Addis Ababa University, College of Health Sciences, School of Public Health

Ethiopian Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

By

Desta Gidena (MD)

Submitted to the School of Graduate Studies of Addis Ababa University in partial fulfillment for the degree of Master of Public Health in Field Epidemiology

April 2015

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Advisors

Dr. Daddi Jima

Mr. Haftom Teame

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Approval by Examining Board

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Examiner

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List of Acronyms and Abbreviation

AAU	Addis Ababa University
ACT	Artemether Combined Treatment
AFI	Acute febrile illness
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
AR	Attack Rate
ART	Anti Retroviral Therapy
AURI	Acute upper respiratory infection
AWD	Acute watery diarrhoea
BCG	Bacillus Calmette-Therapy
BSC	Bachelor of Science
CAR	Contraceptive Acceptance Rate
CDC	Center of Disease Control
CDC	Center of Disease Control
CI	Confidence Interval
CHD	Community Health Days
CTC	Cholera treating centre
CU5	Children Under Five Years of Age
DBS	Dry Blood Sample
DRMFSS	Disaster Risk Management and Food Security Sector
EFETP	Ethiopian Field Epidemiology Training Program
EFY	Ethiopian Fiscal Year
EHNRI	Ethiopian Health and Nutrition Research Institution
EPHA	Ethiopian Public Health Association
EPHI	Ethiopian Public Health Institute
EPI	Expanding Program Immunization
EVD	Ebola Virus Disease
FAO	Food Assistant Organization

FH	Family Health
FMOH	Federal Ministry of Health
FP	Family Planning
HABP	High Availably Business Partner
HC	Health Center
Hep B	Hepatitis B
HEW	Health Extension Package
HF	Health Facilities
Hib	Hemophelous Influenza b
HIV	Human Immunodeficiency Virus
HIV	Human Immune Deficiency
HMIS	Health Management Information System
HO	Health Officer
HP	Health Post
HR	Health Resource
ILI	Influenza Like ILL
ILI	Influenza Like ILL
IMR	Infant Mortality Rate
IRS	Indoor Residual Spray
LLITN	Long lasting Impregnated treated net
LP	Lumbar puncture
MDG	Millennium Development Goal
MOD	Ministry of Defense
NGO	Non-governmental Organization
NGO	Non-governmental Organization
NGO	Non-Governmental Organization
NMCP	National Malaria Control Program
OPD	Outpatient Therapeutic Feeding Program
OTP	Outpatient Therapeutic Feeding Programme
Pf	Plasmodium falciparum
PHEM	Public Health Emergency Management
PIHCT	Provider Initiative Counseling and Test
PLWHA	People leaving with HIV/AIDS
PMTCT	Prevention of mother to child transmission
PSNP	Productive Safety Net Programme
PV	Plasmodium vivax
RDT	Rapid Detected Test
REST	Relief Society of Tigrai
RR	Rall Road
RTI	Respiratory tract infection

SARI	Sever Acute Respiratory Illness
SNNPR	South National and Nationalities People Region
TB	Tuberculosis
TBA	Trained Birth Attendant
TFP	Therapeutic Feeding Programme
TTBA	Traditionally Trained Birth Attendant
UN	United Nations
URTI	Upper Respiratory Tract Infection
USA	United States of America
VCT	Voluntary Counseling and Test
VHFs	Viral Hemorrhagic Fevers
VTM	Viral Transpot Media
WASH	Water, Sanitation and Hygiene
WFP	World Food Program
WHO	World Health Organization

Executive Summery

This document contains a two year output of Field Epidemiology Training Program that to be submitted to the graduate school of public health for the final accomplishment of master degree in Field Epidemiology. The majority of the program (75%) contains field works that known as residency. This document includes the two year outputs including diseases outbreak investigations, public health surveillance data analysis, surveillance system evaluation, narrative summary of disaster situation report, manuscripts, abstracts, and training reports.

During my residency I have tried to work my best in my field work including office works as well as field works in controlling outbreaks, EVD response and preparedness and emergency response and investigation activities. The two years activities are summarized in to ten chapters.

