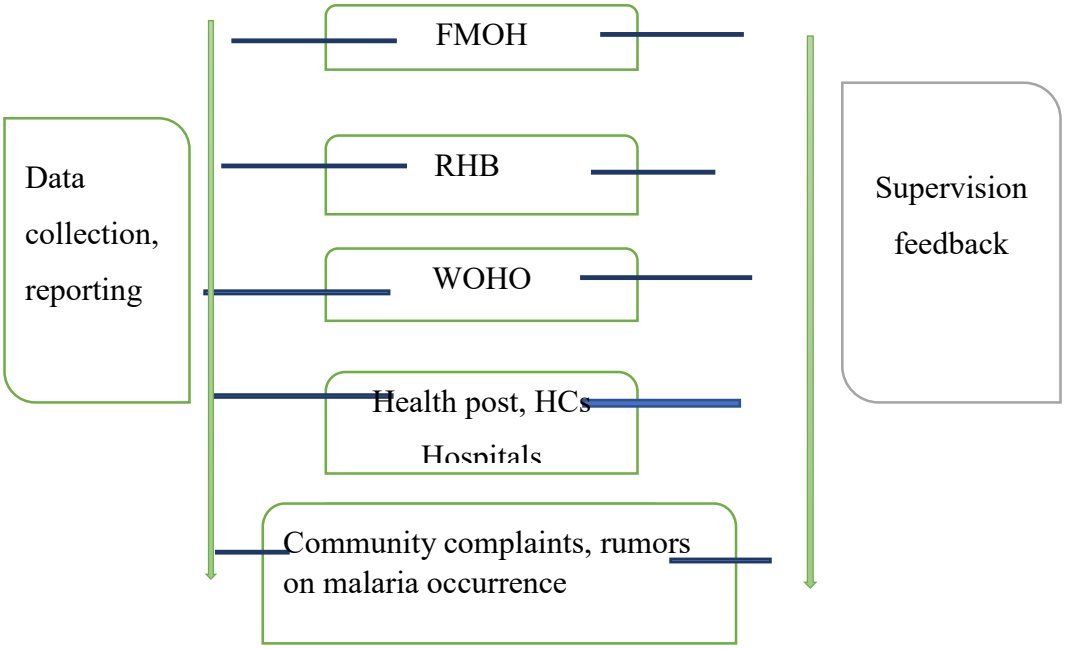


Figure 10: surveillance data and information flow

Rational of the evaluation

Malaria is the leading cause of morbidity and mortality in Ethiopia. Therefore, this study is to conduct to evaluate whether the system is in the way of performing to the set objective and to identify the gaps for improving the surveillance system.

Malaria surveillance system is useful in providing information on malaria trends and provides magnitude of malaria morbidity and mortality in the woreda.

The findings from this evaluation will utilize for planning, effective health interventions and procurement of equipment and materials that helps diagnosis, treatment and prevention of malaria disease.

Objective

General objective

To evaluate the existing surveillance system in Raya Azebo woreda, south Zone of Tigray region specifically on malaria, December 2018

Specific objective

To describe the Performance of the disease surveillance system

To evaluate the attributes of malaria surveillance system in Raya Azebo Woreda.

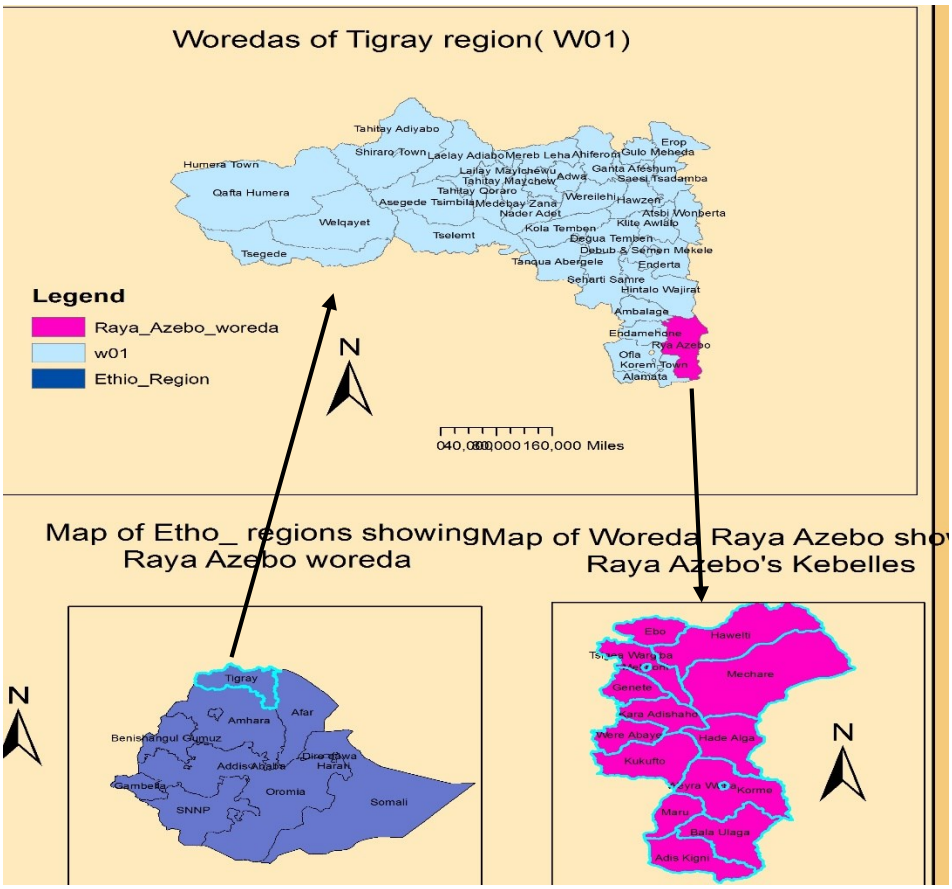
To describe the implementation of core surveillance activities in respect to case detection registration, confirmation, reporting, epidemic preparedness and response

To describe supportive activities of surveillance system such as supervision, staff training, information and feedback

Methods and materials

Study area and period

The study was conducted in woreda Raya Azebo, Tigray Regional State. The woreda is located in southern zone Tigray north Ethiopia. Raya Azebo woreda has a total population of 163209(79972 males and 83237female). The woreda has 21 Kebeles. Raya Azebo woreda has one primary hospital 8 Health Centers and 17 Health posts. Geographically Raya Azebo woreda is malaria endemic in which the population is at risk of malaria. The study was conducted from December 06-15, 2018



Map 5: Ethiopian regions map showing Raya Azebo woreda, south Tigray, Ethiopia, December 2018

Study design

A cross sectional descriptive study design was conducted.

Sample Size and Sampling Technique

The woreda was selected randomly from four zones with malaria endemic woredas in Tigray.

From 8 health centers and 17 health posts, using lottery method we selected four health centers and six health posts and purposely one primary hospital was included in the study. The sample size is based CDC guideline which recommended that to conduct surveillance system evaluation the sample should be above 30%. According to this recommendation we selected 6/17(35.3%) health posts and 5 /8(62.5%) health centers.

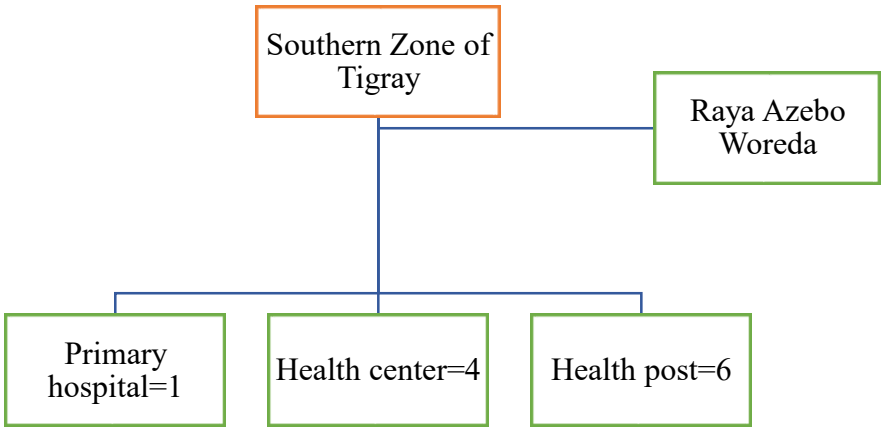


Figure 11: Diagram showing how to select the study area and unit

Study population

One primary hospital, four health center and six health posts were the study subjects in our surveillance system evaluation included.

Data collection method

We collected Primary data using structured check list taken from (CDC Updated Guidelines for evaluating public health surveillance systems 2014) and from surveillance woreda expert (officers), focal persons in the selected health facilities. We also reviewed Secondary data source such as surveillance report completeness and timeliness as well as malaria surveillance data, supervision report, written feedbacks, preparedness plans from existed reports and reporting formats.

Data analysis

We entered and analyzed the data using Microsoft office excel-2016. We entered and edited the data and employed graphs and tables according to the result.

Dissemination of the result:

The findings from the evaluations, Conclusions and recommendations forwarded to all concerned bodies such as PHEM, woreda health offices, mentors, supervisors, coordinators and to Addis Ababa university school of public health.

Case definition

According to National PHEM guideline the case definition categorized in to two, Clinical and community case definition.

Clinical case definition: Any person with fever, headache, back pain, chills, sweats, myalgia, nausea and vomiting diagnosed as malaria clinically.

Community case definition: Any person with fever or fever with headache, back pain, chills, sweating, muscle pain, nausea and vomiting or suspected case confirmed by RDT.

Operational definition

Usefulness: A public health surveillance system is useful if it contributes to the prevention and control of adverse health-related events, including an improved understanding of the public health implications of such events.

Data quality: reflects the completeness and validity of the data recorded in the public health Surveillance system.

Simplicity: The simplicity of a public health surveillance system refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives.

Flexibility: A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds.

Acceptability: Acceptability reflects the willingness of persons and organizations to participate in the surveillance system

Sensitivity: The sensitivity of a surveillance system can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease (or other health-related event) detected by the surveillance system. Second, sensitivity can refer to the ability to detect outbreaks, including the ability to monitor changes in the number of cases over time.

Predictive value positive: Predictive value positive (PVP) is the proportion of reported cases that actually have the health-related event under surveillance.

Representativeness: A public health surveillance system that is representative accurately describes the occurrence of a health-related event over time and its distribution in the population by place and person.

T**imeliness**: It reflects the speed between steps in a public health surveillance system.

Completeness: Containing the necessary variables filled completely and accurately.

Stability: refers to the reliability (i.e., the ability to collect, manage, and provide data properly Without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system

Performance of existing surveillance and response system

Populations under surveillance

Result

The National PHEM targets all population in the country to be under surveillance for all 23 reportable priority diseases.

Raya Azebo woreda follows the same procedure of 23-priority disease under surveillance. Malaria is endemic in Raya Azebo woreda in all Kebeles; hence, the population of the woreda is at high risk of malaria.

Distribution of Health facilities in Raya Azebo woreda, Tigray, Ethiopia 2018

Raya Azebo woreda has one primary hospital, eight health centers and seventeen public health posts as well as 9 private clinics and 31 store pharmacies. The health service coverage of the woreda was 100% in 2018. In all assessed health facilities (11 health facilities) the respondents agree that the population under surveillance have adequate health seeking behavior and they aware when disease occurs and report to the health facility. (Example if a patient has measles like symptoms they report to health facilities).

Malaria case definition

The case definition of malaria was available in all visited health facility documented collectively with 23 priority notifiable diseases.

All 11/11(100%) assessed health facilities they responded correctly the case definition of malaria and all febrile cases are tested for malaria by microscopy and RDT accordingly. All assessed health facilities have case definition for 23 diseases documented.

Reporting formats and registration book

All assessed health facilities have no separate clinical registration book for malaria but incorporated with OPD with other diseases and prepared manual registration themselves with plane paper for clinical registration. From July 2018- December 2018 there was no shortage of reporting format at all health facility assessed and in the woreda. Regarding report completeness in the last six months compared to the expected number of reports the report completeness of the woreda was 10/11 (91.6%).

While the woreda PHEM reported to the regional health Bureau in 14 weeks of reporting period was 100%, between 28-41 WHO weeks prior to visit. All reports were sent to the next level through telephone first and then through the reporting format hard copy from health post to health Center and from health center to the woreda. Even the woreda sent the report to the regional health bureau through telephone.

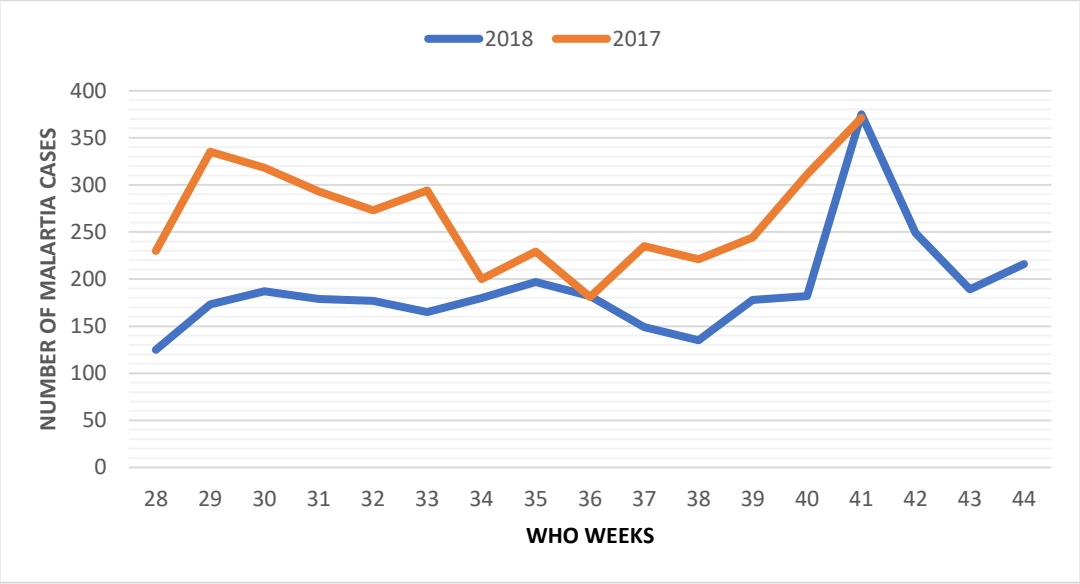


Figure 12: Weekly trend of malaria cases, Raya Azebo woreda, south Tigray Ethiopia, December 2018.

Data Analysis

Except the woreda PHEM, PHEM focal persons at health centers and hospitals did not analyze weekly and monthly malaria report by time, place and person. Simply they reported according to the hierarchy (from health post to HC, from HC to woreda health office.

The threshold for action was done for malaria at woreda health office and health centers. But in health posts, it was not correctly plotted not compared with last week/month/year. In Raya Azebo, woreda there were 24637 febrile cases tested for malaria in 2018. Out of these cases 5301(69.8%)

of them were confirmed for plasmodium falciparum and 2277(30.2%) of them were confirmed for plasmodium vivax malaria by RDT/microscopy. This data indicated that PF malaria is more prevalent in the woreda.

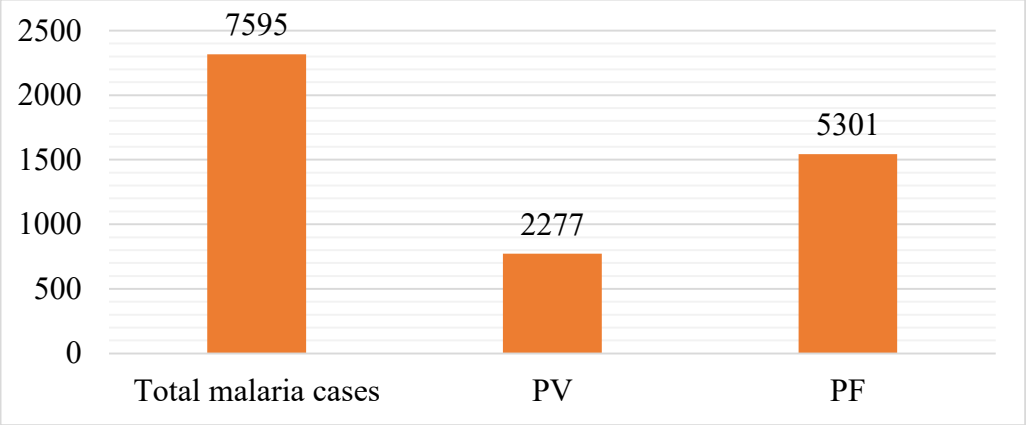


Figure 13: Malaria cases by species Raya Azebo woreda 2018

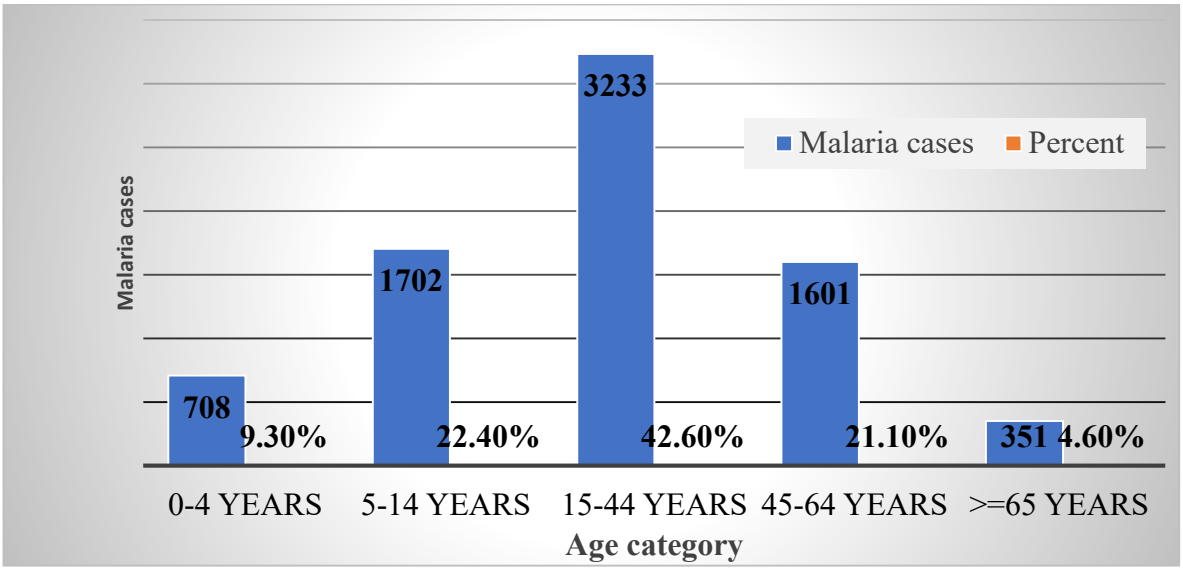


Figure 14: Distribution of malaria by age category, Raya Azebo woreda, December 2018

Epidemic preparedness and response

The woreda did not allocate budget for emergency case management but has RRT committee to give response when an outbreak and emergency case occurred. There was no outbreak in the woreda in the last year (2017) for all priority diseases. All 11/11(100%) respondents in the health facilities have emergency response plan for the priority disease and have epidemic management committee like RRT and task force at their locality that was verified from minute during assessment through

the prepared checklist. At time of assessment, all health facilities (11 of the health facilities) have drug supply and RDT kit adequate for six months' supply. The RRT committee are not active at all times but stand by at outbreak situation only. All PHEM focal persons in each health facility actively involved in outbreak investigation for control and malaria prevention in their catchment area by using epidemic case management tool.

Feedback

The woreda health office has regular supportive supervision (ISS) to all health facilities in the woreda every quarter in each year. The health facilities had supervised twice by the woreda health office as well as written feedbacks were given integrated with the other health department activities together (we checked and found documented). We found Woreda Supportive supervision feedback only in nine (9/11) (81.8%) health facilities.

Supervision

Regional health bureau had undergone ISS in the woreda twice annually, the woreda health office supervised the health facilities quarterly, and the health center PHEM focal person visited monthly to the health posts under his catchment area.

Communication facilities

The main means of communication between woreda health office, regional health bureau and the health facilities is telephone. There is a computer in woreda health office, but there is no computer in health facilities used for PHEM. They use paper based means of reporting helped by telephone for communication between health facilities. Even the woreda health office doesn't use internet for communication to regional health bureau. For immediately, weekly and monthly report they use telephone and paper based communication.

T**raining**

4/5(80%) PHEM focal persons in health centers/hospital and woreda health office PHEM focal person had got short training about surveillance 3-7 days at regional level. But 5/6(83.3%) health extension workers responded that they had got 1-3 days orientation about surveillance at woreda level.

M**aterial and resources availability for surveillance**

Necessary materials like (reporting formats, guidelines, RDT, laboratory reagents and antimalarial drugs were available at all health facilities during assessment).But no computer at all health facilities except in the woreda health office.

Respondents raised questions about transportation when they want to go far from the kebelle to assess active surveillance when rumors raised from the community.

Laboratory service: In 4/5(80%) of health centers microscope is functional and in all (100%) assessed health facilities, RDT was available during assessment and adequately available kits for the next six months. One (20%) health center from the assessed one is with no electricity that is microscope is not yet useful here.

Attributes of surveillance system

Usefulness

The surveillance system is useful to detect outbreak of the priority diseases in Ethiopia and useful to assess the magnitude of diseases morbidity and mortality in the woreda. The collected data through surveillance is used for evaluation of the disease condition in the woreda for information for action. All respondents in the assessed health facilities as well as the woreda PHEM focal persons responded that the surveillance system is useful for diseases outbreak investigation, prevention and control program.

Case detection

Out of 11 health facilities 7(63.6%)of them have national PHEM surveillance guidelines and standard case definition of malaria at all levels and all health workers detect any febrile cases and tested by RDT/microscopy.

All 5/5(100%) health centers plot malaria norm chart/threshold correctly. But out of 6 health posts 2of the (33.3%) plotted correctly.

Rapid response

A strong surveillance and response system is very important for effective priority disease surveillance and response. Respondents replied that when malaria cases increased from the previous bases, they went to the area and verified the cause of malaria cases to increase and took action together with community, but there is shortage of transportation to reach easily to the area.

Simplicity

All respondents agreed that the case definition, the formats for reporting and data collection for malaria is clear and easy to understand and simple to implement and helpful for organizing, entry and data analysis. They communicate with each other and the woreda health office with simple and clear way. All eleven (100%) of respondents agreed that the formats take 5-10 minutes to complete and easy to perform.

Data management

Data were collected, but not compiled and sent from the lowest level of health facility (health post) to health center and then to woreda health office and then to regional health bureau according to the hierarchy.

Flexibility

The system is flexible and can accommodate new variables and information can be done with other systems. Daily case register for malaria management modified to capture RDT positive cases and dose-regimen of treatment administered but clinical cases of malaria. All respondents agreed with a flexible public health surveillance can be easily adjusted to use, change and can be implemented easily with little information without additional expense, time, and manpower or allocated funds. Nowadays it is modified and easy integrated with other systems. As we know IDSR has been changed to PHEM which is comprehensive and included all the formats we have used which makes it flexible. Every health professional should accept for any change in the reforms and needs positive attitude. All assessed health professionals agreed that the system is flexible, easy to perform without any expense.

Acceptability

Being volunteer to continue the acceptability of the surveillance system assessed based on the engagement of the reporting agents and active participation in the case detection and reporting. The reporting format is easy to understand and to implement and health professional know what surveillance meant and the data flows are defined clearly by all stakeholders.

Sensitivity

The sensitivity of a surveillance system can be considered on two levels. First, at the level of

Case reporting, sensitivity refers to the proportion of cases of a disease (or other health-related event) detected by the surveillance system. Second, sensitivity can refer to the ability to detect outbreaks, including the ability to monitor changes in the number of cases over time.

During assessment, sensitivity was described at all levels by surveillance focal person able to detect the case and notify outbreak with the health professionals working in the clinical units. Community based case definition primarily used for health extension workers and health developmental armies in the community to identify and notify early and report febrile cases for malaria diagnosis.

On the other hand, eight positive slides and eight negative slides from four health centers were taken to regional laboratory to check the sensitivity. Out of eight positive slides seven of them were

positive for malaria and two slides were positive for malaria from the eight negative slides. Therefore, the sensitivity was =True positive/True positive +False positive=7/7+1=87.5%.

PVP

Predictive value positive (PVP) is the proportion of reported cases that actually have malaria through the surveillance system, (A/A+BX100) = 7595/7595+17042 (30.8%) cases diagnosed by RDT/ microscopy.

Representativeness

A public health surveillance system that is representative accurately describes the occurrence of a health-related event over time and its distribution in the population by place and person. Representativeness shows how far the routine surveillance report is covered by the health service delivery system and how many facilities are reporting to the offices. The routine surveillance covers all governmental health facilities, health posts, health centers and hospitals as well as woreda health offices and private health facilities and population under surveillance in the catchment area. All febrile cases are diagnosed by RDT at health post level and by microscope at health center and hospital level. For that reason, it is high representative. All respondents agreed that the population under surveillance has good health care seeking behavior and report any event happened suddenly. And all stakeholders report the disease under surveillance similarly. The health coverage for the woreda is 100%

Timeliness and completeness

It is the time required for the identification of trends, outbreaks, or the effect of control and prevention measures. The most important measure of timeliness and completeness are whether data are submitted in timely and completely to start investigation and implement control measures, hence timeliness of reporting was measured according to the national PHEM. The timeliness of report of the woreda was 81.8% at first quarter, 90.9% at second quarter, 81.8% at third quarter and 90.9% at the fourth quarter of 2018. The annual timeliness for 2018 of the woreda was 86.34%

The reporting completeness of the woreda was 94.4% at first quarter, 88.8% at second quarter, 88.85 at third quarter and 94.4% at the fourth quarter. On average the reporting completeness was 91.6% of the year 2018

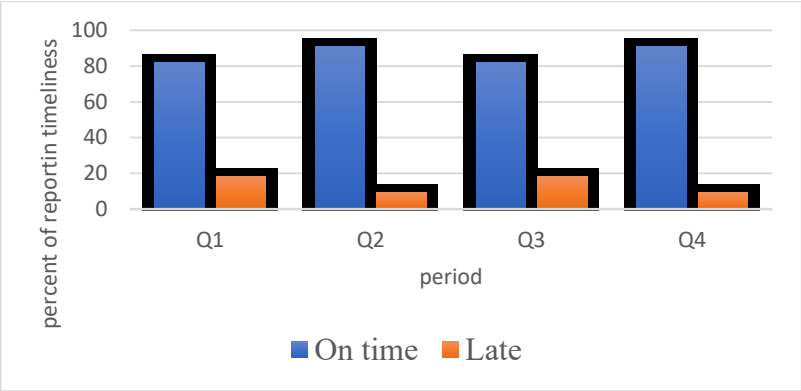


Figure 15: Reporting timeliness of health facility Raya Azebo woreda, south Tigray, Ethiopia, December, 2018

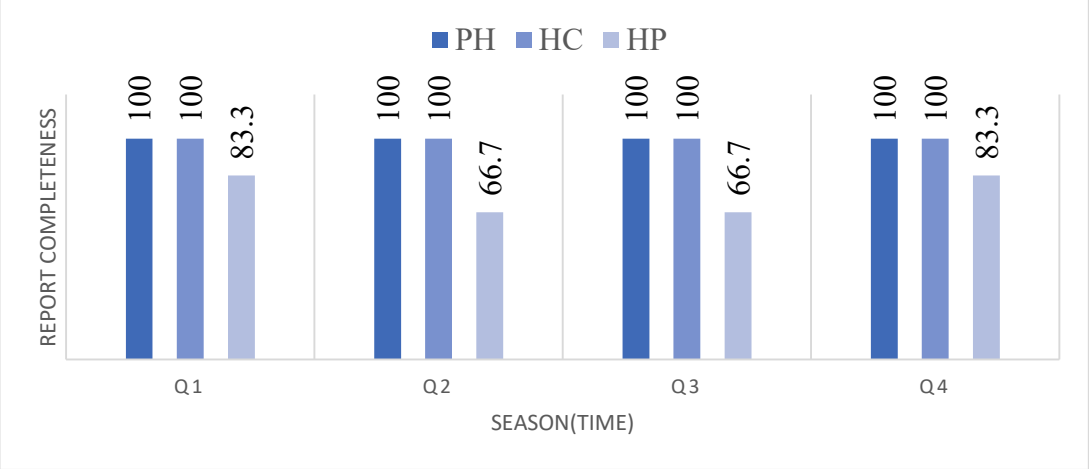


Figure 16: Report completeness, health facility Raya Azebo woreda, south Tigray, Ethiopia 2018

Stability

Stability refers to the reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system. The change of IDSR to PHEM made the reporting system more stable. All respondents responded that no time consuming to collect, receive data, transfer, entry and to release data.

Discussion

Malaria is found to be the major burden first ten top disease in the woreda in each kebelle.

Since the woreda is an investment area many people are mobile from highland to the area for investment and affected by malaria during the end of summer season.

Out of 7595 total malaria cases 5301(69.8%) of them were plasmodium falciparum which is predominant and potential for malaria outbreak in Raya Azebo woreda. Report timeliness and completeness and of the assessed health facilities was 86.34 and 91.6% above the WHO minimum requirement.

All health care providers in the assessed health facilities defined malaria case definition correctly. There was no separate clinical registration for malaria cases. It was incorporated with other diseases together and the reporting system was similar in each health facility.
The structure of data reporting from health post to health center, from health center/hospital to woreda health office to RHB was well organized.
Except the woreda health office, the health facilities don't use computer for data storage and data management and system of reporting is telephone.
No internet service in all the facilities assessed even in the woreda health office. The woreda has plan for epidemic preparedness but didn't allocate budget and the epidemic committee is not active to review the plan actions in all times but they gather when there is epidemic condition. This may lead to respond late the epidemic condition and can give a chance to progress the epidemic. This shows there is little attention on surveillance and response of epidemic prone disease like malaria.There is also low training coverage of surveillance among the health care providers at health centers and health posts and hard to conduct active surveillance in the community due to low transportation system.The sensitivity of the surveillance system 87.5%.

Limitation of the study/challenges

- There was hard to reach health posts because of unsuitable road for transportation
- There was limited mobile network to get health extension workers at health post and absence of health extension workers at their place
- Due to concurrent integrated supportive supervision by the regional health bureau, it was hard to conduct the assessment because of time limitation.

- No computer in all health facilities PHEM unit except the woreda health office

Conclusion

- Malaria cases were detected early in all assessed health facilities using standard case definition for health facilities and community case definitions for community based surveillance.
- Regular trend/ norm chart analysis to detect possible out breaks at Health center/hospital and woreda level is done.
- There is regular supervision and Feedback provision to strengthen the system from higher level i.e. from woreda health office and regional health bureau.
- The system is 100% useful, simple, acceptable, flexible, and representative
- . All health facilities are supervised every quarter by the woreda health office and twice per year by regional health bureau and any gaps in the surveillance system commented to narrow the gaps identified.
- The training and refreshment on surveillance to health professionals/PHEM focal is low and there is no computer at each health facility for PHEM unit.
- There was no outbreak happened in the study area during the study period and one year before.

Recommendation

- Training to health care workers should be continued specially to PHEM focal persons at each health facility.
- To facilitate effective communication among health facilities, woreda health office and the regional health bureau, there should be internet access in each health centers and woreda health office.
- There should be telephone and computer for PHEM unit at each health center.
- There should be budget allocation in the woreda for epidemic committee for active operation and the team should be actively and regularly functional.

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CHAPTER 4: HEALTH PROFILE DESCRIPTION

4.1 HEALTH PROFILE DESCRIPTION REPORT IN GANTA AFESHUM WOREDA, TIGRAY REGION JANUARY 2017

Abstract

Introduction: A community health profile assessment is a collection of information about the characteristics of the community, the health resources within the community data describing the community and the community's perceptions of health. The aim of this study is to assess the health and health related issues and indicators in Ganta Afeshum woreda.

Methods: Data was collected, compiled and analyzed using Microsoft Excel 2016. Frequency distribution, table and figure were employed. The data was collected by interviewing and observational checklist to assess the existing health documents and wall charts**.**

Result: 48652(49%) of the population of Ganta Afeshumwereda were males and 50638(51%) of them were females in 2009 E.C. From the total population in that year 2889(2.9%) of them were <5 years old and 3475(3.5%) were ≥65 years old. 23,313(23.48%) of the population were females in reproductive age between 15-49 years old. The population growth rate of Ganta Afeshum wereda in 2009 is 0.94%. The sex ratio male to female of the woreda is 0.96:1. The dependency ratio of the woreda in 2009 was 89.4%.

Discussion: The contraceptive prevalence rate of the woreda is 32.9% and ANC_1 and ANC_4 coverage for the woreda was 63.1% and 47.9% respectively. The coverage of skilled delivery was 34.9%. The EPI coverage for pentavalent one and pentavalent three was 65.2% and 60.8% respectively. The detection rate for all form of TB and cure rate of pulmonary TB was 29% and 87.5% respectively.

Conclusion and recommendation: From this health profile, assessment data analysis the MCH and EPI coverage is low comparing to the regional and national coverage. The TB detection rate was very low but the TB treatment cure rate was higher than the regional. The woreda health office should work hard on maternity and child immunization to increase the coverage of the services given.

Introduction

Health profile is a system of collecting and summarizing health and health related events, demographic, socioeconomic, Political and cultural aspect of a particular district under study. It is holistic approach, of gathering information, in the community using epidemiological statistics tools. The preparation of health profile provides summary of health information to support local authority members, officers and community partners to lead for health improvement (1).

Health profile description of a particular district is fundamental to provide baseline information about health and health related events of that district with their major determinants, diseases burden, and thereby enable to communicate health related information for those who need to know and is essential for generating evidence-based information for planning, implementation, evaluation of health programs by incorporating the result in their future plane (2).

Globally, a health profile addresses the health of people which includes not only infectious disease but also chronic and non-infectious as well as age related illnesses and the health related conditions. The planning and management of health services in developing countries often proceed within an environment of inadequate information about the health status of the population served and the occurrence of important determination of health (3).

It engages health care suppliers, health maintenance facilities, health related activities and governing bodies and broader communities to provide data that facilities dialogue about community health that can identify targets for the future and help for making informed conclusion and reducing health disparities among communities.(3)

Current population of Ethiopia has been estimated to be 99,391,000 with an average household of 4.6 and a population density of 88/$km^{2.}$ Total fertility rate of the country is 4.59% with annual population growth of 2.48% and male to female ratio of 1:1.03. The younger population under 15 years account for 45%of the total population and elder population above 65 years old is estimated to be 4%. Currently, 19.3% the population resides in urban area (4).

Infant mortality rate (IMR, U5MR, and MMR of the country is 28/1000, 67/1000 and 420/1000 live births respectively (EDHS 2016). National literacy rate is 49.1% (5).

Tigray region is the northern most of the nine regions of Ethiopia. At 96.55% of the local population, the region is predominantly inhabited by the Tigrigna /Tigray people. Amhara and Agew inhabitants account for 1.63% and 0.19% respectively. Total population of region is 5,128,532 with average household size of 4.4 and population density of 95.61/$km^{2.}$ IMR, U5MR and MMR in the region is 67/1000, 28/1000 and 226/100000 live births respectively. Adult literacy rate of the region for men is 67.5% and for women 33.3 % (6).

Health data in Ganta Afeshum woreda is important for advocacy, program planning, and implementation and evaluation of health care including most important at the woreda level. Source of data element that are collected were from different sectors of Ganta Afeshum woreda like health office, agriculture, education office, public relationship finance, water and energy and woreda administration office. Moreover, ecological conditions /geography and climate /demographic data, basic infrastructure of the woreda, socio economic status of the woreda, major health indicators, vital statistics and other related information were elements of the data to address important public health problems and to facilitate effective public actions in the woreda.

Health profile assessment in Ganta Afeshum woreda, can be used as the foundation to assess health and determinants of health in the community which will serve as starting point to stimulate public interest, political commitment and strengthen joint efforts to improve health status of the community. It can also be a basis for suggesting further small scale research in to local health problems and their possible solution.

Rational of the study

Health profiles are designed to give an easily accessible snapshot picture of the community's health and describing health profile is helpful to understand the current health of population and of the many aspects of the community's life with the availability of basic services that influences health. It is very important to understand the demographic, socioeconomic status, morbidity, mortality and other health and health related indicators in the given woreda. Health profile description is conducted in Ganta Afeshum Woreda help planners and programmers to plan and deliver the most effective care to those in greatest need, help to plan apply the principles of equity and social justice in practice, work collaboratively with the community, other professionals and agencies to determine which health issues cause greatest

Concern and plan interventions to address those issues. It is designed to help local government and health facilities to make decisions and plans to improve local people's health and minimize Health inequalities.

The health profile assessment provides a guidance on how healthy community can address the local health problems they face. Profiles can include a wide range of information, including population characteristics, health service data, environmental and social information. The purpose of collecting health profile data is to identify strategies that improve the access of every member of the community to effective health care and health promotion of the community and these contribute a gap in planning and taking evidence-based information for action**.** Community health assessment often yields a long list of public health needs, issues and problems.

OBJECTIVE

General objectives

To assess the health and health related issues and indicators in Ganta Afeshum woreda**.**

Specific objectives

To identify key characteristic of the population of Ganta Afeshum woreda

To document baseline health information about the woreda

To assess basic health services and the health status of the woreda

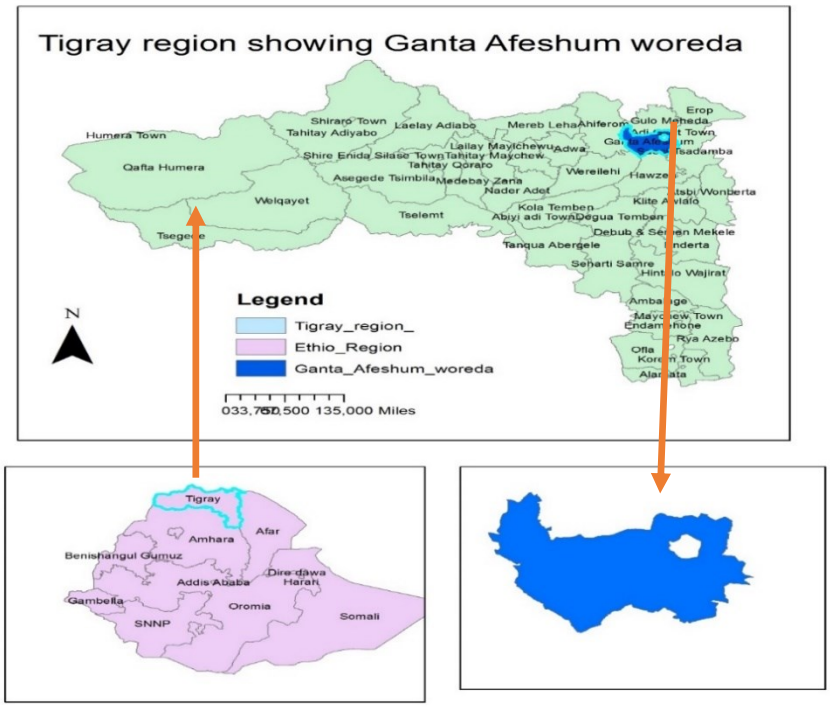
To assess health determinants of the population

To identify problems for priority setting

Methods and materials

Study period and area

Health profile description was conducted in relevant sectors of Health, Agriculture, education, water and energy, Social Affairs and Finance in *Ganta Afeshum woreda*, one of the nine woredas of eastern zone of Tigray Region which is 121 kilometers far from Mekelle and *905 km from Addis Ababa. No information was obtained how the woreda is nominated and when it was established. We conducted the health profile assessment in in one-year data of the woreda health office, which had a total population of 99,290 in 2017. The data collection was done from February 07-12-2017*



*Map 6: **Map of Tigray region showing Ganta Afeshum woreda, January 2017.***

Study Design

Cross-sectional study design was conducted from February 07-12/2017 in Ganta Afeshum woreda**.**

Source of population

The source of population in this health profile assessment is the population of Tigray in 2017.

Study population

The study unit in this study are woreda Ganta Afeshum health office, educational office, agriculture office, water supply office and administrative office of the woreda.

Sample size determination

The whole population of Ganta Afeshum was taken to study the health profile of this woreda.

Sampling procedure

Under TRHB field base, there are 52 woredas. **T**he procedure to take the sample we used a simple random sampling method from the 52 woredas by lottery methods to select woreda GantaAfeshum.

Variable specification

Age	MCH
Sex	EPI
Health institutions	TB
Name of Kebeles	PMTCT

Data collection procedures and Instruments We have written an action plan and checklist for health profile assessment to our mentors and field supervisors. In addition, we informed our nearby supervisor in the region to write us formal letter to allow collecting the data from the respected sectors. Regional health bureau has decided to write a formal letter to get permission for administrative and health office the place where we designed for data collection. We conducted an interview to those concerned body by using structured questionnaire as well as we used an observational check list to assess the existing health and health related documents and the posted charts on the board and wall that displayed the required health statistics

Data quality control

To ensure data quality of the health profile assessment of the woreda the checklist we used was edited repeatedly before administered and verified by other outside examiners to improve and simplified the checklist.

Data analysis and interpretation

Data was collected based on the checklist designed; compiled and analyzed using Microsoft Excel, distribution, table and figure were depicted.

Operational definition

Pentavalent vaccine: A vaccine, which consists of Pertussis, Tetanus, Diphtheria, Hepatitis B virus and Haemophilus influenza type B.

EPI: An extension of immunization program to all under one-year children in the population.

Dependency ratio: The relation between the potentially self-supporting portion of the population and the dependent portions at the extremes of age.

TB case detection rate (all forms of TB) is the percentage of all new forms of TB cases notified among the total number of TB cases estimated to occur in the area.

TB treatment success rate is the percentage of a cohort of new all form of TB cases registered in a specified period that successfully completed treatment with bacteriologic evidence of success ("cured") or without ("treatment completed").

Pulmonary TB cure rate is the percentage of a cohort of new smear-positive TB cases registered in a specified period that were cured as demonstrated by bacteriologic evidence.

PMTCT: It is a strategy developed to prevent HIV transmission from mother to child during pregnancy and labor.

Ethical consideration

A legal letter was written from Tigray regional health bureau to Woreda Ganta Afeshum health office and the other sectors in the woreda to get official permission from the Woreda to collect the required data of health profile assessment in 2017/8

Dissemination of the result

The result of this study will be submitted to Addis Ababa University College of health science, school of public health, department of field epidemiology in partial fulfillment of Master of Science in field Epidemiology. Moreover, it will be disseminated to the woreda administrator, woreda health office, and to the concerned bodies accordingly.

Result

Geography and climate

Ganta Afeshum woreda is one of the nine woredas of the Estern zone of Tigray region, which is located at 118 km far from Mekelle and 901 km far from Addis Ababa. Ganta Afeshum is bordered on the south by Hawzen, on the west by the Central Zone(Ahferom and Wer'eLeke woredas), on the north by Gulomakeda, and on the east by SaesiTsaedaemba. Since the town of Adigrat split off GantaAfeshum as a separate woreda, it is surrounded by this woreda. There are several local monolithic churches in this woreda, which include Mariyam Si'it and Samuel Mayaba

(abandoned as of 1970). High points in GantaAfeshum include Mount Alequa (3290 meters) and Mount Undale, part of the Harat Mountains.It has a total area of 530.35 km^2 .10287 (19.4%) hectare is used for farming.

Table 18: ***Topography of GantaAfeshum woreda, Tigray, Ethiopia, February 2018***

No	Description	Area (km^2)	Area (%)
1	Flat	126.4	23.7
2	Gently Sloping	119.1	22.5
3	Moderately Steep	107.1	20.2
4	Sloping	83.1	15.7
5	Strongly Sloping	53.3	10.1
6	Very Gently Sloping	30.7	5.8
7	Very Steep	10.3	2
Total		530.53	100

Ganta Afeshum woreda is found at latitude of 14º6' to 14º23 N and 39º12'30" to 39º37 E longitude. This woreda has 20 tabias and a total area of 530.3 km^2. It has a low land and semi-low land weather condition and with an altitude of 1800-3000 meter above sea level. It has 450-650-millimeter annual range of rain fall and annual minimum temperature of 4^0c, medium 12^0c and 22^0c high. The woreda gains rain during summer season. The weather condition is suitable to live for humans and breeding of animals.

Administrative and political issues

Ganta Afeshum woreda 19 rural and 1 urban kebelle in which the central administrative office for all sectors is found in Adigrat town.

The government has assigned a political leaders and technical staffs for each sector which are responsible to their duties. They experienced an intersectoral collaboration to achieve the strategic plan. According to the observational checklist, the health sector experts conducted a supportive supervision in a quarter basis every year which was designed to strengthen the capacity of health workers and to achieve high coverage of all activities.

In addition to this woreda created a women development army at all kebelles who are organized based up on five women in one group. Those five leader women have responsible to lead another five women each to facilitate the overall health activities and other administrative issues to solve the problems that faced to their neighbor's community to achieve health related activities in the woreda mainly on maternal and child health on the national slogan no one mother die due to pregnancy and labor related.

Population and population structure

In Ganta Afeshum, there are 20 tabias. In this woreda, the population growth rate was 11.6% in 2009 and 0.94% in 2010. The total population of females were higher than males which indicated a sex ratio of (male: female) 0.96:1.

According to the regional conversion factor used to compute age groups, the total population of female reproductive age were 23313, the pregnant mothers were 3416, and none pregnant in the childbearing age was 19918. The dependency ratio in GantaAfeshum in 2017 was 0.89:1.

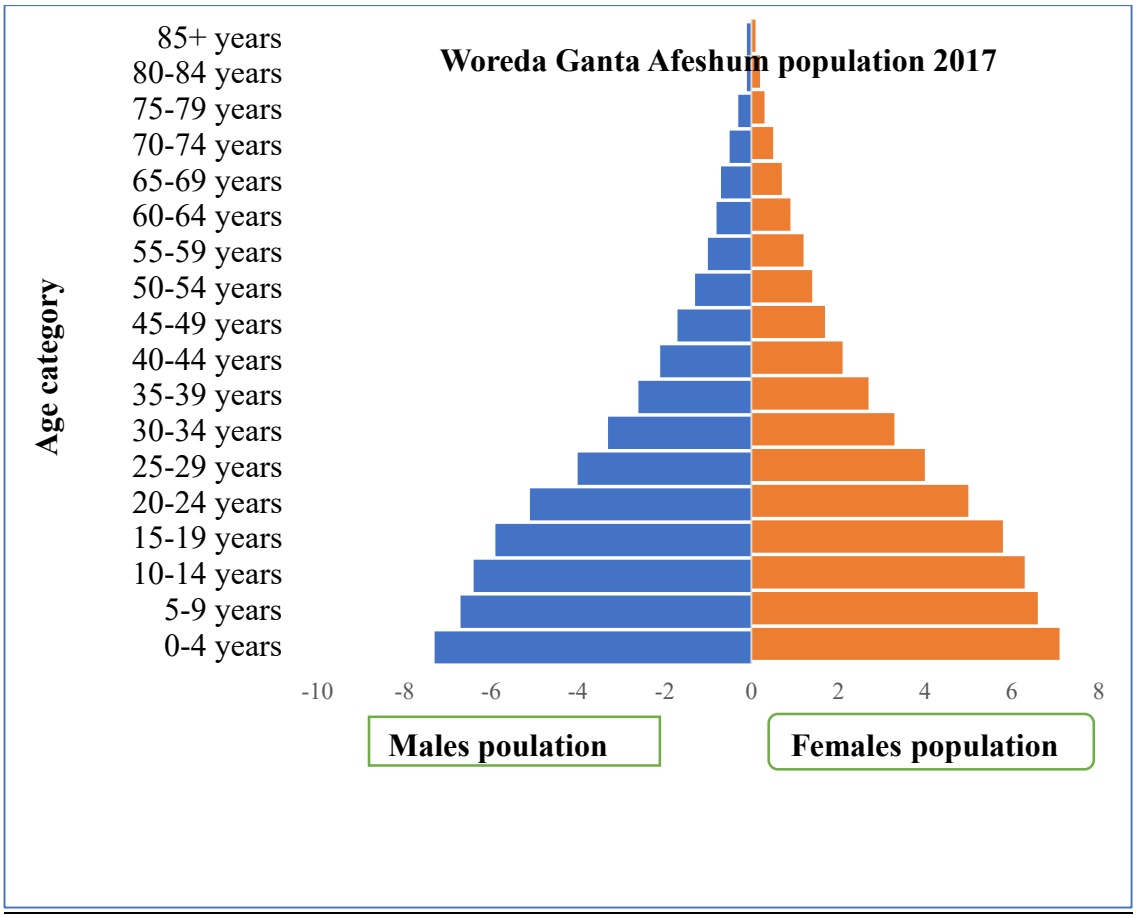


Figure 17: *Socio Demographic Distribution of Population, Ganta Afeshum februay 2017*

Economical status

The community of Ganta Afeshum woreda is mostly dependent on agriculture harvesting a variety of crops like, wheat, barley, maize and beans. 19.4% the area of Ganta Afeshum is used for farming and there are 17921 people who dependent on agriculture and the woreda's land production is 12.6 quintal per hector. The total production from agriculture by irrigation in 2017 was 86099.25 quintals. There are also 30638 people whose economy depends on husbandry. In the woreda 1.81% of the population are permanent governmental employed. Out of this 966 of them are males and 825 of them are females. The data of average annual individual income level of the woreda is not available. (on process annually).

Education

There are 16 schools of first cycle (1-4 grade), 35 schools of 5-8 grades, 4 schools of 9-10 grade and 1 school of 11-12 grade in this woreda. In 61.8% of the schools' library is available which can help the students to read in their break time but only 11(32.4%) of the schools have library professionals.

*Table 19**: Number of teachers by sex in woreda Ganta Afeshum 2017 Tigray, Ethiopia January 2017***

School type	Male sex	Female sex	Total
Primary	316	393	709
Secondary	115	45	160
Total	431	438	869

In woreda Ganta Afeshum district 18.41% of the teachers are working in secondary schools and the majority 81.59% are in primary schools. From the total 49.6% of them are male teachers and 50.4% of them are females. Almost the proportion of male to female in this district is equal

Table 20: Number of students in the woreda from registration up to the completion of school by sex in woreda Ganta Afeshum January 2017 .

School Grade	On enrolment			Currently on Education			Dropout rate of students			
	M	F	Total	M	F	Total	M	F	Total	%
1-4	4474	4230	8704	4408	4119	8598	61	30	91	1.04
5-8	4807	4662	9469	4682	4616	9298	92	39	131	1.38
1-8	9299	8874	18173	9090	8806	17896	153	69	222	1.22
9-10	1350	1326	2676	1274	1287	2561	21	12	33	1.23
11-12	123	150	273	116	141	257	4	2	6	2.19
9-12	1473	1476	2949	1390	1428	2818	25	14	39	1.3
1-12	10754	10368	21122	10480	10234	20714	178	83	261	1.23

25. 5% of the schools have pipe and hand pump water supply. The rest schools have no portable water supply. 69.1% of the schools have latrine. There are 35 schools having HIV club which participate in HIV and related conditions by the school youth.

Basic infrastructure and development of facilities

Among the total 20 kebelles of the woreda, 7(35%) of them have an electric power supply which gives a 24 hours service in 2017. In addition to this, the numbers of kebelles that have a permanent and temporary transportation access to their central administrative office were 19 kebelles. This means there is no routine way of transporting but this road capable of transporting for cars and ambulances. There is no telephone (cable) service in each kebelle but mobile network access is available in all the kebelles of the woreda except one. In the woreda there are four ambulances currently giving service to the community.

And there are 583 women health developmental armies that give service in the community health related activities and other administrative issues. Each WHDA constitutes a member of five women who actively participate in the community, especially in child and maternity health, environmental sanitation and enhanced nutrition action in each household and neighbors.

From 2017-2018 there are 16102 eligible populations for health insurance member enrolment. But out of this number 9815(61%) people paid the annual dues of 2018 and 2179(13.5%) are exempted for free and 4108(25.5%) have not yet paid. In Ganta Afeshum woreda there is no NGO supporting the woreda. The source of water for human consumption in this woreda is obtained from ground and surface water sources. Chlorination for water sources is done every quarter in this woreda.

Disaster situation

Last year in the woreda there was a drought for shortage of period. As a result, there was food insecurity, 2419 moderate malnourished and 224 severe malnourished under five children were screened from a total 8179 children screened for nutritional status. The local government supported the affected three kebelles by food provision.

And also, there was an outbreak of cholera in the woreda due to shortage of water supply to drink. Four cases of cholera (two males and two females) were obtained and treated well on admission and recovered. The disease outbreak was controlled immediately by participating the woreda's (RRT) rapid response team in community giving education how to prevent and control the diseases occurrence.