Chapter I contains disease outbreak investigation. I conduct two outbreak investigations as first outer. Both were investigated using case control study design based the outbreak investigation format (Abstract, background, methods and materials, results, and discussion). The first outbreak investigation was about malaria outbreak in Humera Town, Western Tigray that occurred on October 2014. The second outbreak investigation was conducted on measles outbreak occurred in Kola Tembien Woreda of Central Tigray.

Chapter two elaborates about five year malaria data analysis in Ethiopia since 2009 to 2013. It shows the trend of malaria in years, regions and the morbidity and mortality incidence as national and regional. Type of malaria as regional level, the laboratory results and gaps in surveillance system are identified.

The third chapter addresses surveillance system evaluation of Severe Acute Respiratory Infection Sentinel Surveillance of Mekele Hospital. In addition to the the purpose and objective of the sentinel surveillance this chapter presents the progress, the strength and gaps in related sectors. The evaluation based on the sentinel surveillance attributes of simplicity, flexibility, stability, acceptability, representativeness, timeliness, data quality, sensitivity and predictive positive value.

Chapter four contains assessment of Kilte Awlaelo Woreda of Eastern Tigrai health profile. Health and health related activities, plans and achievement, different sectors data, major challenges and special condition in the woreda were assessed in this woreda. Recommendation and gaps were forward in order to help the planners and the health sectors.

Using the Vancouver Group style manuscript is stated in the fifth chapter for peer reviewed journals. It is prepared on the malaria outbreak investigation.

Two abstracts on malaria outbreak investigation and malaria surveillance data analysis are included in the sixth chapter. None of these were accepted and presented in any conference or organization.

The seventh chapter indicates about the disaster narrative situation of the belg assessment of six woredas of Southern Tigray zone (five Woredas) and one woreda of the South East Zone Tigray. Health and health related like outbreaks, nutrition, Water, Sanitation and Hygien as well as preparedness of the woredas was documented.

In chapter 8 two protocols for epidemiologic project were included. These protocols were about the Ebola Viruses Disease awareness assessment among health professionals and the effect of huge agricultural/sesem harvesting workers in acquiring malaria. The second topic sent to African Field Epidemiology Network for grant.

Finally EVD preparedness and screening in Gambela region and Flood Emergency Response was included in the last chapter.

Chapter I- Outbreak/Epidemic Investigation

1.1 Malaria Outbreak Investigation in Humera Town, Western Tigrai Zone, Ethiopia, 2014

Back Ground; Malaria is the most important parasitic and vector born disease which is transmitted by infected Anopheles mosquitoes. Malaria is a major public health problem in Humera Town and the total population is estimated to be high risk for malaria. The purpose of this study was to verify the existence of malaria outbreak and identify the risk factors for the outbreak in Humera Town.

Methods; Unmatched case – control study of 123 cases and 123 controls was conducted in house to house data collecting method in the town from November 4 to 20, 2014 after the high magnitude of malaria cases were report from the woreda. Data related to the risk factors, the knowledge of mode of malaria transmission and its control measures were collected. Data collected on clinical bases, risk factors of the disease and knowledge assessment about the disease and mode of transmission and prevention method surveys were managed and analyzed using a statistical computer program epi info version 7.1.3.3 and Microsoft excel.

Results; The overall incidence of malaria in the two weeks outbreak investigation report in Setit Humera was 8.4%. The bulk of the cases were found in the productive age played along in the range of 15-59 with the incidence rate of 172 in 1000 followed by the age group 5 – 14 with the incidence rate of 23/1000. The confirmed cases were P.falciparum (1831, 71.9%), P.vivax (686, 26.9%) and Mixed (21, 0.8%) malaria, which were confirmed microscopically and RDT method. The principal classes of environmental elements were the climatic change and a significant risk of man-made breeding sites (OR = 10.9 (95% CI 4.6 – 25.5)) occurred in the town. There were interrupted rivers crossing the town and Tekeze river made a significant risk factor of vector breeding stagnant water (OR 3.1 (95% CI 1.7 – 5.9)) that was clearly seen mosquito larvae while the team were on the site. The national malaria prevention and control strategy of continuous provision of malaria prevention method (IRS) seems to fail in Setit Humera. Most of the population was living and staying outside home during the night due to high environmental temperature who were exposed to mosquito bite were more significant (OR = 2.3 (95% CI 1.1 – 4.8)) factors to develop malaria than who stay at home. An increasing number of people at risk whose were unplanned and non-immune during the season was one of the factors to increase the number of cases.