Primary Health service

Health service and financing

Table 21: ***Budget allocation of Ganta Afeshum woreda, Tigray region, 2007- 2010EFY***

Source	Amount in Birr 2007	Amount in Birr 2008	Amount in Birr 2009	Amount in Birr 2010
Total district budget	75203533.49	83847165.90	96961942	122741573
Allocated to health sector	6872996.32	6878170	9496983.60	10800915.80

Health facilities

Ganta Afeshum woreda has expanded a health posts and health centers in the woreda to fulfil the interests of the community health. The woreda also allocated budget for the operation of all activities in the sector. It has five health centers and 20 satellite health posts and assigned health professionals and supportive staffs to undergo all activities. However, the people travel far away from their residence to find hospital to Adigrat.

Table 22: Health professionals in woreda Ganta Afeshum, Tigray, Ethiopia, January 2017

SNO	Health profession	Male	Female	Total
1	IESO	1	0	1
2	Health officers	4	6	10
3	Laboratory technicians	2	3	5
4	Pharmacy technicians	4	3	7
5	Nurses	11	19	30
6	Midwives	0	14	14
7	Environmental health	1	1	2
8	HIT	3	1	4
9	HEW	0	40	40
	Total	26	87	113

As we can see in the table the health professionals assigned in each health center is not standard in all professional categories.

Table 23: Health professional and health facility to population ratio in Ganta Afeshum woreda Tigray, Ethiopia 2017

SNo	Health professional	Ratio	standards
1	Integrated emergency surgery officer to population	1:99290	NA
2	Health officer to population	1:9929	NA
3	Nurse to population	1:3310	1:5000
4	Laboratory to population	1:19858	NA
5	Pharmacy to population	1:14184	NA
6	Midwife to population	1:7092	1:5000
7	Environmental health to population	1:49645	NA
8	HIT to population	1:24823	NA
9	HEW to population	1:2482	1:2500
10	Health center to population	1:19858	1:25000
11	Health post to population	1:4965	1:5000
12	WDA to population	1:34	1:30

Disease occurrence

Table 24: **Ten top leading cause of morbidity among adults in Ganta Afeshum, Tigray, Ethiopia 2017**

S.no	Disease	Count	%
1	Plasmodium vivax Malaria	3232	23.36
2	Acute upper respiratory infections	1951	14.1
3	Parasitic infections	1551	11.21
4	Trauma and injuries	1522	11.0
5	Other unspecified disease	1228	8.88
6	Acute febrile illnesses	1159	8.38
7	Malaria confirmed plasmodium falciparum	990	7.16
8	Dyspepsia	815	5.89
9	Pneumonia	712	5.15
10	Disease of the musculoskeletal and connective tissues	675	4.88
	Total cases	13836	100

Table 25: Five top leading cause of morbidity among pediatrics in GantaAfeshum Tigray, Ethiopia, January 2017

S.N	Disease	Count	%
1	Diarrhea non-bloody	1204	25.58
2	Pneumonia	848	18.02
3	Other un specified diseases	596	12.66
4	Acute upper respiratory tract infections	496	10.50
5	Malaria confirmed other than plasmodium falciparum	459	9.75

There are exempted services in Tigray region as well as in woreda Ganta Afeshum. These services are

- ANC Safe Abortion service
- Delivery Immunization service
- PNC TFU/OTP
- Family planning Under five examinations
- TB diagnosis by AFB and treatment and Leprosy

MCH and EPI

The target population for ANC, PNAC, BCG, Pentavalent vaccines, pneumococcal vaccines, measles vaccine and TT2+ for pregnant mothers. The annual achievement of the activities is done from the target of the annual plan in 2017 below in figure. The TT vaccination data for all pregnant and non-pregnant mothers was not available. The dropout rate for measles vaccine in 2017 was 6.7%.

Table 26: Maternal health coverage in Ganta Afeshum woreda, Tigray, Ethiopia, February 2017

Activities	Annual plan	Achievement	Percent (%)
Family planning	5339	1724	32.9
ANC 1	3615	2282	63.1
ANC4	3615	1730	47.9
PNC	3075	1724	56.1
Skilled delivery	3075	1074	34.9

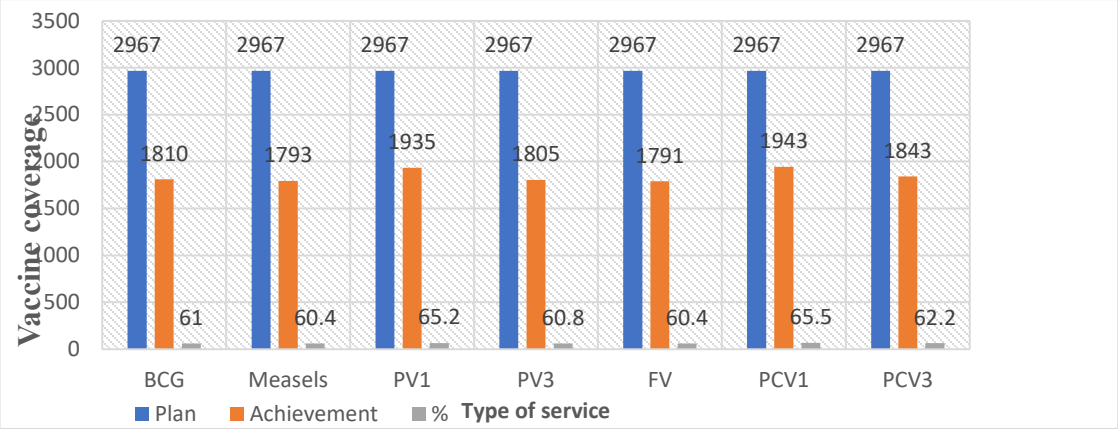


Figure 18: EPI coverage in Ganta Afeshum woreda Tigray, Ethiopia, January 2017

HIV/AIDS

In this woreda there are two health centers that give ART services. In 2009 E.C there were 5248 people screened for HIV. Out of the total screened 490 persons were screened on VCT, 3195 of them on PTIC and 1563 of them were on PMTCT. And from the total 1111(21.2%) of them were males and 4137(78.8%) of them were females. 5 positive people were found from VCT, 8 from PTIC and 2 from PMTCT and two infants of HEI whose status not yet known. The prevalence rate of HIV positive in the woreda in the year was 15(0.29%) which is below the prevalence of region and nation.

Currently there are 170 people on ART, 17 of them are pediatrics and 153 of the are adults above 15 years old. Data for Condom distribution was not found.

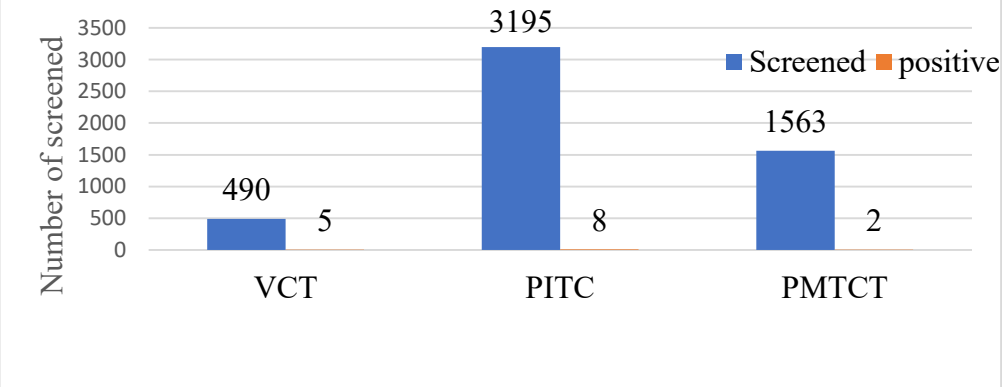


Figure 19: ***People screened for HIV,Ganta Afeshum woreda, Tigray February 2018***

TB/Leprosy

In 2017/8, there were 11 pulmonary positive TB, 34 pulmonary negative and 26 extra pulmonary TB patients. The detection rate of all form of TB was 29%. The treatment outcome of TB patients on the same quarters was done for 8 pulmonary positive cases, 30 pulmonary negative cases and 27 extra pulmonary. TB suspected cases referred by the community to health facilities were 16 patients. (247 TB cases per 100000 populations of all form of TB).

Table 27: Treatment outcomes of all form of TB cases in Ganta Afeshum 2017, Tigray, Ethiopia

Type of TB	Cure	Completed	LTFU	Died	defaulted	Moved to MDR TB
Pulmonary positive TB	7	1	0	0	0	0
Pulmonary negative TB	-	30	0	0	0	0
Extra pulmonary TB	-	25	0	2	0	0

In this year the treatment outcome for pulmonary TB was 87.5%, treatment success rate was 96.9%, and death rate was 3.2%. No data was found for leprosy cases. 43 males and 22 females Were screened for HIV and two males and four females were found HIV positive. The prevalence of HIV positive among TB cases was 9.2%.

Malaria

In this woreda in four areas malaria is endemic disease. For this reason, from 4681 total malaria cases 990(21.1%) confirmed by laboratory/RDT plasmodium falciparum and 3232(69.05%) cases confirmed plasmodium vivax in adults >15 years. 459(9.8%) cases confirmed plasmodium vivax in under five children. In 2017 ITN was not distributed to the community in the malaria endemic areas during the assessment period. The chemical spray (Deltamethrine) for residential homes was not done in the area during assessment.

Public health nutrition

The CBN, TSF programs and OTP sites are available in all twenty-health posts and five healthCenters found in GantaAfeshum woreda. But there are only two health centers giving TFU service in the woreda. Those which have not the program of TFU referred to the nearby health centers and hospital Adigrat. 8179 children screened for nutritional status in 2017 in the woreda. Out of them 2119 of them were MAM (moderate acute malnutrition) treated by TFS and 224 SAM (severe acute malnutrition) treated on OTP and TFU.

Hygiene and Environmental sanitation

There are 20361 households in the woreda, out of them 99.7% fulfilled the elements of health extension activities.

Table 28: **Hygiene and sanitation of households in Ganta Afeshum woreda, Tigray, Ethiopia, February 2017**

List of Activities	Plan	Achievement	%
Number of households who fulfilled the component of health extension activities	20361	20311	99.7
Number of households graduated with new latrine	149	97	66
Number of households who got support and follow up	20361	15271	75
Number of households utilized latrine	20361	19746	96.9
Number of households with complete hand washing (water& soap)	20361	16199	79
Availability of hand washing facility and practice hand washing with water and soap continuously	20361	15440	76
Number of developmental army/team declared ODF	596	583	98
Number of kebelles declared ODF	20	18	90
Number of households with complete solid waste disposal site	20361	20311	99.7
Number of households with complete liquid waste disposal site	22361	16295	80

Discussion

The total area of woreda Ganta Afeshum is 530.35 km^2 which is 0.048% of the area of our nation, Ethiopia which has a total area of 1.1 million km^2. The woreda has a semi highland whether condition which is suitable for human living and animal breeding like sheep and goats.The population live at around 187 people per kilometer, which is less than San Francisco at which the average population was 17,081 per square mile.

The annual growth rate of this woreda was 0.94%, which is equivalent to Alexandria, which has annual population growth rate of 1% and lower than our nation and San Francisco with 2.7% and 3.7% annual growth rate respectively. The female population is higher than the male population in the woreda with a male to female ratio of 0.96:1 and the dependency ratio is 89.4% higher than the national, which was 80%.

The overall school dropout rate in 20217 in the woreda from grade 1-12 was 1.23% which was high among female students. The sex of the teachers working in the woreda were almost proportional

that is females participate equally. 25.5% of the schools have water supply to drink their students, this is less water supply coverage, which needs improvement.

From 16102 eligible populations for health insurance member enrolment only 61% were paid annual dues of 2017. The other 25.5% accept the exempted for free the need to pay and being member of the health insurance.

The nurse to population ratio and midwife to population ratio of woreda Ganta Afeshum was below the national standard. However, the HEW and Health center to population ratio is similar to the national standard. The first three ten top diseases in adults in the woreda are malaria vivax (23.4%), acute upper respiratory infection (14.1%) and parasitic infections (11.2%)**.**

Where as in under five children the first three five top diseases were diarrhea non-bloody (25.6%), pneumonia (18%) and other unspecified disease (12.7%). In the region in 2017 the first ten top disease at OPD were AURTI (10.8%), diarrhea all form (8.8%) and malaria all form (8.8%).

There is low maternity and child health service coverage in the woreda like that of MCH and EPI for all antigens. Malaria is the first ten top disease in the woreda in adults as compared to other diseases. In 2017, there was an epidemic of cholera in the Woreda as result four persons were diseased. No data about TT immunization coverage. There is no vital registration book in the woreda.

HIV prevalence rate of the woreda was 0.29% in 2017, which was below the national and regional level. The TB detection rate for all forms of TB was 29%, which was below the regional, which was 79%, and the cure rate was 87.5%, which was higher than the regional (72%). The death rates among all forms of TB cases was 3.1% which was lower than the regional (3.6%) and HIV prevalence among TB cases was 9.2% which was equivalent to the regional which was 9.4% in 2017.

The contraceptive prevalence rate (32.9%) in the woreda was slightly lower comparing the regional (35%), and national (35%). (DHS 2016). However, ANC_4 (47.9%) was higher compared to the national average 32 %. (DHS 2016). The coverage of skilled delivery (34.9%) was similar with the national coverage (35%) but lower than the regional, which is (69%). (DHS 2016).

The post-natal coverage for the woreda was 56.1%, which was higher than the regional and national 45% and 17% respectively. The EPI coverage was similarly very low for Pentavalent one (65.2%) which was below the regional (92%) and national (73%), pentavalent three (60.8%) lower than the regional (81%) but higher than the national (53%), measles (60.4%) was higher than the national (54%) but lower than the regional which is 80%. The pentavalent three-dropout rate for the woreda was 6.7%, which is lower than the regional (12%) and national 27% respectively.

Limitations

The vital statistics registration book is not available in the woreda; as a result, we could not calculate NNMR, IMR, CMR, CDR and CBR for the woreda.We could not know the annual individual income level; the GDP and GTP for the woreda since the agriculture office have not yet calculated at the time of assessment.

Conclusion

- The contraceptive prevalence of the woreda was low
- Low immunization coverage for all antigens
- The pentavalent thee vaccine dropout rate was 6.7%
- Plasmodium vivax is the first 10 top disease in the woreda
- The nurse/midwifery to population ratio of the woreda is below the standard
- HEW and Health center to population ratio is similar to the national standard.
- Detection rate of all forms of TB as well as pulmonary positive TB were low in the woreda.
- The overall school dropout rate in 2017 in the woreda from grade 1-12 was 1.23% which was high among female students.

Recommendation

- Since ANC ($_4$) is measure of quality of care, the women developmental armies should strengthen and encourage working hard in maternity related activities.
- The child immunization for under-five children should be strengthen and increase its coverage.

- Continuous health education should be given for the community to increase the awareness towards the family planning, immunization and ANC, skilled delivery and post-natal care.
- TT immunization should be given for all childbearing age mothers.
- Health extension workers should spend their time with the community and strength their work related to MCH and environmental sanitations.
- Children in under-five were suffered from non-bloody diarrhea, so health education should be given on environmental sanitation, personal hygiene, safe water and food sanitation.
- Since malaria is endemic to some areas in the woreda, bed net should be distributed to the community on time.

Table 29: Action plan for Problems identified in Ganta Afeshum woreda, February 2018

No	Health activities to be done	Responsible person	When to start to do	Output
1	Low immunization coverage for all antigens	MCH expert, EPI focal	January 30/2018	Health education and community mobilization
2	High measles vaccine dropout rate (6.7%)	MCH expert, EPI focal, WDA	January 30/2018	Health education and community mobilization
3	Low skilled /institutional delivery (47%)	MCH expert, Midwifes, WDA	January 30/2018	Health education and community mobilization
4	*Low pulmonary positive TB detection rate (10.3%)*	TB/HIV expert, TB/HIV focal person, laboratory experts	January 30/2018	Health education and community mobilization, community screening
5	Low contraceptive prevalence Rate	MCH expert, midwifes	January 30/2018	Health education and community mobilization,
6	High Female school dropout rate	School director , parents	January 30/2018	community mobilization and collaboration with female affairs

Table 30: problems identified and prioritized Ganta Afeshum woreda, eastern zone of Tigray , february 2018

	Identified Problems	Relevance	Availability of information	Urgency of the problem	Feasibility	Political acceptance	Applicability	Ethical acceptability	Total	Rank
1	Low skilled /institutional delivery (47%)	3	3	3	2	3	3	3	20	1
2	Low immunization coverage for all antigens	2	3	2	3	3	3	3	19	2
3	Low contraceptive prevalence rate	1	3	1	1	2	2	2	12	3
4	Low pulmonary positive TB detection rate (10.3%)	1	2	1	2	1	2	2	11	4

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CHAPTER 5: SCIENTIFIC MANUSCRIPT FOR PEER REVIEWED JOURNALS

5.1 EPIDEMIOLOGICAL LINKED MEASLES OUTBREAK INVESTIGATION IN ALAMATA TOWN, SOUTHERN ZONE OF TIGRAY, ETHIOPIA JANUARY 2019.

Abstract

Background: Measles is highly contagious, vaccine preventable viral disease most affecting under five children. In January 14-2019, an index case was detected in Alamata hospital and we investigated the outbreak, to identify possible risk factors and to characterize it and to implement public health control measures.

Methods: We conducted unmatched case control study with 32 cases and 96 controls with a ratio of 1:3 methods in terms of their ages, sex and residence area using non-probability purposive sampling from January 14 to March 08-2019.We used line lists and standard questionnaires to collect the data. We conducted the study by defining suspected cases of measles as any person presenting with fever and maculopapular rash and plus one of the three Cs (cough, coryza and conjunctivitis. To decide the significance of the association, we used p-value and 95% confidence interval for odds ratio.

Result: We identified 32 suspected cases of measles. The overall attack rate was 4.9/10000 population and it was high in under five male children. On multivariate analysis measles illness was statistically significant with contact history with active measles case [(AOR=3.584, 95% CI (1.424, 9.024). Being unvaccinated for measles vaccine ((AOR, 3.520, CI, 1; 225, 10.111) and becoming sick by other diseases [AOR=3.031, CI (1.114, 8.248)] were identified risk factors associated with measles contraction.

Conclusion: History of Contact to suspected measles cases was the possible risk factors and we recommended that isolation active case is necessary and continuous active surveillance should be conducted in the woreda.

Key word: Measles outbreak, Alamata town, February 2019

Introduction

Measles is highly contagious outbreak-prone acute viral diseases characterized by maculopapular rash. The virus is transmitted via the respiratory route (aerosolized in respiratory droplets) or by direct or indirect contact with nasal and throat secretions of infected persons. Measles virus is particularly contagious, with >90% secondary attack rates among susceptible individuals(1).

Measles remains one of the leading causes of death among children worldwide. It is caused by an RNA virus of the paramyxoviridae family which belongs to the genus morbillivirus. Its incubation period ranges from 7 to 21 days (rash appears after 14 days of exposure). In 2012, an estimated 122 000 deaths caused by measles infections were reported globally(2).

Among childhood diseases measles is a highly contagious disease that can be effectively prevented through vaccination, but it results in a significant public health impact when there are displaced populations, less sanitation and poor nutritional systems due to their characteristic mass population displacement, high population density in camps and low measles vaccination coverage among children(3).

Measles disease is considered endemic especially in the developing countries with a peak of transmission from October to March. Measles carries with it high morbidity and mortality especially when clinical cases are not properly managed(4).

Approximately 30% of reported measles cases have one or more complications. Complications of measles are more common among children less than 5 years and adults over 20 years of age. Relatively common complications of measles include otitis media, laryngo-tracheobronchitis, pneumonia, and transient suppression of cellular immunity(5).

The measles vaccine is one of the most cost-effective health interventions developed. Measles occurred in epidemic cycles and an estimated three to four million persons acquired measles each year(6). Globally, there was an estimated 2.6 million measles death/year in 2000 and 145,700 in 2013(400 deaths/day) decreased by 75% from 2000-2013(7).

Generally, in Africa, the measles case fatality rate ranges from 3 to 5 %, reaching up to 30 % during severe outbreaks and outbreaks in closed communities such as refugee camps. Measles continues to be a major public health problem in Africa, causing an estimated 28,000 deaths each year(8).

In Ethiopia, 348 cases had been confirmed and 40 outbreaks reported in Addis Ababa, Afar, Amhara, Oromia, Southern Nations Nationalities and Peoples, Somali and Tigray regions, as of 31 March 2017. The majority of the cases (39 per cent) have occurred among children under five years. As of week 22, 2017 there have been 1,981 reported cases of measles across the country, including 961 confirmed cases (420 laboratory confirmations, 490 epi-linked and 51 clinically compatible cases)(9). Studies done on the perception of the rural community on causes of measles revealed that both natural and supernatural forces were mentioned as a cause of measles. The distinction between the two explanations was not clear. Natural explanation of illness is somehow related to a supernatural cause as an ultimate reason. Of the vaccine preventable diseases, measles is more associated with supernatural causes than others(10).

Estimates of measles-related deaths have been considered a crucial indicator to evaluate the progress of any nation towards measles elimination. The global estimates for the year 2013 suggest that close to 0.14 million deaths were attributed to measles, accounting for nearly 16 deaths each hour. Study findings have indicated that more than 50% of the global measles-associated deaths were reported in India alone(11).

Measles vaccination given to susceptible contacts within 72 hours of exposure as post exposure prophylaxis may protect against infection and induces protection against subsequent exposures to measles. Vaccination is the intervention of choice for susceptible individuals older than 12 months of age who are ex- posed to measles and who do not have a contraindication to measles vaccination(12). Demo- graphic health survey data shows in low and middle income countries that only 50% of the population vaccinated for measles and measles outbreak evidenced in these countries during 2016; 4395, 1500, and 162 measles cases occur in Ethiopia, South Sudan and Kenya, respectively.(13) Ethiopia has documented an increase in reported measles cases from 3,332 in 2002 (the year of the first sub-national catch-up measles SIAs) to 17,745 in 2015.(14)

METHOD AND MATERIALS

We conducted measles outbreak investigation in Alamata town from January 14-March 8/2019. We started the investigation to verify the outbreak, to identify the possible causes and to intervene the public health control measures. we started to collect the data from line listing of cases and OPD registration book in under five clinics in the health center and hospital. The index case was found at Alamata hospital. The index case had history of traveling to neighbor woreda 18 km far from the town the so called Ofla woreda where an outbreak of measles case was occurred. The index case a four-year age has a history of unvaccinated to measles who defaulted for vaccination due to time elapsed. We started to collect the data by using structured questionnaires face to face interview with mothers, guardians and cloth relatives of the measles case. The data was collected by defining suspected measles cases, as any child with maculopapular rash with fever associated with cough, coryza or conjunctivitis. We conducted a 1:3 ratio of case control study by including all 32 cases and 96 controls. We selected controls by simple random sampling a lottery method. We collected six serum samples and sent to national /EPHI laboratory for confirmation. Unfortunately, all the six samples discarded might be due to inadequate sample. Active surveillance was critically enhanced to capture measles cases in the town. Health education was given to schools and community. The sample was returned after the outbreak ended. We entered data in to SPSS version 21 to describe results.

Case definition

Suspected measles case: Any person with fever and maculopapular rash (non-vesicular) rash and cough, coryza or conjunctivitis OR any person in whom a clinician suspects measles.

Confirmed measles case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiologically linked to confirm Cases in an outbreak.

Epidemiologically linked cases: A suspected measles case that has not had a specimen taken for serologic confirmation and is linked (place, person and time) to a laboratory confirmed case; i.e., living in the same or in an adjacent district with laboratory confirmed case where there is a likely hood of transmission; onset of rash of the two cases being within 30 days of each other.

Measles associated death: for surveillance purpose, a measles death is defined as any death from an illness that occurs in a confirmed case or epidemiologically linked case of measles within one month of the onset of rash.

Inclusion criteria

Case: Any resident of Alamata town who have sign and symptoms of measles from January 14 to March 12/2019 and wanted to participate in the study was included.

Control: Any resident of the area where the outbreak is occurred during the study period who didn't have sign and symptoms of measles and agreed to participate and responded the question was included.

Exclusion criteria

Cases: Cases who were not volunteer to participate were excluded.

Controls: Those who did not have sign and symptom of measles refused to participate were excluded as well as family members from same household.

Result (Descriptive epidemiology)

Socio-demographic characteristics

The mean age for case was 3.7 (SD 2.4) years and for control 3.3 (SD 2.6) years with a rage of seven month of age to 19 years of age in the cases. Majority (78.1%) of the cases were Tigray in ethnic, and 90.6% of the cases and 85.4% of the controls their religion was orthodox. Out of 128(35.2%) of the respondents believed that stayed at home during infection and diseased from measles is better than going health facility. And 3.9% of them responded that it is better to go holy water. Majority of the respondents (60.5%) those who said stayed home responded the reason why not to go health facilities were not to be aggravated the disease

***Table 31*: Socio- demographic characteristics, Alamata town, south Tigray February 2019**

Variable		Cases (%) N=32	Control (%) N= 96
Age	Mean	3.7	3.3
	SD	2.4	2.3
	<1 Year	25	0
	<1-4 Years	40.6	20.8
	5-14 Years	31.3	74.0
	15-24 Years	3.1	5.2
Sex	Males	56.3	49
	Females	43.7	51

Table 32: Knowledge and attitude assessment of respondents about measles Alamata town February 2019

Questions asked	Number of respondent's (%)N=128
Do you know mode of measles transmission?	
Yes	62(48.4%)
No	66(51.6%)
Do you know measles is vaccine preventable?	
Yes	110(85.9%)
No	18(14.1%)
Where did you go first if you get ill for measles?	
Health Facility	80(62.5%)
Holy water	4(3.1%)
Traditional healer	3(2.3%)
Stayed home	41(32%)
If the answer is other than HF why?	
Not to be aggravated	29/45(64.4%)
Measles is self-limited	8/45(17.8%)
Holy water is better than others	4/45(8.9%)
Injection kills measles case/complicate eye **d**isease	4/45(8.9%)
Who do you think that can be affected by measles?	
Under 5 children	81(63.3%)
Under 18 children	38(29.7%)
Women of any age	0(0%)
Any age group	9(7%)

How do you people get measles?	
Contact with measles case	73(57%)
Wrath of God	4(3.1%)
Curse of other people	2(1.6%)
I don't know	49(38.3%)
How do you think measles can be cured?	
Using modern medicine	69(53.9%)
Using modern medicine	3(2.4%)
Holy water	4(3.1%)
Keeping the sick person home and making cultural Practices [xx]	48(37.5%)
I don't know	4(3.1%)

XX: It is celebration made to a child with measles case within the home, neither harmful nor useful cultural practice made locally using 'kolo', soft drink, fruits like orange and green leaves to avoid measles culturally.

Laboratory result

Six blood serum sample were collected from patients in the woreda from 14-13 February 2019 and sent to EPHI for confirmation. All six of the specimen were discarded might be due to inadequate sample during the outbreak period. As the result delayed we treated them as measles suspected cases and we continued active surveillance.

We identified a total of 32 suspected measles cases from February 14th to March 8th 2019 from four Kebelles of Alamata town ranging from seven-month age child to 19 years old young adolescent. Out of the 32 suspected cases 18(56.3%) of them were males. The overall attack rate was 4.9/10000 population. The highest attack rate (6.2/10000) population was seen in 01 kebelle followed by kebelle 02 with attack rate of 5.3/10000 population. No admission, no death and no complication was registered during the outbreak investigation.

Description of measles cases by person

Majority of the cases were 1-4 years old children followed by of the age category 5-14 years old Children.

The least affected group were above 15 years old. The mean age for cases was 3.7 years (SD 4.2) and for control 3.3 years (SD 2.3). Males were more affected.

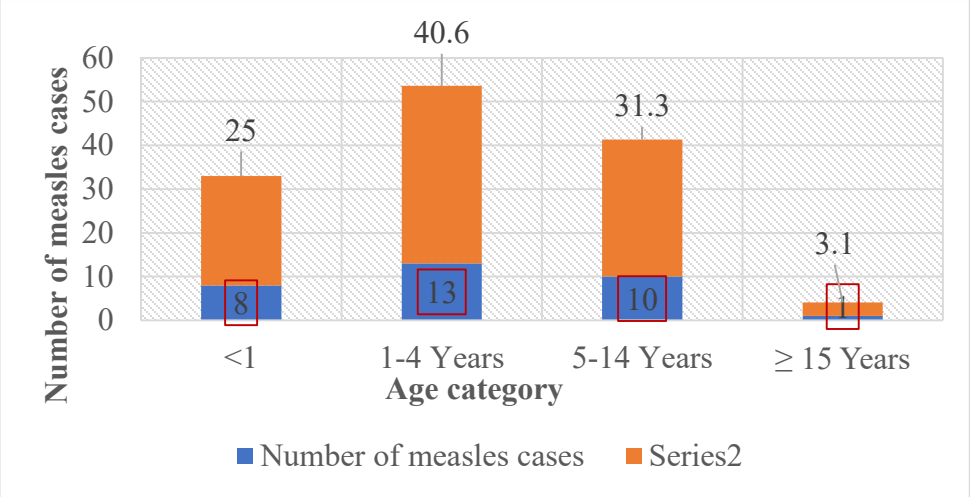

Figure 20: Distribution of suspected measles cases by age category, Alamata town, southern Tigray 2019.

The age specific attack rate of measles was high among children 1-4 years old followed by the age category of 5-14 years old children in Alamata town. The age specific attack rate for under five children in this town was 21.9/10000.

Table 33: Measles specific age attack rate, Alamata town, South, Tigray, February 2019.

Age category	Total population	Number of cases	AR/10000 population
<1 Year	1944	8	41.2
1-4 Years	7640	13	17
5-14 Years	19121	10	5.2
15-24 Years	13078	1	0.8

Vaccination status of the cases

Out of the total cases, majority 11(34.4%) of them took one dose for measles at their nine month of age. But 7(21.9%) took two doses of measles vaccine and 4(12.5%) of the total cases took three

doses of measles vaccine. The rest 10(31.3%) cases never took measles vaccine i.e. they were defaulters. Even though the vaccine coverage for the town average of four years was 89.1% there were defaulters traced during the outbreak.

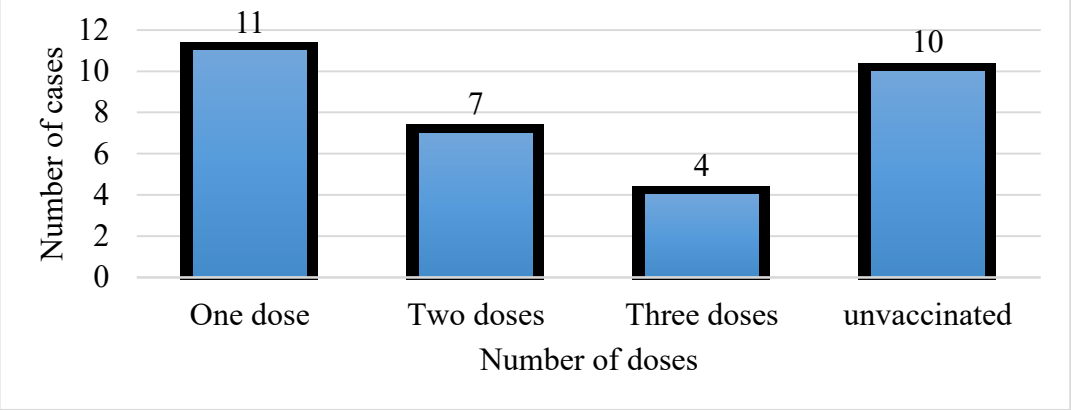

Figure 21: Vaccination status of cases, Alamata town, South Tigray, February 2019

Under five immunization coverage for Alamata town is good relatively to other regions. But still there were defaulters for the expanded immunization program. This is because of migrants came from other woredas and regions (Amhara region-Wag khimra zone and Afar region). During SIA done side to side with the outbreak, 23 children under two years who did not take measles vaccine in the routine immunization schedules were found.

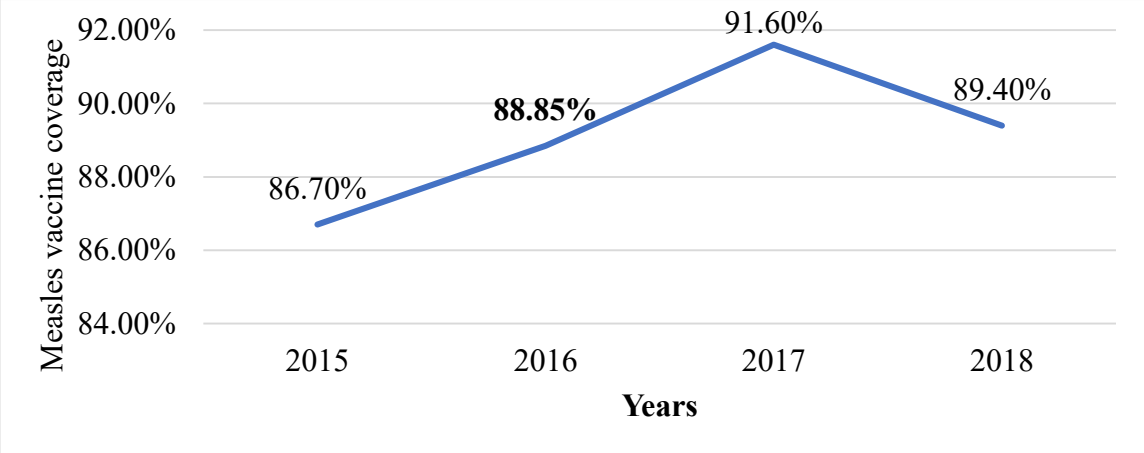

Figure 22: Four years measles immunization coverage, Alamata town, February 2019

Description of measles cases by place

The distribution of suspected measles cases was more in kebelle 02 followed by kebelle 04 in the woreda.

The outbreak was occurred in four of the kebelles of the district. The more affected kebelle was 01 with attack rate 6.2/10000 population followed by kebelle 02 with attack rate of 5.3/10000 population. The overall attack rate for the district was 4.9/10000 population. The figure below shows attack rate per 10000 populations per kebelle.

Table 34**: Measles attack rate Alamata town south Tigray 2019**

S.no	***Alamata town Kebelles***	***Population per***	***Number of measles cases***	***Population affected per 10000***
1	*Kebelle 01*	*11321*	*7*	*6.2*
2	*Kebelle 02*	*22584*	*12*	*5.3*
3	*Kebelle 03*	*12545*	*5*	*4.0*
4	*Kebelle 04*	*19237*	*8*	*4.2*
Total		65687	*32*	*4.9*

Description of measles cases by time

Index case

The index case was detected in Alamata hospital on January 14- 2019 and came from Ofla adjacent woreda 18 km far from the town. He was five years old male case with unvaccinated history for measles immunization. It was one week ago laboratory confirmed measles case was reported from the adjacent woreda Ofla before the outbreak occurred in Alamata town. The confirmed case had history travelling to Amhara region, Sekota woreda where an outbreak of measles occurred on January 26-February 18-2019.

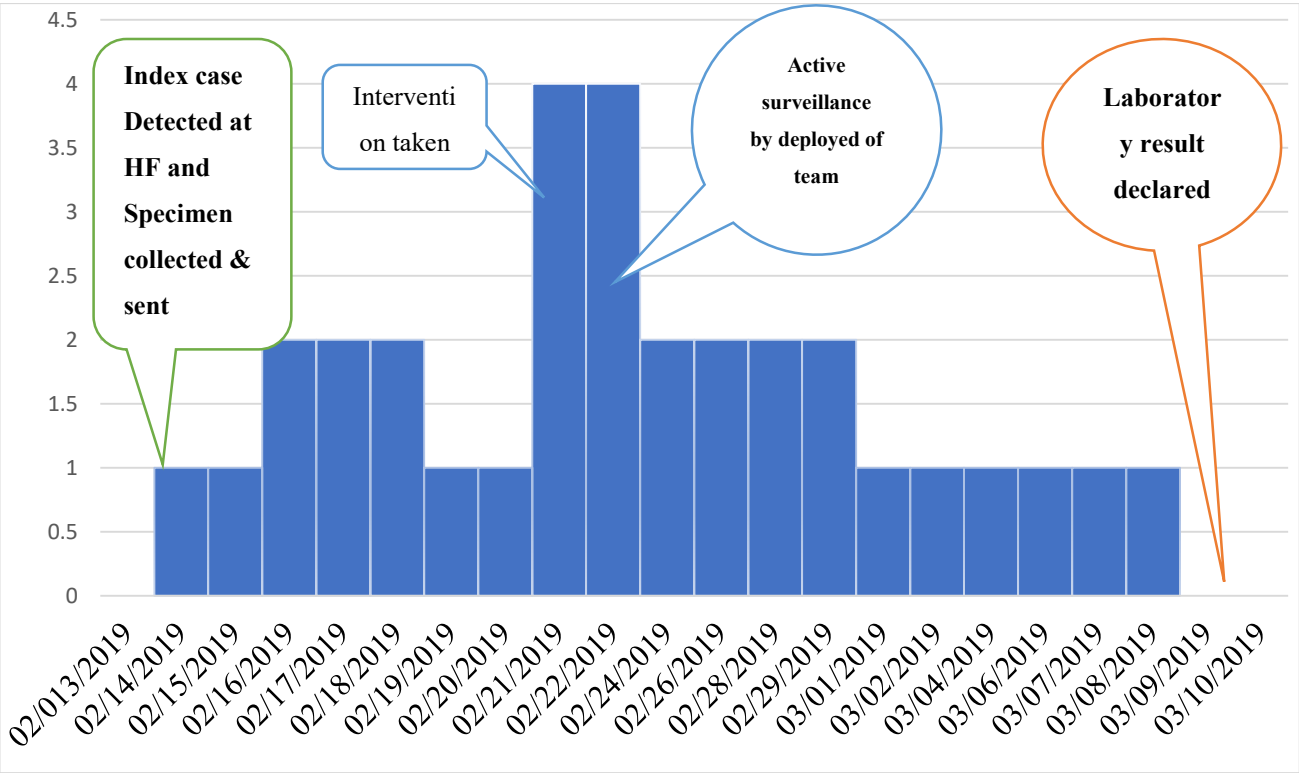

Figure 23: Distribution of measles cases based on onset of rash Alamata town, south Tigray February 2019

The outbreak started between January 11 and March 12/2019 with some peaks and remained for about three weeks with some intervals. After the index case detected at health facility (Alamata hospital) all health professions, health extension workers and women developmental armies aware about the occurrence the disease so as to do active surveillance in each kebelle and actively aware at OPD.

Analytic Epidemiology

Table 35: Univariate analysis to Identified Socio-demography factors and risk factors for measles outbreak Alamata town, south Tigray, February 2019.

Variables	Case status		COR	CI	p-value
	case	Control			
Have you contact history with active measles? No[1]	18	76	2.956	1.257, 6.947	**0.013**

Yes	14	20			
MUAC					
<12113 cm	5	1	0.360	0.102, 1.272	0.113
>12 cm[1]	27	95			
Housing condition	13	35			
Not ventilated	19	61	0.839	0.370, 1.1902	0.673
Ventilated[1]					
Have you ever vaccinated for measles?					
No	10	11			
Yes[1]	22	85	3.512	1.323, 9.324	0.012
Do you know mode of measles transmission?					
No	17	40	1.457	0.653, 3.252	0.278
Yes[1]	15	56			
Do you know measles is vaccine preventable?					
No	17	42	1.457	0.653, 3.252	0.358
Yes[1]	15	54			
Was the control or case diseased by other diseases in the last 7-8 days back?					
No[1]	21	82	3.068	1.218, 7.728	0.017
Yes	11	14			

A total of 32 cases with median age 2.5 years and 96 control with median age 2.7 years were included in the study. 96.9% of the cases had maculopapular rash, 93.7% fever, 62.5% of them had coryza and cough and 59.4% of them had conjunctivitis. On multivariate analysis measles illness was statistically significant with contact history with active suspected measles case [(OR=3.584, 95% CI (1.424, 9.024). being unvaccinated to measles (AOR, 3.520, CI, 1. 225, 10.111) and becoming sick by other diseases prior to the outbreak [OR=3.031, CI (1.114, 8.248)] were risk factors associated with measles contraction.

Table 36: Multivariate analysis to Identified Socio-demography factors and risk factors for measles outbreak Alamata town, south Tigray, February 2019.

Variables		Case status		COR	CI	P-Value	AOR	CI
		Cases	controls					
Have you ever vaccinated for measles?	No	10	11		1.323			1.225
	Yes	22	85	3.512	9.324	0.012	3.520	10.111
Have you contact history with active measles?	No	18	76	2.956	1.257	0.013	3.584	1.424
	Yes	14	20					9.024
Was the control or case sick before the outbreak occurred?	No	21	82	3.068	1.218	0.017	3.031	1.114
	Yes	11	14		7.728			8.248

Multivariate analysis shows, Contact history with active case of measles and becoming sick prior to the outbreak were risk factors associated with contracting of measles infection in Alamata town, south Tigray, January 2019. But vaccination to measles was protective factor.

Public health intervention taken to control the measles outbreak

Active cases of measles were treated with antibiotics, antipyretics, TTC ointment and vitamin A supplement to prevent measles caused complications according to their status at health facilities so as to prevent measles attributed morbidity and mortality and to control further transmissions for other children. The routine surveillance was critically enhanced and active surveillance was on daily bases to control the outbreak.

Health education was given to the community to aware the presence of measles outbreak in the town at all kebelles. Kindergartens and primary schools have been actively surveyed and there were continuous communications with school directors about to report measles case to PHEM of the district. Side to side the outbreak, SIA was done according to its schedule and 746 children

from age 13-23 months old were vaccinated according to the FOMH recommendation.

Discussion

We identified a total of 32 measles cases from January 14-2019 to March 08-2019 with mean age 3.7 years (SD 4.2) years within a range of seven months to 19 years old child. 56.3% of the cases

were males. Majority (40.6%) of cases were 1-4 years old, followed by 31.3% in the age category 5-14 years. And infants were more affected next to 5-14 years old children. The age specific attack rate was high among children 1-4 years old. And the least affected group was ≥15 years old. The overall age specific attack rate for under five children in the district was 21.9/10000 population. 11(34.4%) of the cases were vaccinated for measles vaccine at their nine months old at routine immunization schedule and the rest 7(21.9%) and 4(12.5%) took two doses and three doses of measles vaccine at their nine months and after. But 10(31.3%) of the cases never took measles vaccine. A study conducted by WHO in Ethiopia in 2017 showed that 39% of the outbreak was on under five that is slightly higher than our study. (9) This might be due to the study was nationwide.

No admission and death were registered in the town. The overall attack rate was 4.9/10000, this is lower than a study conducted in Jarar Zone of Ethiopian Somali regional state, eastern Ethiopia with attack rate of 28.2/10000(18). The difference might be in displaced population and the vaccination coverage in Jarar zone was lower than vaccination coverage in Alamata.

The age specific attack rate was high among children <1 year old with attack rate of 41.2/10000. This is different from a study conducted in Jarar zone of Ethiopian Somali regional state, eastern with attack rate of 127.1/10000. (18) and the magnitude is higher in Jarar zone of Ethiopian Somali might be due to low immunization coverage. As mentioned above the age specific attack rate for less than one year in our study was 41.2/10000 population which is higher than a study conducted in Guji zone Oromia region in 2015. (19)

48.4% of the respondents didn't know the mode of measles transmission and 37.5% of them didn't go to health facilities when their child affected by measles.

Limitations

- Absence of child immunization card in the family and unable to recall whether immunized or not for measles vaccine.
- Not to be voluntary to tell a child with measles case inside home.

Conclusion and recommendation

- ✓ The outbreak was epidemiologically linked.

- ✓ The disease primarily affected under five male children.
- ✓ History of contact to measles cases, being unvaccinated for measles and becoming sick by other diseases one week prior to the outbreak were risk factors in Alamata town
- ✓ We recommend to have strong active surveillance on febrile rash cases, and
- ✓ Health education on measles prevention and control measures to the community.
- ✓ There is low awareness towards mode of measles transmission in the community, so health extension workers should strengthen health education on how to transmit, control and the benefit to go health facilities when their child has measles infected.

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5.2 SCABIES OUTBREAK INVESTIGATION AMONG 'YEKOLO TEMARI' IN THREE CHURCHES IN KOREM TOWN, APRIL 2019

Abstract

Background: Scabies is a neglected an ecto-parasitic disease that is a major public health problem worldwide, particularly in resource-poor regions. Dermatologists estimate that more than 300 million cases of scabies occur worldwide every year. The objective of the investigation was to confirm scabies outbreak, identify risk factors and to suggest control measures to decrease disease burden among the; Yekolo temari'.

Method: Unmatched case control study with a ratio of 1:2 (31 cases and 61 controls), epi- info stat calculation was used to determine the sample size and we used a structured questionnaire to collect the data.

Result: A total of 61 cases were identified from three churches within the town. There was no death reported. The mean age was 17 years (Standard deviation 3.3. The overall attack rate was 45.9%. On multivariate logistic regression analy**sis** putting on some one's clothes who had scabies diseased six weeks (AOR=2.746**,** CI **[**1.018, 7.403**]** and lack of knowledge about scabies disease transmission **[** AOR=3.628**,** CI=1.279, 10.292**]** are the two variables associated with contracting of scabies among 'Yekolo temari' in three churches of korem town.

Conclusion: Scabies outbreak occurred in three churches of korem town, south Tigray among 'Yekolo temari'. 15-24 years old students were more affected. Contact history with active scabies and lack of knowledge about scabies transmission and treatment were the risk factor for transmission of scabies among the students. We recommended that continuous health education on how to prevent and control scabies, and avoid sharing of clothes should be given and strong active surveillance should be conducted routinely by PHEM expert in the town.

Keyword: scabies outbreak, risk factor, korem town April 2019

Introduction

Scabies is an ecto-parasitic, highly contagious skin disease caused by infestation of the skin by the human itch mite, Sarcoptes scabies var. hominis. Dermatologists estimate that more than 300 million cases of scabies occur worldwide every year. In Ethiopia, according to national survey conducted in 2008, there are 6.2% of school children and 5.6% of orphan school children affected with scabies(**1** .) Scabies affects all age groups and both sexes but the most vulnerable age groups are young children and the elderly in resource-poor communities who are especially susceptible to scabies as well as to the secondary complications of infestation. The scabies mites usually spread by prolonged direct skin to skin contact with a person who has scabies. It can also spread easily to sexual partners and household members. Sometimes scabies can spread indirectly by sharing clothes, towels, or bedding used by infested individuals(2).

Scabies is an important public health problem in residential care homes. Delayed diagnosis contributes to outbreaks, which may be prolonged and difficult to control(3). In high income countries scabies outbreaks have been reported in long term care facilities and hospitals, often originated after a single undiagnosed or incompletely treated case(4).

The clinical presentation includes pruritus and a variety of dermatological lesions ranging from papules, pustules, burrows, nodules, and wheals. In epidermal parasitic diseases (EPD), host-parasite interactions are restricted to the stratum corneum, the upper layer of the epidermis, where the ecto-parasites complete their life-cycle, in part or entirely. Lesions are commonly found on the wrists, finger webs, antecubital fossae, axillae, areolae, periumbilical region, lower abdomen, genitals, and buttocks(5).

Treatment of scabies on individuals and reduction of skin-to-skin contact with infected individuals is recommended as the primary means of eliminating the infestation. Although transmission via fomites is possible, regular housekeeping and hygienic measures such as changing and washing of bedding in hot water followed by drying materials in a mechanical dryer at the highest temperature setting (preferably 120º F or hotter) should be adequate to prevent further spread(6). Scabietic patients characteristically suffer from intense pruritus and scratching which occasionally lead to hyperkeratosis forms and secondary bacterial skin lesions. The worse itching at night due to

nocturnal activity of mites causes insomnia and restlessness which has negative impact on daily regular activities of patients(7). Risk factors for scabies among low-income countries include

young age, illiteracy, low socioeconomic status, shared clothing and beds, and household overcrowding(8).

Scabies has a different epidemiological distribution among different communities due to its various management patterns and different healthcare policies. In developed communities, scabies primarily occurs in institutional settings such as prisons and long-term care facilities such as nursing homes and hospitals. Besides, the prevalence rate of this infection seems to be higher in developing countries because of its improper management, the presence of predisposing conditions such as natural disasters, wars, and poverty leading overcrowding and increased rates of its transmission(9). The diagnosis should be suspected in any patient with a clinical history of itch, worse at night, affecting other family members or close contacts, and can be made on the clinical distribution and appearance of skin lesions(10). Epidemiological studies indicated that the prevalence of scabies is not affected by sex, race, or age, and that the primary contributing factors in contracting scabies seem to be poverty and overcrowded living conditions(11).

METHOD AND MATERIALS

We conducted 1:2 case control study to investigate scabies outbreak among 'Yekolo temari in korem town in three churches to verify the presence of outbreak, to identify possible potential risk factors and to apply public health intervention for disease prevention and control measures. We conducted the study on April 04-11-2019.we collected data by using structured questionnaires using simple random sampling by lottery method by drawing lots of 31 cases and 61 controls. We used epi info sample calculation to determine our sample using two sided confidence interval of 95%, power 80%, and the assumption of the percentage of controls exposed to flood 75% with odds ratio 22 taken from study conduct in Bedewacho district, SNNP IN 2016. We entered data in to SPSS version 21 and excel for descriptive analysis.

Case definition

Suspected case: A person with sign and symptoms consistent with scabies. The characteristic symptoms of a scabies infection include superficial burrows, intense pruritus (itching) especially at night.

Confirmed case: A person who has a skin scraping in which mites, mite eggs or mite faces have been identified by a trained health care professional.

Contact: *Is defined as a person without sign and symptoms consistent with scabies who has had direct contact (particularly) prolonged direct skin to skin contact) with suspected or confirmed.*

Inclusion and exclusion criteria

Inclusion criteria

Case: Any 'Yekolo temari' of the churches in the town with sign and symptoms, specially (itching and rash) of scabies was selected for investigation and agreed to participate in the study during the investigation period. Diagnosis was made clinical based up on typical symptoms usually pruritus itching at night.

Control: Any 'Yekolo temari' resident in the churches found in the town without sign and symptoms of scabies and voluntary to participate in the investigation was selected.

Exclusion criteria

Case: One who refused to participate or any person with the disease who is not Yekolo temari' in the church during the investigation period was excluded**.**

Control: Healthy 'Yekolo temari' in the church refused to participate in the investigation was excluded.

Ethical clearance

A supportive letter was obtained from Tigray regional health bureau to the woreda health office as this was emergency public health importance to give health intervention no approval was obtained. Verbal permission was obtained from participants after verbal informed consent to participate in the study and we discussed with religious teachers in the importance and confidentiality. Anonymity and confidentiality was ensured.

Result (Descriptive)

Socio-demography

There were 133 'Yekolo temari' in three churches found in Korem town. Out of the total 61(45.9%) of them were infected by scabies disease. The mean age of the students was 16.7 with standard deviation 3.3 years. All were male Christian orthodox and single. Except 3(9.7%) the rest were Tigray in ethnicity**.**

Table 37: Age category of scabies cases, Korem town, south Tigray, Ethiopia, April 2019

S.no	Age category	Frequency distribution	Percent (%)
1	5-14	15	24.6
2	15-24	44	72.1
3	25-44	2	3.3
Total		61	100

Most of the respondents (48.4%) of them were primary educated students and the least (6.5%) were neither able to read nor able to write children. 72.1% of cases and 46.6% controls of the study subjects were 15-24 years old. And 52.5%) of the students were from St. Gabriel church followed by St. Abunearegawi church (37.7%).

Table 38: ***shows the socio demographic characteristics of cases and controls in korem town, Tigray, Ethiopia, April 2019***

Variable	Cases status	
	Case (%)	**Control (%)**
Age category 5-14	24.6	36.1
15-24	72.1	46.6
25-44	3.3	17.3
Group size of the 'Yekolo temari')		
<5	56.1	34.4
≥5	41.9	65.6
Ethnicity Tigray	90.3	91.8
Amhara	9.7	8.2
Educational status		
Illiterate	0	9.8
Only able to read	16.1	11.8
Able to read and write	25.8	16.4
Primary	48.4	49.2
Secondary	9.7	9.8

The age specific attack rate was higher among 15-24 years age group with attack rate of 72.1% and it was 24.4% among the age group of 5-14 years old**.**

Table 39: ***Shows age specific attack rate of scabies in korem, churches, April 2019***.

S.no	Age category	Total 'Yekolo temari'	Total cases AR/100 P	'Yekolo Temari'
1	5-14	48	15	31
2	15-24	62	44	71
3	25-44	23	2	8.7
Total		133	61	46

Site of scabies infection

75.4% of the cases the site of the infection was in their hands followed by 11.5 % on their abdomen. 30/61(49.2%) of the cases had mild skin lesion (<5 skin lesions), 21(34.4%) cases had moderate skin lesions (6-10 skin lesion) and 9(14.8%) cases had severe skin lesions (11-49 skin lesion). 78.7% of the cases had skin itching during night time and 7(11.5%) of the students responded that they had skin itching during day time and the rest 6(9.8%) students had skin itching all the time.

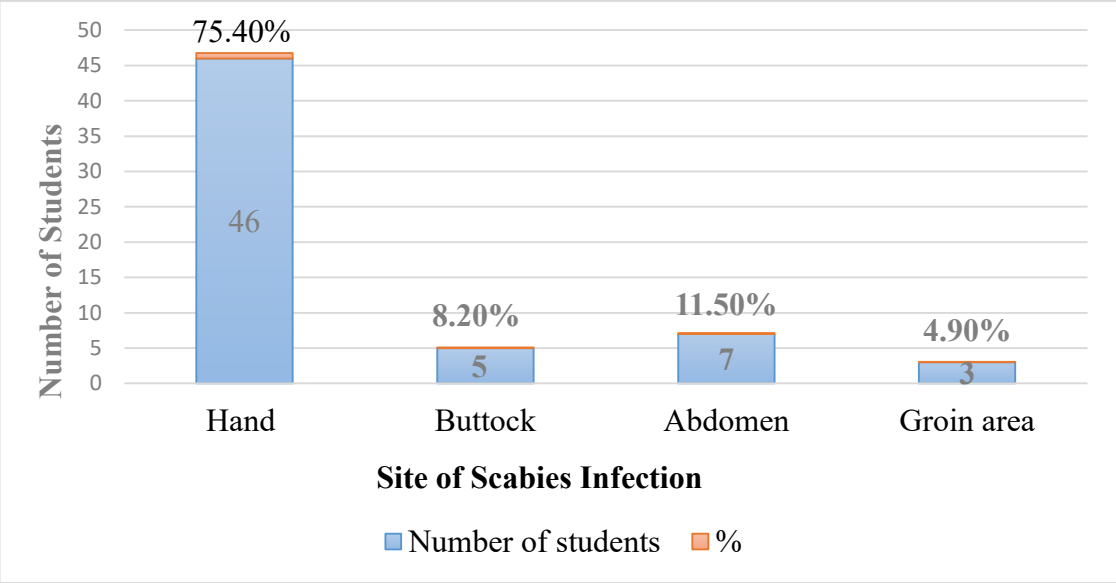

Figure 24: Site of scabies infection among 'Yekolo temari', Korem town April 2019

Description by place

When we compare the attack rate by place, the students in St. Abune Aregawi church were more affected than the other students living in the churches. The least affected 'Yekolo temari' were in St. Mary Hayalo church. The students had a habit of living together crowdedly in a small room

There was no under-five case detected in each church. And no death reported. All cases had skin rash. 88.5% had persistent skin itching. A mass treatment was given to all students. Health education about scabies prevention and control methods, mode of transmission and what to do if a student has a scabies disease.

Table 40: Attack rate of scabies per 100 population by church, korem town, Tigray, Ethiopia April 2019

S.no	Korem town Church name	Number of students in the Churches	Number of scabies cases	%(Percent)
1	St. Gabriel	71	32	45.1
2	St. Abune Aregawi	40	23	57.5
3	St. Marry Hayalo	22	6	27.3
	Total (overall AR/100)	133	61	45.9

Description by time

The index case was 17 years old male came from Ofla rural neighbor woreda specifically from Mymaedo kebelle. All 61 of them were active cases on active surveillance. As shown in the figure below the epi-curve has indicated propagated pattern of outbreak with its peak on week sixteen (week 16).

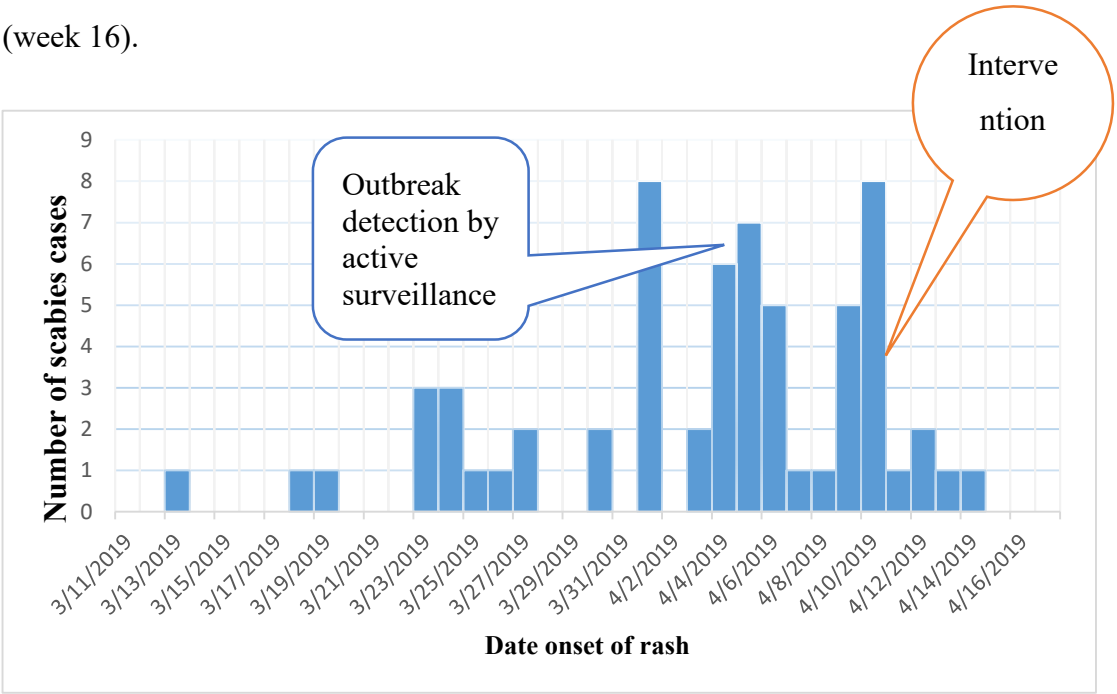

Figure 25: ***Epi curve showing scabies outbreak investigation korem south Tigray April 2019***

ANALYTICAL RESULT/RISK ANALYSIS

Table 41: Univariate risk factor analysis of scabies outbreak, korem town, Tigray Ethiopia April 2019

Independent variables	Case status		COR	CI	P-value
	Cases(31)%	Controls(61)%			
Have you put on some one's clothes who had scabies diseased six weeks back? No[1]	15	45	2.358	**0.970** **5.7.334**	**0.059**
Yes	16	19			
Have you contact history with scabies case? No[1]	13	41		**1.164**	**0.022**
Yes	18	20	2.838	**6.922**	
Have you ever heard about scabies disease prevention treatment and transmission? No	14	43		**1.184**	**0.020**
Yes[1]	17	18	**2.901**	**7.107**	
Number of students living per single room <5[1]	7	37	5.286	**1.971** **14.172**	**0.001**
≥5	24	24			
Did you Share of matts/bed sheet? No[1]	10	34	2.664	1.068	0.036
Yes	21	27		6.549	
Did you sleep with scabies case in the last two weeks? No[1]	19	31	1.879	0.771	0.165
Yes	12	30		4.578	
How often do you take shower? Weekly[1]	18	29	0.655	0.273	0.341
Every two weeks	13	32		1.566	
Have you bath someone with scabies? No[1]	15	36	1.536	0.530	0.599
Yes	16	25		3.007	

NB: Yes[1] and No[1] indicate reference when we used logistic regression analysis.

Table 42: Multivariate risk factor analysis of scabies outbreak, korem town, Tigray Ethiopia April 2019

Variables	Case status		COR	AOR	CI
	Case(31)	Control(61)			
Have you contact history with scabies case?					1.525
No[1]	13	41	2.838	4.873	15.567
Yes	18	20			
Did you share matts/ bed sheets?					
No[1]	10	34	2.664	0.105	0.026
Yes	21	27			0.418
Have you ever heard about scabies disease prevention treatment and transmission?					**1.210**
No	14	43	2.901	4.465	**16.468**
Yes[1]	17	18			
Number of students living per single room ≥5					
<5[1]	24	24	5.286	0.139	0.041
	7	37			0.469

NB: Yes[1] and No[1] indicate reference when we used logistic regression analysis.

Risk factors Assessment

We conducted unmatched case control study by recruiting 31 cases and 61 controls with 1:2 ratios randomly selected by lottery methods from line listing. Using multivariate analysis, we found that history of contact with scabies case (AOR =4.873, CI, 1.525, 15.567) and lack of knowledge about scabies transmission and treatment were the two risk factors associated with contracting of scabies disease among 'Yekolo temari' in korem town south Tigray**.**

Environmental investigation

We conducted environmental investigations with woreda health office PHEM expert and health extension workers. We didn't find access of latrine and hand washing in the residential area of the 'Yekolo tamari'. They travelled around 45 minutes to get water to take shower and washing their

clothes from rivers and spring sources. They live crowded in a small room with a maximum of 20 students per room.

Public health intervention

We gave health education about what is scabies, MOT, how to occurred and how to prevent in three churches sites together. Each religious' teachers helped us to gather them. In collaboration with woreda health office, local concerned bodies, and society of 'mahbere kudsan', a latrine was constructed, and hand washing access was made and we found a fund of excess detergents for personal hygiene. By communicating with korem general hospital, the students have been treated on mass according to the severity with BBL and antibiotics. We discussed with the religious leaders to report with a scabies case to nearby health institution and to treat.

Discussion

From 133 'Yekolo temari' in three churches, namely St. Abune Aregawi, St. Gabriel and St. Marry Hayalo, in Korem town, south Tigray,61(45.9%) of the students had infected by scabies disease. The mean age of the cases was 16.7 years with a standard deviation of 3.3. All cases and controls were males, due to the fact that all 'Yekolo temari' (students) in Ethiopia are males. This study agrees with a study conducted in north Gondar (1).

The majority (72.2%) of the cases were 15-24 years old. This is higher than a study conducted in Dembiya district, north Gondar zone (23%) (12). the age category from 25-44 years old students were least affected. 48.4% of the 'Yekolo temari' had primary education background and the least (6.5%) were neither read nor able to write children.

Most of the cases (52.5%) were from St. Gabriel church and 37.7% of them were from St. Abune Aregawi church. The age specific attack rate was high among the age category 15-24 year's old students. 88.5% of the cases had persistent itching with 100% skin rash from mild to moderate skin lesion and in 75.4% of the cases the site of infection was in their hands and 11.5% in their abdomen. 34.4% and 14.8% of the cases had moderate and severe skin lesion respectively.

The attack rate was high in St. Abune Aregawi church followed by St. Gabriel church. The outbreak was propagated type of epi-curve which shows the transmission continued (from the sign and symptoms of the index case Seen-April 14-2019) for one month among the ('Yekolo temari')

students. ‘Yekolo temary’ who had history of contact with active case of scabies were 4.8 times at high risk to develop scabies disease than those did not have exposure to scabies disease. This is similar with a study conducted in north Gondar town (1) and Dembiya district north Gondar zone. (12).

Limitation of the study

Unavailability of literature review in Africa particularly in Ethiopia about scabies among ‘Yekolo temari’.

Conclusion

- The source of outbreak for this study was 17 years old adolescent ’Yekolo temari’ came from Ofla rural neighbor woreda.
- The scabies outbreak was propagated type in which transmission continued among the students for one month
- The age specific attack rate was high among the age group 15-24 years old cases
- The attack rate was high in St. Abune Aregawi church.
- The overall attack rate was 45.9%.
- Contact history with active scabies, lack of know about scabies transmission and treatment and sharing of clothes/bed sheets among students were significant risk factor for transmission of the disease in korem town in the three churches.

Recommendation

- To church leaders/teachers
    - There should be water supply for hand washing to increase hygiene and sanitation
    - There should be continuous supervision to ‘Yekolo temari’ on hygiene and sanitation
- To woreda health office
    - Active case search and routine surveillance should be strengthened.
    - Health education should be strongly given to the students routinelyRegular inspection to the churches on hygiene and sanitation should be routinely done.

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CHAPTER 6: ABSTRACT FOR CONFERENCE PRESENTATION

6.1 EPIDEMIOLOGICAL CONFIRMED MEASLES OUTBREAK INVESTIGATION IN ALAMATA TOWN, FEBRUARY 2019.

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Background: Measles is highly contagious, vaccine preventable viral disease most affecting under five children. In February 11/2019 an index case was detected in Alamata hospital and we investigated the outbreak, to identify possible risk factors and to characterize it and to implement public health control measures.

Methods: We conducted unmatched case control study with 32 cases and 96 controls with a ratio of 1:3 methods from February 11 to March 08/2019.We used line lists and standard questionnaires to collect the data. We conducted the study by defining suspected cases of measles as any person presenting with fever and maculopapular rash and plus one of the three Cs (cough, coryza and conjunctivitis. To decide the significance of the association, we used p-value and 95% confidence interval for odds ratio.

Result: We identified 32 suspected cases of measles. The overall attack rate was 4.9/10000 population and it was high in under five male children. On multivariate logistic regression analysis, history of contact [AOR=2.956, 95% CI (1.424, 9.024) and sickness by other disease one week before the outbreak (AOR ,3.031, 95% CI, 1.114, 8.248) and being unvaccinated (AOR, 3.520, CI, 1; 225, 10.111) were risk factors associated with measles contraction in Alamata town.

Conclusion: Contact to measles cases and being diseased by other diseases one week before the outbreak and being unvaccinated for measles were the possible risk factors investigated in the outbreak .And we recommended that isolation active case is necessary and continuous active surveillance should be conducted in the woreda.

Key word: Measles outbreak, Alamata town, February 2019

6.2 SCABIES OUTBREAK INVESTIGATION AMONG 'YEKOLO TEMARI' IN THREE CHURCHES OF KOREM TOWN, MARCH 2019

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Abstract

Background: Scabies is a neglected an ecto-parasitic disease that is a major public health problem worldwide, particularly in resource-poor regions. Dermatologists estimate that more than 300 million cases of scabies occur worldwide every year. The objective of the investigation was to confirm scabies outbreak, identify risk factors and to suggest control measures to decrease burden among the spiritual students.

Method: Unmatched case control study with a ratio of 1:2 (31 cases and 61 controls) was conducted and we used a structured questionnaire to collect the data.

Result: A total of 61 cases were identified from three churches of Korem town. There was no death reported. The mean age was 17 years (range 11 to 30 years). The overall attack rate was 45.9%. Multivariate analysis showed that contact history with active scabies **[A**OR=4.873, 95% CI [1.525, 15.567], lack of knowing about scabies transmission and treatment [AOR=4.465, 95% CI=1.210, 16.468) were statistically significant risk factor associated with the contracting of scabies disease among 'Yekolo temari' in Korem town**.**

Conclusion: among 'Yekolo temari'. 5-14 years old children were more affected. Contact history with active scabies, and lack of knowledge about scabies transmission and treatment were the risk factor for transmission of scabies among the students. We recommended that continuous health education on how to prevent and control scabies should be given and strong active surveillance should be conducted routinely by PHEM experts in the woreda.

Keyword: scabies outbreak, risk factor, korem town April 2019

CHAPTER 7: NARRATIVE SUMMARY DISASTER SITUATION REPORT

7.1 'MEHER' HEALTH EMERGENCY NEED ASSESSMENT REPORT IN OFLA WOREDA, SOUTH TIGRAY, ETHIOPIA, NOVEMER 2018

Abstract

Background: A community needs assessment is a dynamic ongoing process undertaken to identify the strengths and needs of the community, enable the community-wide establishment of health, WASH, nutrition and education priorities and facilitate collaborative action planning directed at improving community health status and quality of life. We conducted a cross sectional method assess nutrition among under five children in Ofla woreda.

Method: Descriptive cross sectional study was conducted in Ofla woreda, one of the rural woredasand among the priority I hot spot areas in southern zone of Tigray region from November 12 –22/2018. Data was collected using structured questionnaire through discussion and interview from woreda health office head, surveillance expert, maternal and child health case team and HMIS data base and we used Microsoft excel to analyze the data.

Results: Emergency preparedness and response plan was available at health office and health centers. Non bloody diarrhea was the leading cause of morbidity for children of < 5 years. Proxy GAM prevalence among under five children was 9.3% and 51% among mothers. From the total 240 SAM children 85% of them were linked to OTP.

Conclusion and Recommendation: Maternal proxy GAM prevalence was beyond the prevalence detected during the drought season of 28% and the national and regional acceptable prevalence of below 10% - while they were under the support of TSF program. Woreda health office should assess the implementation of the TSF program towards its impact on reducing prevalence of nutrition.

Key Words: Health emergency need assessment, Ofla woreda. November 2018.

Introduction

A community needs assessment is a dynamic ongoing process undertaken to identify the strengths and needs of the community, enable the community-wide establishment of health, WASH, nutrition and education priorities and facilitate collaborative action planning directed at improving community health status and quality of life. The health and socio-economic wellbeing of people are fundamentally linked to their natural and built environment. Along with emergency preparedness, the timeliness and quality of assessments help determine an effective humanitarian response.

Disaster risk management (DRM) is a crosscutting and multi-sectoral responsibility where by concerned institutions shall integrate DRM in to their regular development activities. National development can't be sustainable unless DRM is considered as part of sectoral development. Understanding hazard, their behaviors, and the risk they pose, and the vulnerabilities they create are fundamental to achieve successful DRM. As DRM is multi-disciplinary and multi- sectoral. It requires a range of data and relies on timely, smooth and efficient communication of information and reliable data generated by a range of institutions, sectors, and decision makers (1).

An information system developed to implement the new DRM approach implies, disaster risk profile for every woreda in a country based on information collected from communities, households and DRM actors builds upon livelihood assessments, and other risk elements to analyze risk and vulnerabilities in all areas and hence appropriate context-specific transfer mechanisms and tools (2).

Ethiopia has registered steady economic growth in the recent past years, but it is also one of the most disaster prone countries in Africa (World Bank 2010). Lack of safe water and sanitary facilities could lead to adverse effects in fulfilling daily needs and increased morbidity and mortality due to food and water borne diseases. Prior to 2008, numerous barriers stood in the way of Ethiopia's ability to deal with disasters. Low level of information on the vulnerabilities historical impacts and coping mechanisms used dealing with disaster and the inability to integrate disaster risk management adequately in spite of high vulnerability to climate variability and disasters were among those identified barriers(3).

Humanitarian need assessment is a bi-annual exercise done across the nation following main rain season of 'Meher' and 'Belg'. This Meher emergency need assessment was done for food and non-

food part of the health and nutrition sector in Ofla woreda as it is crucial to forecast and assess the magnitude of emergency human damage threats and accordingly to make the necessary plans and preparations to prevent unnecessary human damage and death. This risk assessment activity was conducted one week prior to the regional health bureau and UNICEF Meher assessment program.

Objectives

General objectives

To assess the health and nutrition emergency situation and the need for emergency aid and the level preparedness to act on the emergencies in Ofla woreda November 2018

Specific objective

To identify existing or potential health and nutrition emergency in the woreda

To describe the magnitude and likelihood of the emergency situations and describe the need for emergency aid in the woreda

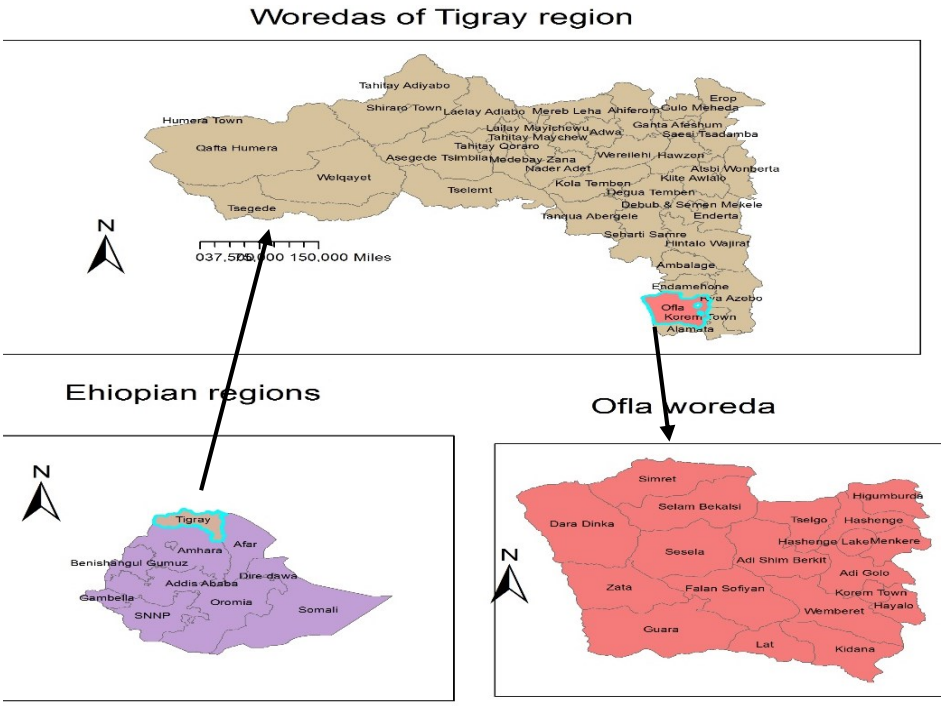
To describe existing capacity of the health system and the level of preparedness for response and humanitarian assistance in the woreda

To provide baseline information for project planning and support for informed decision making

Method and materials

Study area and period

This 'Meher' assessment was conducted in Ofla woreda, one of the eight woredas in southern zone of Tigray which is found 18 Km far from Alamata district, 42 Km far from zonal town Maichew, 162 Km far from the regional state of Tigray and 619 Km far from Addis Ababa. The total area of the woreda covers 1086.55 ^{2}km/133500 hectares with an average population density of 132/km$^{2.}$ Its altitude ranges from 1538m-2720 meters above sea-level and is mostly mountainous. It is located at geographical coordinate of 12^{0} 31, N latitude and 39^{0} 31, E longitude. The average rain fall ranges from 750-850 mm/ per year. The average annual temperature ranges from 14.6c^{0}-22.4c^{0}. The climatic zone division of the woreda includes 'Kola', 'Weina dega and 'Dega'covering 29%, 29% and 42% respectively. The woreda is one of the priority I hot spot areas in the region which is bordered with Endamekoni woreda to the north, Raya Azebo woreda to the east, Raya Alamata to the south and Amhara region to the west. The study was conducted d from November 12-22/2018.



Map 7: ***Map of Ofla woreda showing the study area, South Tigray, Ethiopia, November 2018***

Study design- Cross sectional study was done.

Source of data collection tools

A structured questionnaire prepared by UNICEF, TRHB, and FMOH was used to collect health and nutrition related data at woreda level. The questionnaire addresses socio- demographic profile, health profile, and multi-sectoral coordination committee at all levels, status of epidemic prevention and control and ongoing epidemic situation, presence of risk factors for epidemics, status of malnutrition and availability of emergency drugs at woreda level.

Source of data

Secondary data was collected through discussion and by interviewing woreda health office head, surveillance expert, maternal and child health case team and HMIS data base.

Data analysis

Data was analyzed using Micro soft excel and displayed through tables, graphs and narrative statements**.**

Result

Socio-demographic information

Ofla woreda has a total population of 144,086. Out of this number 50.8% were females and 21024 under five children. The district has six (6) health centers and 25 health posts with 72 health extension workers. From the health facilities four (4) health centers have water access with hand pump and the two health centers and 17 health posts have roto for temporary water supply in which 14 of them were not functional.

Table 43: Socio-demographic description of woreda Ofla, south Tigray, Ethiopia, November 2018

Description	Quantity (number of….)
Total population of the woreda	144, 086
Total males	70890
Total females	73196
Under five population	21024
Total women of reproductive age (15-49) years	33831
Total number of health extension workers	72
Total number of health centers	6
Health centers with water access	2
Total number of health posts	25

Health posts with water access	0

Health profile

Coordination and management

Functional multi-sectoral coordination committee was available at wereda and kebelle level. And there is also functional RRT (Rapid response team) in both woreda and health center level with a regular meeting schedule every week. The woreda conducted four multi-sectoral health emergency coordination forum in the last six month special focus on epidemic prone diseases like AWD. Emergency preparedness and response plan was available at woreda health office and health center level. In health posts the plan is incorporated with their annual plan. Ofla woreda administration had allocated budget for emergency situation and provide 60000 birr for each health center.

There are seven PHEM officers, one at woreda level and six at health center level. Weekly report is done according to the hierarchy, i.e. from health posts to health centers from Sunday to Monday and from health center to woreda from Monday to Tuesday as well as compiled data is sent to TRHB from Tuesday afternoon every week. All information change is conducted through phone prior to the hard copy.

Morbidity (causes of morbidity)

Non bloody diarrhea was the leading cause of morbidity in under five children in 2018. Pneumonia was the second leading cause of morbidity in under five and the fifth leading cause in adults in the same year. AURTI was the first leading cause of morbidity in adults followed by acute febrile illness**.**

Table 44: **Top five causes of morbidity for under five and above five years, Ofla woreda, south Tigray, November 2017.**

S.no	Morbidity below five	%	Morbidity above five	%
1	Diarrhea non-bloody	36.5	AURTI	16.7
2	Pneumonia	24.6	Acute febrile illness	14.3
3	Moderate acute malnutrition	15.6	Pneumonia	11.3
4	AURTI	12.8	Dyspepsia	10.8
5	Dysentery	9.4	Disease of musculoskeletal system	8.6

Case detection and outbreak situation of major epidemic prone diseases

In the last year, 2018 an outbreak of AWD was occurred in the woreda. Five cases were detected in September month and they were admitted and treated at CTC. There was no death registered during the outbreak.The number of malaria confirmed cases within six months were 88 in 2017. But the number of malaria cases detected in 2018 was 53 in the same months. No death reported from malaria. As shown in the figure below the trend of malaria detection was decreased from2017

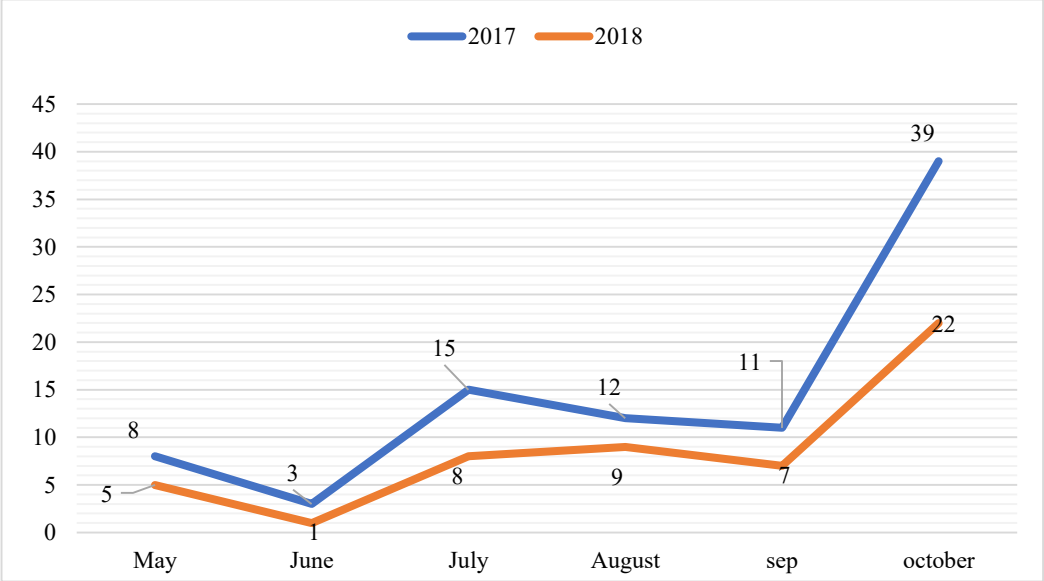


Figure 26: Trend of malaria cases in six months in Ofla woreda in 2018, Tigray, and November 2018.

There were no measles and meningitis cases in Ofla woreda detected in 2017 and 2018. But a total of 15 AWD cases with one death a (case fatality rate) of 6.7% were detected from August to September 2017. In 2018 only four cases of AWD were detected on September. The cases were came from a holy water where huge AWD outbreak was occurred in the central zone of Tigray local name called Sie

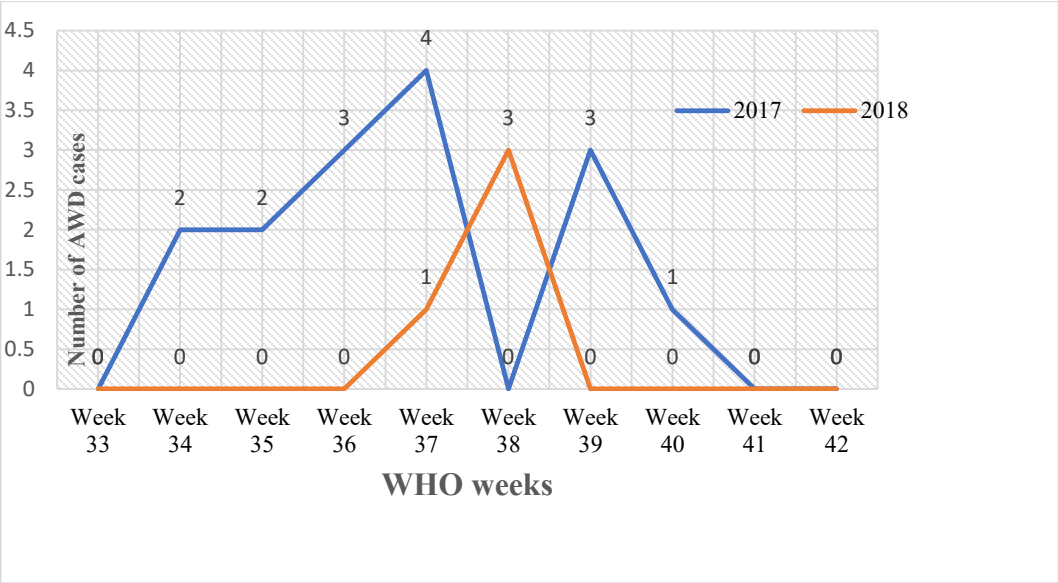


Figure 27: Trend of AWD from WHO week 37-38, Ofla woreda, Tigray, Ethiopia, November 2018

Preparedness: Availability of supplies for emergency response

Essential supplies for the management of AWD, Measles outbreak, and malaria like ringer lactate, ORS, Doxycycline, gloves and syringes, Amoxicillin, TTC ointment, Vitamin, A , coartem, and lab supplies like RDT for malaria were available at the health facilities in the woreda. A total of six case treatment center (CTCs) and 258 kits were prepared in all health centers aware from the last year of AWD outbreak. Lab supplies for detection of meningitis were not available at the district during the assessment period.

Risk assessment factors for epidemic prone diseases

Malaria: The woreda is not endemic to malaria. But there are seven kebelles completely malarious and four kebelles are partially malarious with a total population of 81025. Last year, out of 32820, bed nets 31800 (97%) of it was distributed for the population. But in 2018, no bed net distributed. We surveyed two kebelle which are malarious to assess utilization of bed net and we took a sample of 20 households from each. The availability of bed net and utilization of bed net was 13/20 (65%) and 5/13 (38.5%) respectively. In three health centers visited, active malaria surveillance was not conduced. Cases with fever were passively tested for malaria this year.

Meningitis: No cases detected for the last consecutive four years in this woreda. In March 2016 meningitis immunization campaign was conducted for people 1-29 years which was provided for 94179 individuals with vaccination coverage of 97.1%.

AWD: Outbreak of AWD was occurred in the past three consecutive years from 2016, 2017 and 2018 with cases of 2, 15 and 4 cases respectively. The latrine coverage for the woreda in 2017 was 53.2% with 100% utilization. But in 2018, the coverage is 38/60 (63.3%) %. All health professionals are aware about to prepare AWD prevention, treatment and control measures.

Measles: There was no measles outbreak occurred in the woreda for the last four years consecutively. In February 2017, SIA was conducted for children 15-23 months old children. 21837 children were vaccinated (second dose of measles). In 2018 the second round will be conducted. All health center staffs interviewed, defined correctly the case definition of measles.

Nutrition situation

Therapeutic and supplementary feeding program (TSFP) in the woreda

The woreda is under priority I hot spot category with TSFP supplies and with available supplies on stock. There is a mechanism that children discharged from OTP were linked to TSFP for continued service. There were 11 food distribution sites before July 2017 and this year (2018) it expanded to 21 kebelles for better access to distribution. Mothers below 23 centimeter mid upper arm circumference (MUAC) and children 11 to 11.9 centimeter are included under TSF.

Screening activities

Screening for malnutrition is the routine monthly activity in the woreda. Pregnant and lactating mothers and children below five years of age were screened for malnutrition at screening sites and during home to home visit in a monthly basis.

Albendazole and vitamin A were given for under five children through routine supplementation activities. Vitamin A supplementation, deworming and screening coverage of the woreda in the recent supplementation month – October was 3030 (100%), 2002 (100%) and 16462 (90%) respectively. The average screening coverage for children in the past six months was 88.8%. Among those screened children, proxy GAM prevalence was 9.3% from which Severe Acute Malnutrition accounts for 0.25%.

Table 45: screening coverage and proportion of malnutrition among screened children, Ofla woreda, south Tigray, Ethiopia, November, 2018

Month	Target children 6-59 months	Number children screened	Screening coverage (%)	MUAC <11 cm	MUAC 11-11.9 cm	% of proxy GAM for children	% proxy SAM for children
May	18081	16333	90	57	1492	9.5	0.35
June	18081	15818	87	29	1498	9.7	0.18
July	18204	15671	866	44	1530	10	0.28
August	18204	16221	89	44	1597	10.1	0.27
September	18204	16236	89	31	1365	8.6	0.19
October	18204	16462	90	35	1540	9.6	0.21
Average	18163	16124	88.8	240	1504	9.3	0.25

Proportion of malnutrition over the six month period has similar trend except for the month August with slightly increased above 10%.

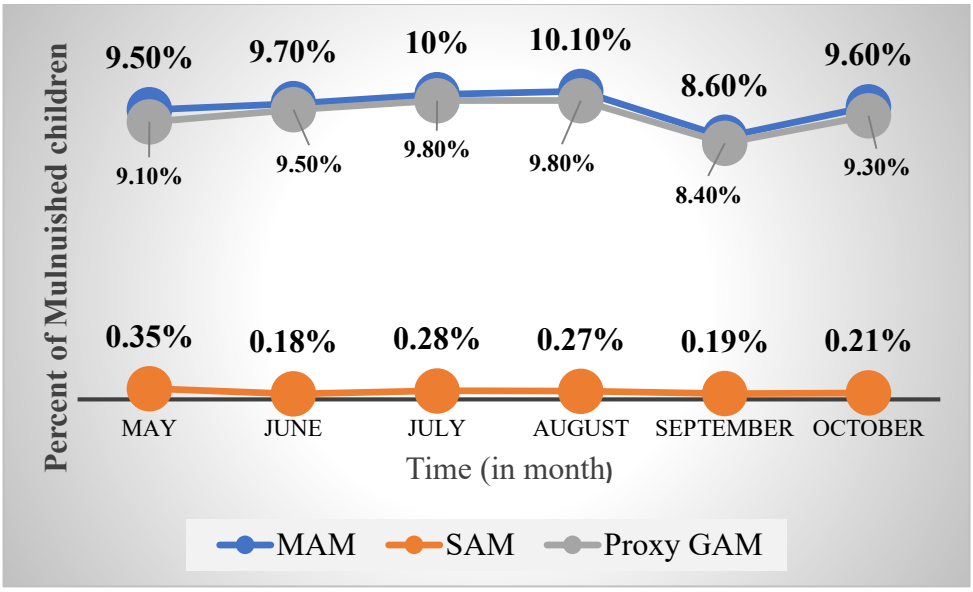


Figure 28: Trend of proportion of proxy GAM and proxy SAM among children from May to October. Ofla woreda, south Tigray, Ethiopia, November 2018.

Screening performance for pregnant and lactating women (PLW)

During the routine screening program, 67.5% of women were screened for acute malnutrition and proxy GAM prevalence among those mothers was found to be 51%.

Table 46: screening coverage and proportion of proxy GAM among pregnant and lactating mothers from May to October, Ofla woreda, south Tigray, Ethiopia, November 2018

Month	Target PLW	Number of PLW screened	Coverage (%)	MUAC <23 cm	% of proxy GAM
May	4747	3105	65.4	1565	50.4
June	4747	3315	70	1596	48
July	4779	3007	63	1628	54
August	4779	3067	64	1573	51.3
September	4779	3199	67	1663	52
October	4779	3613	76	1827	50.6
Average	4768	3218	67.5	1642	51.0

Facilities with SAM management and availability of supplies

Six health centers and 25 health posts were functional for providing outpatient therapeutic program (OTP) service and two health centers were equipped to provide admission services as stabilizing centers. A total of 269 children were admitted to OTP during 2017, in six months (from May to October). And 204 children were admitted in the same months in 2018. From total 240 diagnosed children with SAM during screening program, only 204 (85%) of them were linked to OTP service centers. The average cure rate for the previous six months was 97.4%ranging from 92% to 100% in different months and no death was reported due to malnutrition. There were no children linked to therapeutic feeding unit in these two stabilizing centers during the six months period.

Table 47: Treatment outcome of malnutrition children on OTP service, Ofla woreda, south Tigray, Ethiopia November 2018.

Month	Beginning of month		Admission		Cured		Death		End of the month		Cure rate	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
May	68	91	34	26	48	48	0	0	39	65	76	92.3
June	39	65	77	32	56	42	0	0	48	54	82	98
July	48	54	41	30	27	36	0	0	85	51	100	100
August	85	51	42	48	33	12	0	0	94	84	100	100
September	94	84	37	32	48	66	0	0	82	49	98	100
October	82	49	38	36	33	23	0	0	82	62	87	100
Total			269	204	245	227	0	0			96.1	97.4

Supplies required for SAM management like RUTF, F100, F75 and drugs were available at woreda level. All (72) health extension workers and 24 other health professionals trained about severe and moderate acute malnutrition detection and management. All 31 health facilities providing malnutrition management services and send reports to their corresponding higher level in a weekly bases. There was no flooding or other disaster situation occurred in the woreda in the previous six months period from May to October 2018.

Discussion and conclusion

There is a marked decrease in the number of malaria cases in the recent six months in 2018 comparing to the last year in the same months. Last year the case fatality rate of AWD was 6.7% (due to late referral from the community to hospital (1 case from 15 cases) beyond the WHO recommendation (<1%), But this year, from four cases of AWD reported no death was reported There was no meningitis cases detected in the last three years in the woreda. There was also no measles cases reported in these six months period. This might be due to poor active surveillance practices at community level and negligence during passive surveillance.

The proxy GAM prevalence among children below five years (9.33%) was as high as in the drought season of 2016. Similarly maternal proxy GAM prevalence was 51% which is beyond the prevalence detected during the drought season of 28% when the woreda was characterized as priority I hot spot area and the national and regional acceptable prevalence rate below 10% while

they were under the support of TSF program.to some extent this might related with the change in the standardization of MUAC measurement as 21 cm and above as normal status for up to 2016 that changed to 23 cm and above from 2017 onwards. On the other hand, it might be due to the fact that pregnant and lactating mothers who attend screening program will be those who think of they were malnourished. In the contrary, mothers visited and measured in the previous told as normal might absent in the revisit the screening programs.

Recommendation

- Woreda health office should have strong surveillance activities by providing onsite support and timely feedback to minimize negligence, and lack of knowledge among the epidemic prone diseases like malaria, meningitis and measles
- Health centers should aware during patient assessment and diagnosis about epidemic prone diseases
- Woreda health office should assess the implementation of the TSF Program towards its impact on reducing the prevalence of malnutrition at all kebelles.

Reference

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2. Muluneh W., Policy and Institutional Framework for Effective Disaster Risk Management in Ethiopia, August, 2013
3. Department for International Development DFID, Climate and Development Knowledge Network (CDKN) – Africa Climate Change Resilience Alliance - Ethiopia good practice guide: Local Disaster Risk Reduction Planning)

CHAPTER 8: EPI PROJECT PROPOSAL

8.1 PREVALENCE OF MALNUTRITION AND ASSOCIATED FACTORS AMONG 6-59 CHILDREN IN OF WOREDA, SOUTH TIGRAY, ETHIOPIA, APRIL 2019

Introduction

Adequate nutrition is essential in early childhood to ensure healthy growth, proper organ formation and function, a strong immune system, and neurological and cognitive development(1). Child undernutrition is a major public health problem, especially in many low-income and middle-income countries(2). Ethiopia is facing successive droughts that are badly affecting the food and nutrition security situation of about four million people each year (3). Acute malnutrition considerably increases the risk of childhood morbidity and mortality, and is reported to be responsible for nearly 875,000 (13%) of the global deaths in children under five years of age. Severe acute malnutrition (SAM) contributes to almost three-fifths of these deaths (4).

Child malnutrition continues to be the leading public health problem in developing countries. Globally, there were 165 million stunted, 99 million underweight, and 51 million wasting children by year 2012. It kills 3.1 million under-five children every year (5).

Ethiopian demographic health survey 2016 revealed that 38% of children in Ethiopia were stunted, 10% of children were wasted and 24% of the children in Ethiopia were underweight (6)

Childhood malnutrition remains common in many parts of the world; the magnitude of worldwide stunting, underweight and wasting in children under five years of age were 24.7 %, 15.1 % and 7.8 %, respectively. More than 150 million children under the age of five years in the developing world are malnourished (7).Complementary feeding practice is a noteworthy factor that determines the nutritional status of children. The transition period from exclusive breastfeeding to 2 years is a critical window for optimal growth and development of the child. During this period, appropriate, safe, adequately nourished and frequent feeding is essential (8).One of the world's most important difficulties is to secure, sufficient and substantial nourishment for all in an ecologically manageable way (9).

Nutrition is a cornerstone that affects and defines the health of all people, rich and poor. Conversely, malnutrition makes us all more vulnerable to disease and premature death. It is a devastating

problem, particularly for the poor and particularly for the poor and un privileged as poverty is a fundamental cause of household food insecurity and consequently malnutrition which continues to be one of the major and most pressing health problems affecting children.(10)

A survey conducted in 318 under five children representing 587 household randomly selected from rural communities in Tigray showed that 46.9%,33.0% and 11.6% were stunted, underweight and wasted respectively(11).

Statement of the problem

The overall prevalence of malnutrition for 32 countries in the four sub-regions of SSA was 33.2% for stunting, 7.1% for wasting, and 16.3% for underweight in 2013(2).

Stunting is more common in Amhara (46%) and less common in Addis Ababa (15%). Children from the poorest households (45%) and whose mothers have no education (42%) are more likely to be stunted.(6)

Globally, Malnutrition is alarmingly decreasing the two-decade, but still major public health problems in the world, especially in developing countries, include Ethiopia**.** stunting and wasting affected 22.2% or 150.8, and 7.55 or 50.5 million children under five respectively in 2017 (12).

Ethiopia has a high prevalence of Acute and Chronic Malnutrition, with almost half of Ethiopian children chronically malnourished and one-in-ten children wasted. About 47% of children under-five are stunted, 11% are wasted and 38% are underweight. Acute malnutrition also known as wasting, it is characterized by a rapid deterioration in nutritional status over a short period(13).Epidemiological studies were conducted in developing countries have identified several factors associated with under nutrition, including low parental education, poverty, low maternal intelligence, food insecurity, rural residence and sub-optimal infant feeding practices(14).Nearly half of death under-five is attributable by malnutrition. Malnutrition puts children at greater risk of dying from common infections, increases the infection and delayed recovery. Poor nutrition in the first 1,000 days of a child's life can also lead to stunted growth, which is irreversible and associated with impaired cognitive ability and reduced school and work performance(19).Children whose preceding birth interval was less than two years were 1.43 times at higher risk of being

malnourished compared to children with preceding birth interval greater than 24 months. The risk of being malnourished among children whose mother did not attend education was 1.32 times higher compared to children whose mothers attended primary education(25). Chronic undernutrition in Ethiopia is widespread and many children consume highly monotonous diets. To improve feeding practices in Ethiopia, a strong focus in nutrition programing has been placed on improving the nutrition knowledge of caregivers(28).

Literature review

The demographic health survey of Ethiopia 2016 shows nearly four in 10(38%) of children were stunted (too short for their age which indicates chronic malnutrition), and it was common in Amhara (46%) and less common in Addis Ababa (15%). The study also shows that the overall 10% and 24% of children in Ethiopia were wasted and underweight respectively. In addition to that children from the poorest (42%) and children whose mothers have no education 942%) are more likely to be stunted(6).

A Cross-sectional Study conducted in January 2014 to study nutritional status and effect of maternal Employment among Children Aged 6–59 Months in Wolayta Sodo town, Southern Ethiopia, the overall result showed that the prevalence of malnutrition was 29.9%, 18.4% and 29.9% for underweight, stunting and wasting, respectively. And the knowledge and understanding of mothers have on child nutrition and feeding practices were likely to have a positive impact on their children(7). A community based cross section study on the prevalence of stunted, wasted and underweight among 6-59 months old children conducted in east Bedewacho district, SNNP Ethiopia from February 20-30-2014 shows that 44.1%, 9.7% and 28.7% respectively that was similar with DHS of Ethiopia 2011(10).

Another health facility based cross sectional study conducted in Shashemenie referral hospital among 6-59 months old children shows that the overall magnitude of stunted was 38.3%, 49.2% wasted and 25.5% was wasted. The highest magnitude of malnutrition was registered among female children 6-59 months old. The highest magnitude of stunted was among children 24-35 months (9.9%) followed by children aged 12-23 months (9.6%) The study also shows Children whose mother completed grade 9-12 were 0.3 times less likely to be stunted than children whose mother had non-formal education(14). A community based cross sectional study about under nutrition and

associated factors among children 6-59 months old conducted in Belesa district, North West Ethiopia shows the prevalence of stunting and wasting was 57.7% and 16.0% respectively. Stunting was higher among male children and wasting was more among female children. However both stunting and wasting were more prevalent among children 12-23 months old(15).

A study conducted about acute malnutrition among children aged 6–59 months of the nomadic population in Hadaleala district, Afar region, northeast Ethiopia, shows that the overall malnutrition was 11.8% in which female children were more affected (60%) opposite to a study conducted in Belesa district north west Ethiopia and it was high in 12-23 months old children accounted 50%.(16). Community cross sectional study conducted in rural dwellers of Damot gale district, south Ethiopia, from February 1-March 2-2016, shows that the prevalence of underweight and wasting was 27.6% and 9% respectively(18).

A community based cross-sectional study conducted in Haramaya district, East Hararghe Zone, Ethiopia from January 05 to March 25, 2015 indicated the prevalence of stunting, wasting and underweight were 36.07%, 14.43% and 23.63% respectively. The study also revealed that child age, child sex, diarrhea infection, employment status of the mother, and household food security status were important factors of all three indicators of nutritional status of the children(20).

Magnitude of wasting and underweight among children 6–59 months of age in Sodo Zuria District, South Ethiopia, a community based cross-sectional study conducted showed that the prevalence of severe wasting and underweight was 4.4% and 3% respectively. The likelihood of being wasted was 60% higher for children who started breastfeeding between 1 and 24 h of birth than their counterparts. Children who had diarrhea 3.2–7.4) higher odds of being wasted than children had in the past 2 weeks were 2.8 times no diarrhea. Children who had diarrhea 2 weeks prior to this study were 2.8 times more likely to be underweight than children without diarrheal disease. Risk of underweight among children more likely than children whose fathers were illiterate was 5.4 times more likely to be underweight were literate. Female children were 3.2 times more affected than males.(8,23) A cross sectional study conducted among 180 agro pastoral households selected, 6-59 months old children, in Aysaita, afar regional state shows that 12.8% wasting, 46.1% and 67.8% stunting respectively (27).

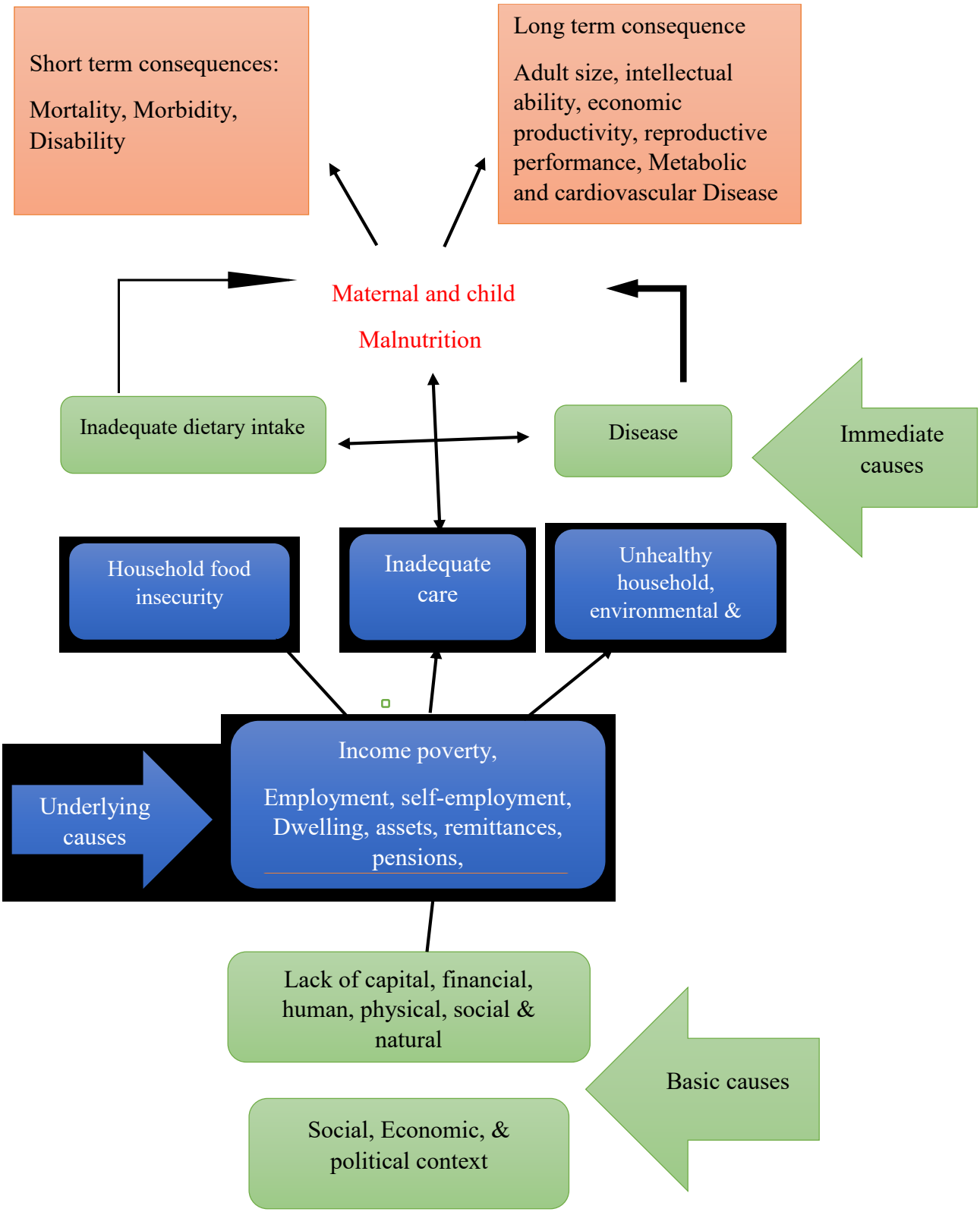


Figure 29: conceptual frame work, Ofla woreda south Tigray, Ethiopia March 2019

Object of the study

General objective

To determine the magnitude and factors contributing to 6-59 months old children malnutrition in Ofla woreda, south Tigray, Ethiopia, in 2019.

Specific objectives

To determine the prevalence of stunting among children 6-59 months old in woreda Ofla

To determine the prevalence of underweight among children 6-59 months old in the woreda

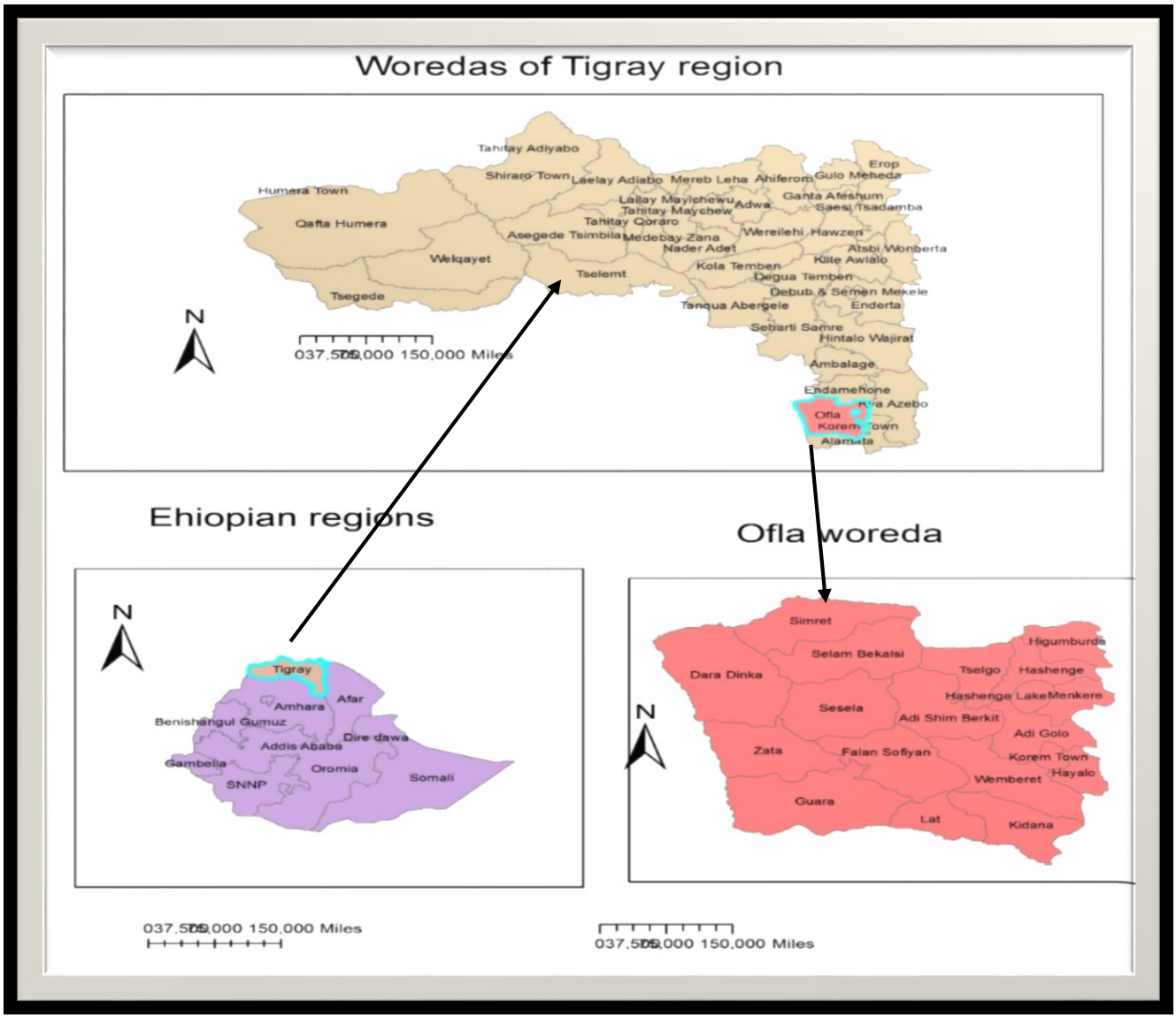
To determine the prevalence of wasting among children 6-59 months old in the woreda

To describe associated factors contributing to malnutrition among children 6-59 months old in the woreda

Methods and Materials

Study area and period

Ofla woreda is one of the eight woredas found in southern zone of Tigray, north Ethiopia. The woreda is found 579 km far from Addis Ababa and 167 km far from Mekelle. It is one of the six woredas identified as priority I hot spot for drought affected area. The study is going to be done on August 20-30-2019



Map 8: Map of Ethiopia region showing the study area, Ofla woreda, south Tigray Ethiopia May **2019**

Study design

Community based cross sectional study design is selected to conduct the study.

Study population: The study population is all 6-59 months old children living in the selected kebelles of woreda Ofla.

Source population: The source population for this study is the population of Ofla woreda living in the area during the study period.

Eligibility criteria

Inclusion criteria: All children whose age 6-59 months and resident to the area for or more than six months will be included in the study. Even if twins are included in the study.

Exclusion criteria: Children with deformity found in the selected household , under six months old children and a family who is not yet 6 months resident in the locality (area) will be excluded from the study.

Sample size determination: The sample size has been determined using population survey process with the assumption of Prevalence of stunted children in Tigray 39% and design effect 2 and total number of under five of the woreda was 23182 used. Besides, 95% confidence interval, 0.05 marginal errors have been used to calculate the final sample size and 10% of sample will be added for the non-response rate. 720 sample was taken.

Sampling procedure and technique

Ofla woreda was selected purposely from five priority I hot spot woredas in Tigray region. And then from 25 kebelles in Ofla woreda we draw six kebelles randomly using lottery method and then going down to villages under the kebelles. The kebelles are selected using multi- stage cluster sampling technique. Out of 2059 children under five in the six villages, 720 children are selected using population proportion from each village. The final sample size was taken from the villages (households) within the kebelles. Systematic random sampling will be used to conduct the survey or anthropometric assessment.

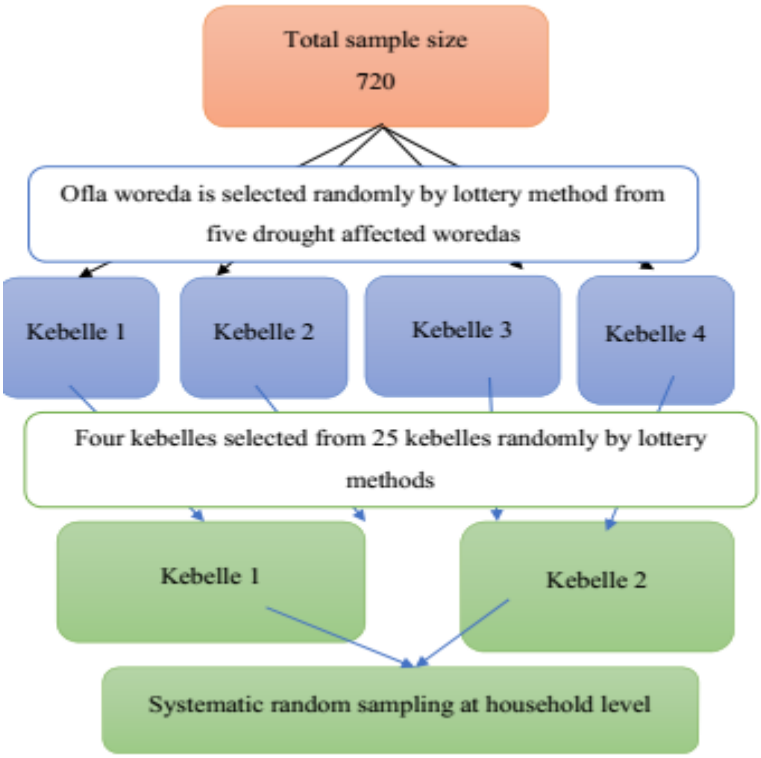


Figure 30: Multistage cluster sampling technique, Ofla woreda south Tigray, Ethiopia, May 2019

Data collection methods

Data is going to be collected using structured questionnaire prepared in English version and then converted to local language Tigrigna. Informed consent from the mothers and care givers will be taken and anonymity and confidentiality will be ensured. The questionnaire consisted of socio demographic characters knowledge assessment and anthropometric measurements to gather quantitative required information. A pretest should be conducted before the actual work started to check language barrier of respondents

Anthropometry-age, sex, weight and height should be recorded correctly to the nearest 0.1 cm and 0.1 Kg respectively. For children under two years, recumbent length measurement will be taken. Each subject will be weighed with minimum clothing and no foot wear. Age of each child should be collected from the mother and counter checked using vaccination cards, baptismal certificates or other forms of informal recording.

Data collection tools

The necessary equipment for body measurements like weight scale, and board for height measurement should be employed during the anthropometric measurement.

Data quality control

To ensure quality of data the questionnaire will be edited and should be corrected to the minimum and before entering and analysis data we should edit and clean our data for completeness. Pretest should be conducted before we start to collect the data throughout the collection period.

Study variable

Dependent Variables	**Independent variables**
Stunting Wasting Underweight	Age, Sex, Educational status Marital status, Number of children, Household income

Data analysis and interpretation

Data analysis would be carried out with SPSS software. The anthropometric result will be analyzed by using emergency nutrition assessment for SMART software. We will also use WHO standard to compare results.

Operational definition

Malnutrition: The condition that develops when the body doesn't get the right amount and proportion of protein, carbohydrates and fats as well as of vitamins and mineral salts. All of them needed to maintain healthy tissues and organs functions. Malnutrition occurs in people who are either under nourished or over nourished (which will not be included in this study).

Undernourished: Is below -2 or -3 z-score line in weight for age, weight for length/height or BMI for-age and length/height for age.

Stunted: (length/height for age) below the -2 Z score line. Severely stunted below the -3 Z score line.

Underweight: (weight for age) below the -2z score line. Severely underweight is below the-3 z score line.

Wasted: (weight for length/height) or body mass index for age) below -2z score line .severely underweight is below -3z score line.

Ethical clearance

We will obtain ethical clearance from Addis Ababa University College of health sciences, school of public health and official cooperation letter from Ofla woreda administrative office and health office head. Communication will be made between us and the health office of Ofla woreda. We will obtain also permission from participants after informed consent before we started data collection and anthropometric measurement. Data will never be used for other purposes than the objective of this study. Confidentiality will remain secured and anonymity will be ensured. For all children consent will be obtained from mothers/care givers.

Dissemination of the result

The result of this study will be summited to Addis Ababa University school of public health department of field epidemiology , in partial fulfilment of the degree master in field epidemiology and it will disseminated to the woreda health office and administration and to concerned bodies accordingly.

Table 48: Work and budget break down plan, Ofla, south Tigray, Ethiopia May 2019

S.	Activities	Mar	Apr	May	June	Jul	Aug
1	Write up proposal	X					
2	Submission to mentors	X					
3	Incorporate the comments given by mentors	X					
4	Submission of proposal to AFNET		X				
5	Presentation Of the Proposals(defense)			X			
6	Procurement of research materials					X	
7	Trainings to data collectors and supervisors					X	
8	Data collection					X	
9	Data entry and analysis						X
10	Write up research report						X

11	Submission of the final version research report						X
12	Presentation of the final research report(defense						X

S.no	**Budget category**	**Unit cost**	**Quantity**	**Total cost**
1	Personal	Perdiem/d	No staffs/days	
	Principal investigator (Subsistence allowance)	350 birr	1x15	5250
	Supervisors' per diem	300	2 x10	6000
	Data collectors	300	6x10	18000
	Data entry clerk	300	1x10	3000
	Sub total			32250
3	Supplies	Cost per item	Number	
	Questionnaire duplication	2 birr/per page	720 x2	2880
	Flip chart paper	150	2x150	300
	Pen	10	10x10	100
	Pencil	2 Birr	10x1	20
	Eraser	10 birr	5x10	50
	Sharper	10 birr	5x10	50
	Printing paper(pack)	500 birr/per pack	1	500
	Printing and Binding	500	2	1000
	Sub total			4900
4	Training	Cost/item	Number of days	
	Hall rent	1500	2	3000
	Tea/coffee	150	9 x2	2700
5	Sub total			5700
	Total			42850
6	Contingency (5%xTotal)			2142.5
7	Grand total			44992.5

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CHAPTER 9: ADDITIONAL OUTPUT

9.1 WEEKLY BULLETIN TIGRAY REGIONAL HEALTH BUREAU APRIL 2019

Tigray Regional Health Bureau, Health Promotion and Diseases Prevention Core Process

Public Health Emergency Management (PHEM) Case TeamWeekly Bulletin, WHO week 15 /2019 (30/07/2011-06 /08/2011

Introduction

Early warning is the identification of public health threat by closely and frequently monitoring identify indicators and predicting the risk it poses on the health system. As part of the indicator based surveillance system our country closely following 23 diseases in daily and weekly bases.Table 1: Daily reportable diseases

S.N	*Disease type*	*Ca*	*Death*
1	*AFP*	*0*	*0*
2	*Anthrax*	*0*	*0*
3	*Avian Human*	*0*	*0*
4	*AWD*	*0*	*0*
5	*Dracunculiasis*	*0*	*0*
6	*Measles*	*4*	*0*
7	*Neonatal Tetanus*	*0*	*0*
8	*Pandemic Influenza*	*0*	*0*
9	*Rabies/Dog Bite*	*4*	*0*
10	*SARS*	*0*	*0*
11	*Smallpox*	*0*	*0*
12	*VHF*	*0*	*0*
13	*Yellow fever*	*0*	*0*
14	*Maternal Death*		*1*
15	*NND*		*7*

Table 1: Daily reportable diseases

Dog bite

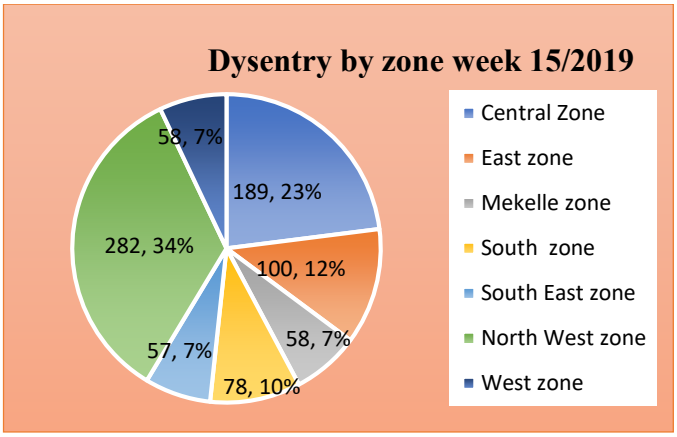
A total of 45 Rabies suspected cases were reported from different zones out of those central zone reports 22(48.9%), followed by Mekelle 15(33.3%), East 5(11.1%) and the West zone zones 3(6.7%).

Maternal and Neonatal Death Only seven neonatal deaths (Mekelle =6, Western=1) and one maternal death was reported from eastern zone this week.Table 2: Weekly reportable diseases

Disease type	*Case*	*Death*
Malaria	*2108*	*0*
Dysentery	*833*	*0*
Meningitis	*2*	*0*
Relapsing fever	*8*	*0*
Typhoid fever	*584*	*0*
Typhus	*14*	*0*
Severe malnutrition	*122*	*0*
Hepatitis veno-occlusive disease	*0*	*00*
Scabies	*143*	*0*

Public Health Emergency Management (PHEM) Case Team

Weekly Bulletin, WHO week 15 /2019 (30/07/2011-06 /08/2011 E.C)



A total of 822 cases of Dysentery were reported from the region, North West zone is the leading one with the number of cases 282(34.3%) followed by Central zone 189(23%), East zone 100(12.2%) and the rest four Zone 251(30.5%). This might be show that low in WASH activity especially in North West and central Zone.

Scabies A total of 143 cases were reported in this week. Out of these 69(48.3%) from East zone, 24(26.6%) from central, 12(8.4%) from North West zone and 11(7.8%) from south east zone were reported

Focus issues for next week

Increase preparedness on rabies & Malaria

- Measles active case searches should be in place
- Follow up should be in place for dysentery and scabies.
- Attention should be strengthening in NND and

A total of 822 cases of Dysentery were reported from the region, North west zone is the leading one with the number of cases 282(34.3%) followed by Central zone 189(23%), East zone 100(12.2%) and the rest four Zone 251(30.5%). This might be show that low in WASH

A total of 14,514 patients tested for Blood film or RDT. Out of those malaria confirmed cases of 2108 of these P. F=1513(71.8%), P. V= 595(28.2%) and no death reported

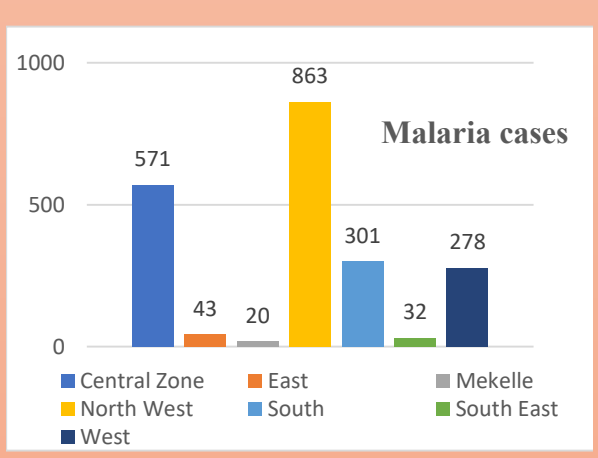


Figure: 1 Summary of malaria cases

WHO week 15/2019

Annex 1: Measles outbreak investigation questionnaire for Case control study

Respondent: Case □ control □

1. Data collector name……..
2. Date of data collection…….
3. Village/Kebelle……. Got /ketene…….
4. Latitude……Longitude……..
5. What is your relation to the person we are asking questions about?

   Mother □ Father □ Grandmother/ father □ Guardian sister/ brother □ □ other
6. Respondent's age
7. Sex :Male □ Female □
8. Family size…
9. Ethnicity :Tigray □ Amhara □ Oromo □ Afar □
10. Religion: Orthodox □ Muslim □ Catholic □ Protestant □ other □
11. Educational status : Kindergarten□ illiterate□ Able to read and □ Primary (1-8) □ Secondary(9-12)□ College and above□ not applicable
12. Occupation :Farmer □ housewife □ Merchant □ Student □ Unemployed□ Gove'tal employee □ Pastoralist □
13. Marital status: single □ Married □ Divorced □ Widowed □ separated □ not applicable
14. Is there any sick person with rash, Fever, running nose or conjunctivitis? Yes □ No □
15. If Yes, number of sick person……
16. Were the case/ control Sick for Other disease 1 week back this disease? Yes □ No □
17. What was the symptoms? Fever □ Rash □ Cough □ Coryza □conjunctivitis □ Diarrhoea □ Blurred vision □ Ear discharge □ vomiting □ Croup □
18. Date of onset of fever……/……./……..Date onset of Rash……./……/……
19. Date seen at health facility……/……./……
20. Did you/he/she take treatment? Yes □ No □
21. If yes, treatment taken: ORS □. Antibiotics □ Vitamin A □ TTC ointment □ Anti pyretic□ supplementary food □
22. Did you /he/she recover after treatment? Cured □ Partially improved□ Deteriorated □ Dead □ same □

23. Have you ever vaccinated for measles? Yes □ No □ Unknown □
24. If yes last vaccination date by card…./ ./……By history …../……../……
25. Number of vaccine doses received: One dose □ Two doses □ Three and above □
26. Have you ever had measles infection? Yes □ No
27. Did you have any travel history 7-8 days to areas with active measles cases? Yes □ No
28. If yes to Q26, Did you have any contact with confirmed or suspected cases of measles? Yes □ No
29. If yes in Q 30, How? Living together □ Playing together□ Sleeping together □ visiting relatives □ Admitted with suspected measles cases □
30. Do you have any travel history four days before and after rash onset? Yes □ No □
31. If yes to Q29, where.....Do you have any contact history with someone who has measles disease? Yes □ No □
32. If yes for Q30, when……. /……. /…….
33. If yes to Q31 With whom? School friends' □ Neighbors □ neighbor □ Market □ other specify…….
34. Do you know modes of transmission for measles? Yes □ No □
35. Nutritional status (MUAC)…….cm…….
36. How many people sleeping together...?
37. Housing condition: Ventilated □ not ventilated □
38. Where do you go first if you get ill for measles? Health facility □ Traditional Healer □ Holy water □ Stayed at home □ other □
39. If answer for Q39 other than health facility, why.....?
40. How do you think people get measles? Contact with sick person □ Wrath of God Curse of other people □ I I don't know □ Other □
41. Do you know measles is vaccine preventable? Yes □ No □
42. Who do you think that can be affected by measles? Under five children □ Children less than 18 years □ Women of any age □ any age group □ I don't know □
43. How do you think measles can be cured? Using modern medicine □ using traditional medicine □ holy water □ Feeding nutritious food □ keeping the sick person indoor □ I don't know □
44. When do you go to health facility if get ill for measles? Immediately □ 1-3 days after □ after a week □ keeping the sick person indoor and making cultural practices □

Annex 2: ***Scabies Outbreak Investigation Questionnaire*** *for case – control study*

ID Number …….

Respondent status… Case □ Control □ Latitude ……Longitude……

1. Respondent's age……..
2. Sex : Male □ Female □
3. Residence: Urban □ Rural □
4. Occupation: Farmer □ Student □ House wife □ other specify……..
5. Religious: Orthodox □ Protestant □ Muslim □ catholic □
6. Marital Status: Single □ Married □ Divorced □ Widowed □ Separated □ Not applicable/under 18
7. Educational Status: Kindergarten□ illiterate□ Able to read and □ Primary (1-8) □ Secondary (9-12)□ College and above□ not applicable
8. Ethnicity :Tigray □ Amhara □ Oromo □ Afar □ other
9. Total number of family members who live in the house……
10. Number of Families affected……
11. Did you sleep with scabies case? Yes □ No □
12. Have you contact history with scabies case in the last 6 weeks? Yes □ No □
13. Which sign and symptom did you experience first? Itching □ Rash □
14. Date of onset/onset of itching? ……/……/……. (DD/MM/YY)
15. When is itching is intense? Daytime □ At night □ All the time
16. Is rash seen? Yes □ No □

Skin Examination

17. Can you see scabies lesion? Yes □ No □
18. If yes, how long is the duration…….?
19. If there are lesions, How many? Mild (5 or less) □ Moderate (6-10) □ Severe (11-49) □ Very sever (50-More)
20. Which body part is mostly affected? Hands □ Wrist □ Elbows □ Breasts □ Armpits □ Waist line □ Groin area □ Abdomen □
21. Do scabies lesions look infected? (Pus filled sores or crusted sores over scabies lesion)? Yes □ No □

22. Does it look like crusted/Norwegian Scabies? (Generalized scaling and crusting of skin)? Yes □ No □

Skin sore Assessment

23. Can you see any Skin sores? Yes □ No □
24. If yes sores, how many? Mild (5 or less) □ Moderate (6-10) □ Severe (11 -49) □ Very sever (≥50) □
25. Do any the sores look crusted (infected scabies)? Yes □ No □
26. Are there any of the sores pus filled (include infected scabies)? Yes □ No □

Sanitation and Hygiene

27. How often do you take shower? Weekly □ Every other week □ Monthly □ Quarterly □ Once a year □ Never □
28. What do you use detergents to take shower? Only water □ with soap □ Other □
29. Have you bathed someone else with the disease in the previous six weeks? Yes □ No □
30. If yes, who is he/she ……?
31. How often do you wash your clothes? Weekly □ every other days □ monthly □ every two months □ Every three month □ Not at all □
32. Did you share matts/bed sheets? Yes □ No □
33. Have you put on clothes of someone who was diseased in previous six weeks? Yes □ No □
34. What are the sources of water for your drinking water? Pipe □ Well □ Spring □ River
35. Have you ever heard about scabies disease prevention, treatment and transmission? Yes □ No
36. If yes on question 35 where and when did you hear about scabies disease prevention, treatment and transmission?

Annex 3: T otal Pneumonia cases reported tyo Tigray regional healrh bureau from 2015-2017

Annex 4: pneumonia death by age and sex in Tigray, Ethiopia from 2015-2017

Year	Males				Females			
	< 5 years	5-14 years	≥15 years	Total	< 5 years	5-14 years	≥15 years	Total
2007 IPD	2806	458	2070	5334	1729	257	2298	4284
2007 OPD	49617	9224	40316	99157	38284	7060	30749	76093
Total	52423	9682	42386	104491	40013	7317	33047	80377
2008 IPD	3250	505	2257	6012	2081	323	2805	5209
2008 OPD	56533	9786	40417	106736	43852	7803	33067	84722
Total	59783	10291	42674	112748	45933	8126	35872	89931
2009 IPD	3174	423	2156	5753	1956	301	2320	4577
2009 OPD	64204	12188	50355	126747	49295	9332	40570	99197
Total	67378	12611	52511	132500	51251	9633	42890	103774
Grand total	179584	32584	137571	349739	137197	25076	111809	274082

Year	**Male**				**Female**			
	< 5 years	5-14 years	≥15 years	Total	< 5 years	5-14 years	≥15 years	Total
2007	61	8	45	114	19	8	34	61
2008	43	11	56	110	30	5	51	86
2009	42	5	47	94	25	4	27	56
Total	146	24	148	318	74	17	112	203

Annex 5: The population of Tigray, Ethiopia by age from 2015-2017

S.no	**Age category**	**2015**	**2016**	**2017**

1	< 5 years	737569	751722	765584
2	5-14 years	1471434	1499668	1527324
3	≥15 years	2845997	2900608	2954097
	Total	5055000	5151998	5247005

Annex 6: ***Data collection tools for surveillance system evaluation in Raya Azebo woreda south Tigray Ethiopia, December 2018.***

I. HEALTH POST LEVEL QUESTIONNAIRE

Identifiers

Assessment team ……Type of health facility

Date District……Interviewer

Region/province……..Respondent

Respondents position……..Name of health facility Surveillance system

1. Number of Health Post with national surveillance manual

Is there a national manual for surveillance at Health Post?

Observe national surveillance manual: Yes □ No □ Unknown □ Not applicable □

I. Case detection and registration

2. Does the Health Post have a clinical register Yes □ No □ Unknown □ Not Applicable?

3. Does the Health Post correctly register cases during the previous 30 days?

Yes □ No □ Unknown □ Not applicable □

4. Does the Health Post have standardized case definitions for the priority diseases (each priority disease) Meningitis, AFP (polio), measles, malaria?

Yes □ No □ Unknown □ Not applicable □

II. Data reporting _____

5. Does the Health Post have appropriate surveillance forms for that site at all times over the past 6 months Yes □ No □ Unknown □ Not applicable □

6. Does the Health Post reported accurately cases from the registry into the summary report to go to higher level

Observed that the last monthly report agreed with the register for 4 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])

A. Observe Malaria Yes □ No □ Unknown □ Not applicable □

B. Observes Malaria Yes □ No □ Unknown □ Not applicable □

C. Observe Meningitis Yes □ No □ Unknown □ Not applicable □

7. Does the Health Post that reported each reporting period to the next higher level during the past 3 months?

Yes □ No □ not Known □ Not applicable □

8. Number of reports in the last 3 months compared to expected number

Observe Weekly: /12 times the number of sites

Observe immediately: /--times the number of sites

9. on time (use national deadlines)

Observe Number of weekly reports submitted on time:-_____ /12 times the number of sites

Observe Number of immediately reports submitted on time: ___/--times the number of sites

10. Does the Health Post have means for reporting to next level by e-mail, telephone, fax or radio

How do you report?

a. Mail b. Fax

c. Telephone d. Radio

e. Electronic f. Other

11. Strengthening reporting

How can reporting be improved?----------

III. Data analysis

Percent of sites that:

12. Does the Health Post describe data by person (outbreaks, sentinel)

Observe description of data by age and sex

Yes □ No □ Unknown □ Not applicable □

13. Does the Health Post describe data by place?

Observed description of data by place (locality, village, work site etc)

Yes □ No□ Unknown □ Not applicable □

14. Does the Health Post describe data by time?

Observe description of data by time: Yes □ No □ Unknown □ Not applicable □

15. Does the Health Post Perform trend analysis

Observe line graph of cases by time

Yes □ No □ Unknown □ Not applicable □

IV. Epidemic response_____

16. Does the Health Post implemented prevention and control measures based on local data for at least one epidemic prone diseases Yes □ No □ Unknown □ Not applicable □

V. Feedback

17. Does the Health Post have received a report or bulletin from a higher level during the past year on the data they have provided?

Yes □ No □ Unknown□ Not applicable □

18. How many feedback bulletin or reports has the health facility received in the last year?

19. Does the health post receive at least one report or bulletin from a higher level during the past year on the data they have provided?

Yes □ No □ Unknown □ Not applicable □

20. Doe the health post conducted at least semi-annual meetings with community members to discuss results of surveillance or investigation data.

Yes □ No □ Unknown □ Not applicable□

21. How many meetings has the health post conducted with the community members in the past six months? _____

Observed the minutes or report of at least 1 meeting between the health facility team and the community members within the six months

Yes □ No □ Unknown □ Not applicable □

VI. Supervision:

22. Was HEWs supervised in the past 6 months?

Yes □ No □ Unknown □ Not applicable □

23. How many times have you been supervised in the last 6 months? _____

24. Of those supervised in the previous 6 months, percent of individuals for which the supervisor from the next higher level reviewed surveillance practices appropriate to their level

Observe supervision report or any evidence for appropriate review of surveillance practices

Yes □ No □ Unknown □ Not applicable □

VII. Training

25. Number of HEWs trained in disease surveillance and epidemic management.

Yes □ No □ Unknown □ Not applicable □

26. If yes, specify when, where, how long, by whom? _____

_____

VIII. Resources

27. Does the Health post have?

a. Electricity b. Bicycles

c. Motor cycles d. Vehicles

28. Data management

a. Stationer b. Calculator

c. Computer d. Software

e. Printer f. Statistical package

29. Communications

a. Telephone service b. Fax

c. Radio call d. Computers that have modems

30. Information education and communication materials

a. Posters b. Megaphone

c. Flipcharts or Image box d. VCR and TV set

e. Generator f. Screen

g. Projector (Movie) h. Other:

31. Hygiene and sanitation materials

a. Spray pump b. Disinfectant

32. Protection materials (list) _____ _____

IX. Satisfaction with surveillance system

33. Satisfaction with the surveillance system

Are you satisfied with the surveillance system?

Yes □ No □ Unknown □ Not applicable □

34. If no, how can the surveillance system be improved? _____

_____

35. Opportunities for integration

What opportunities are there for integration of surveillance activities and functions (core activities, training, supervision, guidelines, resources etc.?)

Attributes

a) Usefulness

1. Total population of the district under surveillance_____

2. How many cases and deaths reported in the district from the following disease past 6 month?.

a) Malaria cases _____Deaths _____

b) Measles cases _____Deaths _____

3. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early. Yes□ No □ Not Applicable □

b) To estimate the magnitude of morbidity, mortality and factors related to these

Diseases? Yes □ No □ Not Applicable □

c) Permit assessment of the effect of prevention and control programs? Yes □ No □ Not Applicable

b) Simplicity

4. Do you feel that data collections on a case report form are time consuming? Yes No N/A

5. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) Flexibility

6. Do you think that the current reporting formats used for other newly occurring health

Event (disease) without much difficulty? Yes□ No □ Not Applicable □

7. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes□ No □ Not Applicable □

If yes, how_____

d) Data Quality

8. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes □ No □ Not Applicable □

9. Are the reporting site / data collectors trained/ supervised regularly?

Yes □ No □ Not Applicable □

If, Observe: Review the last months report of these diseases

10. Average number of unknown or blank responses to variables in each of the reported forms _____

11. Percent of reports which are complete (that is with no blank or unknown responses) from the total reports _____

e) Acceptability

12. Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes □ No □ Not Applicable □

If yes, how many are active participants (of the expected to)? _____

13. If no, what is the reason for their poor participation in the surveillance activity?

a) Lack of understanding of the relevance of the data to be collected

b) No feedback / or recognition given by the higher bodies.

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

f) Representativeness

14. What is the health service coverage of the district? _____%.

15. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes □ No□ Not Applicable □

46. Who do you think is well represented by the surveillance data? Urban / rural

g) Timeliness

47. What proportion of health facilities reports in acceptable time------?

h) Stability

48. Was there lack of resources that interrupt the surveillance system?

Yes □ No□ Not Applicable □

If yes, how did you manage it? _____

49. What do you suggest to overcome such problems? _____.

I. Sensitivity:

Do u thing the surveillance system captures most of the priority disease (cases) under surveillance in the HP/Community? Yes, No, If No what is the reason----------

j. PVP:

Do u think cases reported by the surveillance system are actually cases? E.g. measles

Yes □ No □ If No gives explanations

Annex 7: Health profile assessment checklist

Region_____Zone_____Woreda_____Respondant_____Intervie wer_____

1. **Historical Aspects of the area (if available)**

1.1 When founded the area as district

1.2 How and why the name was given

_____

1.3How was the district formed_____

1.4 Any other historical aspect_____

2. **population and Climate**

2.1 Area of the District _____

2.2 Altitude _____

2.3 Latitude_____

2.4 Longitude _____

2.5 Average Annual rain fall _____

2.6 Main rainy season

2.7 Average Annual temperature _____

2.8 Maximum temperature minimum temperature

2.9 Land bodies_____

2.10 Water bodies_____

2.11Boundaries of the district East----------South---------North----------West-----

2.12 Distance from Addis Ababa----------Mekelle----------

3 Demographic information

3.1 Total Population _____

3.2 Household size----------

3.3 Male_____Female_____

3.4 Urban_____Rural_____

3.5 Sex ratio (Male to Female) _____

3.6 Age structure: - percentage of children < 1yrs_____. <5yrs____ < 15 years and >15 Population Pyramid

3.7 Percentage of old people >65 years_____

3.8 Reproductive year female population 15-49

3.9 Percentage of pregnant women_____

3.10 Dependency ratio_____

3.11 Annual growth rate

4 **Population size by religion if available**

4.1 Orthodox ---------- in no……. %

4.2 Catholic ---------- in no……. %

4.3 Protestant---------- in no……. %

4.4 Muslim ---------- in no……. %

4.5 Others ---------- in no……. %

5. Political and administrative organization

5.1Number of Kebeles (Urban) ___ _ (Rural) ____Total _____

5.2 Number of Kebeles with transportation access_____

5.3 Number of Kebeles without transportation access _____

5.4 Number of Kebeles with electric power _____

5.5 Number of Kebeles without electric power_____

5.6 Number of kebelles with telephone service (cable based/wireless_____

5.7 Number of Kebeles without telephone service_____

5.8 How many supporting NGOs are in the area _____

5.9 Number of health development army (HDA)

5.10 Number of ambulances in the woreda

5.11 Health insurance *coverage*

6. Productivity and income

6.1 main base of economy _____

6.2 Average income level_____

6.3 part of the population (%) whose economic source is from

a) Farming _____

b) Animal production_____

c) Trade _____

d) Government employee (salary**)** _____

e) Others_____

6.4. Productivity of the land/hectare _____quintals/hectare

6.5. Common crop products_____

6.6. GDP (during harvesting season/ Meher) _____quintal

6.7. GDP from irrigation_____quintals

6.8. Total GDP_____Quinta

6.9. Employment rate……& unemployment rate……

7. Water supply

7.1. Source of water_____

7.2. Number of pipe water supply_____

7.3. Is there chlorination of water_____?

7.4. Frequency of chlorination_____

8. Education

8.1. Number of enrolled elementary schools (male and female) _____

8.2. Number of enrolled secondary schools (male and female) _____

8.3. Number of colleges/universities total number of students_____

8.4. Number of teachers at elementary_____ secondary_____ and colleges/universities_____

A. Education and school Health

Sr. no	Type of School	# Schools	# teachers			# Students			Student School Drop out	Female Student School Drop out
			Male	Female	Total	Male	Female	Total		
1	Primary									
	1-4									
	5-8									
	Total									
2	Secondary									
	9-10									
	11-12									
	Total									
	Total									

	Toilet		Pipe water	
School	with	Without	with	without
Primary school				
Secondary school				

9. **Social situation:**

9.**1.** Number of libraries_____

9.2. Number of NGO working on public health_____

9.3. Number of youth club……..

10.Estimated Population size by kebelle in 2010EFY (2017/18)

Sr. no	**Name of the Kebele**	**Population size**	
		Male	**Female**
1			
2			
3			
4			
5			

11. Health status

Health service institutions and infrastructure

Sno	**Type of Health facility**		**Number**	**remark**
1	Number of H/post	with sustainable/ 24 hour /electric power		
		without sustainable/ 24 hour /electric power		
		with telephone service (cable based/mobile)		
		without telephone service (cable based/mobile)		
		with piped water supply		
		Without piped water supply		
2	Number of H/C	with sustainable/ 24 hour /electric power		
		without sustainable/ 24 hour /electric power		
		with telephone service (cable based/mobile)		
		without telephone service (cable based/mobile)		
		with piped water supply		
		Without piped water supply		
3	Number of hospitals			
4	Number of health centers			
5	Number of health posts			

6	Number of private clinic		
7	Number of pharmacies		
8	Number of drug vendors		
9	Number of diagnostic laboratories		
10	Hospital to population ratio		
11	Health center to population ratio		
12	Health post to population ratio		
13	Physical health service coverage		

12. Human resource of the district health office and health facility in 2010EFY (2017/18)

Sr. no	Type	Male	Female	Total
1	Physicians			
2	Health officers			
3	Laboratory technician/technologist			
4	Pharmacy technician/Pharmacist			
5	Nurses			
6	Midwife			
7	HEWs			
8	HIT			
9	X-Ray technician			
10	Environmental professional			
11	IESO			
12	Anesthesia			
13	Supportive Staff			
	Total			

13. Top Ten causes of morbidity and mortality 2010EFY (2017/18)

A. Top ten leading causes of OPD visit (morbidity)

	Adult			Pediatrics		
Sr. no	Diseases type	Number	%	Diseases type	Number	%
1						
2						
3						
4						
5						
6						
7						
8						
9						

10						

B. Top ten causes of deaths (mortality).

Sr. no	Adult			Pediatrics		
	Diseases type	Number	%	Diseases type	Number	%
1						
2						
3						
4						
5						

14. **Vital statistics 2010 EFY (2017/18)**

- Under 5-year age PNMR_____
- IMR_____ Live births
- MMR_____ CBR_____
- GFR_____ CDR_____
- CMR NMR_____

15. **MNCH and EPI coverage of the district 2010 EFY (2017/18)**

Sr. no	Description	Performance			Remark
		Plan	Achievement	%	
1	ANC 1 coverage				
2	ANC 4 coverage				
3	Skill delivery				
4	PNC				
5	Still birth				
6	BCG coverage				
7	Measles vaccine				
8	Penta1				
9	Penta3				
10	PAB				
11	Fully vaccinated				
12	Contraceptive prevalence				
13	LAFP				
14	TT2 coverage for pregnant				
15	TT2 coverage for no pregnant				

16. Hygiene and environmental health services 2010 EFY (2017/18)

	Description	

Sr. no		Number	(%)
1	Number of house hold with latrine		
2	Latrine coverage		
3	Safe water supply coverage		
4	Number of Kebeles accessed to safe water supply		

18. Endemic Diseases

A. Malaria prevention and control program of ……...District 20.. EFY (20.../)

Sr. no	Description		Number	
1	Number of Malarias' Kebelles			
2	ITN coverage			
3	CCoverage of Insecticide chemical spray			
4	Total OPD cases			
5	onfirmed cases by RDT/microscope	PF		
		PV		
		Mixed		
6	Cases treated clinically for malaria			
7	Total BF done			
8	Cases treated based on lab finding	PF		
		PV		
		Mixed		

C. Prevalence of TB/Leprosy: **2010 EFY (2017/18)**

Sr. No	Description		Population no. (%)
	Prevalence of TB		
1	Pulmonary TB	Smear positive	
		Smear negative	
2	Extra PTB		
3	TB detection rate		
4	TB Rx completion rate		
5	TB cure rate		
6	TB Rx success rate		
7	TB defaulter rate		
8	Death on TB Rx		
9	Total TB patients screened for HIV		
10	HIV prevalence rate among TB cases		

11	Prevalence of Leprosy	

D. HIV/AIDS 2010 EFY (2017/18)

Sr. No	Activities	Male	Female	Total	Remark
1	Total people screened for HIV				
2	VCT				
3	PICT				
4	PMTCT				
5	HIV Prevalence				
6	Total PLWHIV				
7	On ART				
8	Pre ART				
9	No of health facilities providing ART service				
10	Condom Distribution				

*Private Schools E.g. Nursery

Literacy ratio_____

B. Employment

- Number of people employed_____
- Number of people un employed_____
- Ratio of Employed to un employed_____

19. Health sector expenditure and financing 2006 - 2010 EFY (2017/2018)

	Source	2006 EFY	2007EFY	2008EFY	2009EFY	2010EFY
1	Total district budget (Birr)					
2	Allocated to health sector (Birr)					
3	Salary for employee (Birr)					

*Name of NGOs which Support the health Sector: _____

19.1 Health Care financing /HCF/ (_____to_____ EFY)

Sr. No	Name of the Health HFs	HCF Started at (EFY)	Budget Allocated (birr)				
			2006	2007	2008	2009	2010
1							
2							
3							

20. Exempted Health services:

A/ ---------- E/----------

B/---------- F/----------

C/ ---------- G/----------

D/ ---------- H/----------

21. Disaster situation in the district 20... EFY (20..-20…)

Was there any disaster (natural or manmade) in the district in the last one year?

Yes (specify) _____

No_____

Any recent disease outbreak/other public health emergency?

Yes (specify) _____ _____

No_____

If yes cases_____ and deaths_____

22. Population screened for malnutrition

Children_____MAM----------SAM

Pregnancy_____Moderate--------

23. Nutrition intervention in … district 2009(2016/17)

Sr. No	**Type of food intervention program**	
1	OTP sites	
2	TFU program	
3	TSF program	
4	CBN program	
5	Others	

24. What do you think the major Health problems of the district?

---

25. What do you think solutions of the addressed problems

----

26. What are the main zoonotic diseases in the district**?**

A. ----------

B. ----------

C. ----------

D. ----------

27. Problem Identification and Priority Setting – set priority health problems based on the public health importance, magnitude, seriousness, community concern, feasibility etc.

28. Discussion of the highlights and the main findings of the health profile assessment and description.

Annex 8: Rapid 'Meher' Assessment health and nutrition sector, woreda level questionnaire /checklist

Interviewer name …… Brhanu Adhana Institution---------- health office

Interview Date: ---------- Region Tigray

Main contact at this location Name ----------zone Southern ----------Woreda

Position ----------

Section 1 Socio-demographic profile				
Population: Woreda total population =	Male =	Female =	Under five =	Total =
	Number of reproductive(age 15-49)women=			
	Number of pregnant women =			
Special population (if any)	Pastoralist =	Refugee =	IDPs=	Migrant workers=
Number of HCs= Number of HPs= Number of mobile health team= Number of HEWs=				
Water availability at health centers (HC)	Number of HCs=	Number of HCs with wateravailability	Number of HCs without water availability=	
Section 2 Health Profile				
2.1. Coordination and management systems				
Is there a PHEM Officer at Woreda Health Office level? How many PHEM officers are there	Yes □ No □			
Is there RRT in Woreda health office	Yes □ No □			
Is there RRT in Woreda health office	Yes □ No □			
Are there RRTs at HCs? If yes, number of HCs with RRT _____	Yes □ No □			
Are there PHEM Officers/focal persons at HCs? If yes, number _____	Yes □ No □			
Does the Woreda Health Office regularly report PHEM report as scheduled dates? If yes, Observe copies and comment _____	Yes □ No □			
Is there a multi sectoral Health Emergency/PHEM coordination forum? If yes how frequently meet?	Yes □ No □			
Is there a Public Health Emergency preparedness and response plan? Does it include reproductive health? Observe ~~and comment (Observe a~~nd comment) _____	Yes □ No □			
Is there accessible emergency response fund? If yes, how much is that _____ If yes, how much allocated and/or by whom allocated_____,_____	Yes □ No □			
2.2. Morbidity (List top 5 causes of Morbidity) in the year 2010 EC (2018-2019)				

a. Morbidity below 5	b. Morbidity above 5
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

2.3. List number of cases/deaths from July 2010 to December 2010 (May 2018 –October 2018)

Month	Malaria		Measles		Meningitis		AWD		Pneumonia		Scabies	
	Cas	Death	Ca	Deat	Cas	Death	Ca	Deat	Case	Death	Case	Deat
July												
August												
Septem												
October												
Novemb												
Decemb												

2.4. Outbreak?

Was there any outbreak in the last 3 months? Yes □ No □

If yes specify type of outbreak of disease	Number of cases	Number of death	Specify time and period

Is there any ongoing outbreak of any disease? Yes □ No □

Type of outbreak	Number of cases	Number of death	Specify time and period

2.5. Preparedness: Is there emergency drugs and supplies enough for 1 month? Or easily accessible on need?	Comment
Ringer Lactate to treat AWD cases Yes □	
ORS to treat AWD cases Yes □	
Doxycycline treat AWD cases Yes □ No □	
Consumables (syringes, gloves for AWD management) Yes □ No □	
Amoxicillin syrup Yes □ No □	

Tetracycline for measles	Yes □ No □	
Vitamin A for measles	Yes □ No □	
Coartem for malaria	Yes □ No □	
Laboratory supply: RDT for Malaria	Yes □ No □	
Laboratory supply: RDT (posttorex) for meningitis LP Set	Yes □ No □ Yes □ No □	
Is there CTC kit for AWD? If Yes , number of kits	Yes □ No □	
Are there emergency reproductive health kits in health facilities to provide Basic Emergency Obstetric and New Born Care? (If No, list the missing medicines and supplies)		
Are there emergency medicines and supplies to support care of rape survivors? (Main shortage (if any): Specify)_____		
Is budget allocated for emergency rapid response by the woreda? How much allocated ---------- Yes □ No □		

SECTION III: RISK FACTORS

Disease	**Risk factor**	
Malaria	Malaria endemic area	Yes □ No □
	Presence of malaria breeding site	Yes □ No □
	Interrupted or potentially interrupting rivers	Yes □ No □
	Unprotected irrigation in the area	Yes □ No □
	LLINs coverage Number----------%	
	Indicate the coverage of IRS 2010 number	
	Was there prevention and control activities number -------%--------	
	Number of malarious kebelles and total population in these Kebeles	Kebelle---------- Population ----------
Meningitis	Was there Meningitis epidemic in the last 3 years (If yes specify date) If yes,No_____%_____	Yes □ No □

	Has vaccination been conducted in the past 3 years	Yes □ No □
	If yes, indicate the date and number of people vaccinated If yes, No_____%_____	
AWD	Was there AWD epidemic in the last three years (If yes specify date)	Yes □ No □
	Latrine coverage No_____%_____	
	Latrine utilization	
	Safe water coverage	
Measles	Is there ongoing measles outbreak?	Yes □ No □
	What is the measles vaccination coverage of 2010, in less than one year children	
	Has SIA been conducted in 2010 EFY No_____%_____	Yes □ No □
	If yes, indicate the month and number of children vaccinated including the age group month----------no----------age group----------coverage%----------	

Any other observations you made or any risks of epidemics?

What were the major challenges in your Epidemic response experience?

SECTION IV: NUTRITION– SAM and MAM Management in the woreda July to November 2018

SAM Management

4.1. Facilities with SAM management in the woreda

Month	Total no of HCs and	Total no of health	No of SC	% HCs/Hospitals With SC	No of OTP	No health posts	Total Number of	% of OTP/SC who
July							OTP/SC	
August							reported	

September								
October								
November								
December								

4.2 Admission and performance of the therapeutic feeding program for SAM management

Month	Total SAM cases	% of SAM children cured	% of SAM children defaulted	% of SAM children died	% of SAM children non-respondent	% of SAM children other
July						
August						
September						
October						
November						
December						

4.3. Availability of therapeutic supplies

	Yes □ No □
Is there sufficient supplies for 3 months of :	
RUTF	
F 100	
F 75	
2nd line drugs	
Is there sufficient woreda level storage for SAM treatment at woreda	
water availability at stabilization center (SC)	

4.4. Reporting

Is there weekly SAM report? Yes □ No □ (If yes observe

4.5. Training

How many HWs have been trained on SAM management in the Woreda?	Number

How many HEWs are there in the woreda?	No_____, _____%
How many HEWs have been trained in MAM management?	No _____, _____%

4.6. MAM Management

TSFP program in the woreda

Questions	Yes □ No □
Is this a priority 1 woreda?	
Was there a TSFP distribution last month?	
Are there sufficient TSFP supplies for the next 1 month (RUSF, CSB+/oil	
Is there woreda level storage of TSFP supplies for at least 2 months of	
Are children discharged from OTP referred to TSFP	
Is this a pilot (2nd generation) TSFP woreda?	
Has the Woreda been supported by any NGO in the last 3 months?	

4.7. MAM admission

Month	Priority 1 woreda Yes□ No□ I don't Know□	Total MAM Cases	Total Number of Food Distribution site in the woreda
July			
August			
September			
October			
November			
December			

4.8. Screening

When was the last screening conducted in the woreda?	----------
What screening modality is used in the woredas?	EOS □ CHD □ Routine □ vitamin A □
Screening coverage	%
Vitamin A coverage	%
De-worming coverage	%

4.9. Screening performance for children in the woreda in 2018/2019

Month	Target Children 6-59 months	Number of screened children	Screening Coverage (%)	of Children with edema and MUAC <11cm		No of children with no edema MUAC 11 to	% Proxy GAM for children	% Proxy SAM for children
				MUAC <11cm	Edema			
July								
August								
September								
October								
November								
December								

4.10. Screening performance for Pregnant and lactating Women (PLW) in the woreda

Month	Target Pregnant Lactating	No of pregnant and lactating women	Screening coverage (%)	no of PLW MUAC below 23.0	% Proxy GAM for PLW
July					
August					
September					
October					
November					
December					

* Below 23.0 cm in Tigray

4.11 Any other observations you made or any risks of emergency nutrition?

4.11 Any other observations you made or any risks of emergency nutrition?

4.12 What were the major challenges in your emergency nutrition response experience?

SECTION V: FLOODING

Was there flood disaster in the last 6 months in the **Woreda**? Yes□ No□			Yes □ No □
If yes, how many Kebeles affected? Name of kebelles affected			_____, 1. 3. 2. 4.
Population affected			
Human death due to flooding If yes how many in number			Yes □ No □ _____
Are there displaced people due to flooding?			Yes □ No □
If Yes, how many Pregnant and Lactating Women			
Children<5yrs			
<2 years			
<6 months			
6-23 months			
Was there outbreak in the flood affected area?			Yes □ No □
If yes , Type of outbreak	**Number of cases**	**Number of Deaths**	**Specify time and period**

Any comment on the flooding

Annex 9: Epi project proposal on 6-59 months old children Malnutrition assessment questionnaire

Section 1: Socio demographic background of the mother/care giver

1.*Address……Kebelle ……village …….*

2. Maternal Age (in Years……

3. Maternal age at first birth----------

4. Marital status: Single□ Married □ Divorced □ Widowed □ separated □

5 Religion: Orthodox □ Muslim□ Catholic □ Protestant □ other □

6. Ethnicity: Tigray □ Afar □ Amhara □ Agew □

7. Educational Status: Illiterate □ Able to read and write □ Grade 1-4 □ Grade 5-8 □ Grade 9-12 Grade □ College & above □

8. Maternal Occupation: House wife □ Farmer □ Daily laborer □ Civil servant □

9. Paternal occupation: Farmer □ daily laborer □ other □

10. Estimated monthly income of the family

< 500 Birr □ 1001 – 1500 Birr □ 501 – 1000 Birr □ > 1500 Birr □

11. Head of household: female □ male □

12. Decision making in the household: Individual □ jointly □

13. Livestock ownership? Yes □ No □

14. Household supported by safety net? Yes □ No □

15. Family people in the household……

16. Number of children less than five years

17. Age, sex, weight, and height of the child in the household.

Variable	First child	Second child	Third child
Child birth date			
Age			
Sex			
Weight			
Height			
MUAC			

Section 2: availability of facility and feeding practices

18. Is there health institution near to your home? Yes □ No □

19. Prelacteal feeding? Yes □ No □

20. If yes to the above question, what kind of fluid/food did give your child at birth?

Water with sugar □ Butter □ none □

21. Did you give him/her colostrum? Yes □ No □

22. When did you initiate your child breast feeding at birth? Immediate after birth □ after 1-24 hours □ after 24 hours □23. How many times do you breast feed your child per day?

Less than 8-times □ Above 10 times □ 8- 10 times □ d. other (specify)……

24 For how long did your child breast feed exclusively?

For less than 6-months □ for 6 months □ above 6 months □ other (specify)……

25. For how long did you breast feed your child?

Less than 12-months □ 12-24 months □ above 24 months □

26. At what month did your child initiate complementary food?

Below 6- months' □ at 6 months □ above 6 months □ other (specify)……

27. What type of complementary food did you initiate for your child?

Fluid □ Adult food □ semi-fluid □ other (specify)……

28. What type of material/s did you use to feed your child?

Bottle □ Cup & spoon. □ Free hand □

29. What is your feeding pattern per day?

<3 times/day □ 3 times /day □ Above 3 times/day □

30. Feeding arrangement of the family

All the family together □ Parents and children separately □

each children separately □ other (specify)……

31. Do you use iodized salt in your meal? Yes □ No □

32. Is there maternal or child food taboos in the family? Yes □ No □

33. Do you follow ANC? Yes □ No □

34. Did your child get Vitamin A supplementation in the last six months? Yes □ No □

35. Did your child had diarrhea morbidity in the last two weeks? Yes □ No □

36. Did your child had fever in the last two weeks? Yes □ No □

37. Immunization status of the child □ Immunized □ not immunized □ Defaulted □

38. Was the child sick by diarrhea/other diseases two weeks ago? Yes □ No □

Section3: Hygiene and sanitation

39. Source of drinking water: River □ unprotected spring □ protected spring □ Public tap

40. Water consumption per day :< 40 litter □ 40-80 litters □ >80 litters □

41. Time taken to fetch water: 15 minutes □ 15-30 minutes □ >30 minutes

42. Did the water you use treated by chemicals? Yes □ No □

43. Where do you dispose wastes? Open field □ common pit □ throw to river □

44. Do you have latrine? Yes □ No □

45. Type of house: Thatched type □ Corrugated iron sheet □