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Conclusion; This study indicates that living near to the man- made and natural vector breeding sites, failure to apply indoor residual spray, living style of the population and increasing non immune population were the risk factors for the malaria outbreak in the town. It is recommended that sound prevention and control program designed by the country should able to implement in the town to prevent the outbreak of malaria.

Introduction

Malaria is the most important parasitic and vector born disease caused by the four species (Plasmodium vivax, Plasmodium falciparum, Plasmodium malariae, Plasmodium ovale) in Africa, and another fifth species P. knowlesi seems to be restricted to Southeast Asia [1], which is transmitted by infected Anopheles mosquitoes. It is one of the most important disease prioritize to eliminate by WHO [2]. The global malaria cases, accounts 300 million and between one and three million deaths from among the 2.3 billion people (almost one-third of the world's population) who are at risk of infection with the malaria parasite and 100 million people are at risk for malaria epidemics[3, 4]. The WHO 2012 report shows that an estimated 219 million malaria cases were from 104 countries and territories [5]. Malaria death is ranked at 5th among the infectious disease (after respiratory infections, HIV/AIDS, diarrheal diseases, and tuberculosis) globally and second (after HIV/AIDS) leading cause of death from the infectious disease in Africa [5]. The global malaria cases decrease from 237 million to 222 million between 2005 and 2009, whereas the estimated deaths in during the same period were decreased from 800, 000 to the 691,000 respectively, which was 91% from Africa and 86% were among the children of under five year age [1, 5]. Approximately 90 % of the deaths caused by malaria in the world are from Africa of South of Sahara which is due to the severity of P. falciparum [6].

Almost 110 million of Africa people live in areas at high risk for seasonal malaria outbreak brought by spatial and temporal alterations, changes in the environment caused in great function made by regional climate changes [5, 6]. The approximate Ethiopian population living in a malaria risk area was about 68% (two-third) of the entire 94 million people of the country [2, 7, 8]. Malaria was the leading cause of outpatient visits in Ethiopia in 2010/2011.

Approximately 75% of the geographic regions of the country have significant malaria transmission risk. Among the leading communicable disease in Ethiopia, malaria accounts for about 30% of the overall Disability Adjusted Life Years lost [8].

Malaria is the leading health problem in Ethiopia [9]. That is among the ten top diseases that deaths among the children of less than five years age and adults. Ethiopia has succeeded to prevent the malaria prevalence and in decreasing the number of areas affected by malaria outbreak [10]. Ethiopia has taken a massive expansion of malaria control programs since 2005 such as distribution of long-lasting insecticidal nets (LLINs), and the shift of malaria treatment to Artemether-Lumefantrine as first line treatment for PF in July 2004 [9, 11]. At least one LLTN was provided for household in a percentage of 53.8% and 72% in 2007 and 2010 respectively as well as 20% of household below an altitude of 200 meters above sea level was subjected to IRS [9]. Even though the malaria admission increase in 2009 and more than expected malaria cases was seen in 2010/2011 due to undocumented reasons in South Ethiopia the national malaria control program has shown the result of malaria cases decrement since 2005 [9]. The population living between an altitude of 1,500 and 2,500 meters above sea level are at risk of malaria and the areas experience outbreaks in Ethiopia [10, 12]. The major risks of malaria are associated with environmental factors such as rainfall, altitude and temperature mainly caused due to climate change [5, 10]. This makes the occurrence of malaria is unstable and seasonal [10]. Area, near houses to breeding sites, lack of windows or screens, and open eaves are also curtained in current studies as malaria risk factors [12]. Even though no deaths were reported, the weekly report of malaria cases from Humera town showed abnormal increment during WHO epidemic week report of 43, 2014. Humera town is located in malarious altitude but it was unexpected time to occurred malaria outbreak during this season. This may be due to rain fall seasonal instability.

The aim of this paper is to investigate the cause of the malaria outbreak in Setit Humera town, the gaps in malaria control intervention, the risk factors of malaria outbreak and also attempt to assess other factors which may made to account in the prevention and control of malaria.

Objective

General objective

To investigate the malaria outbreak and predisposing factors for the outbreak in Setit Humora Town of Western Tigray Ethiopia from November 4 to20, 2014

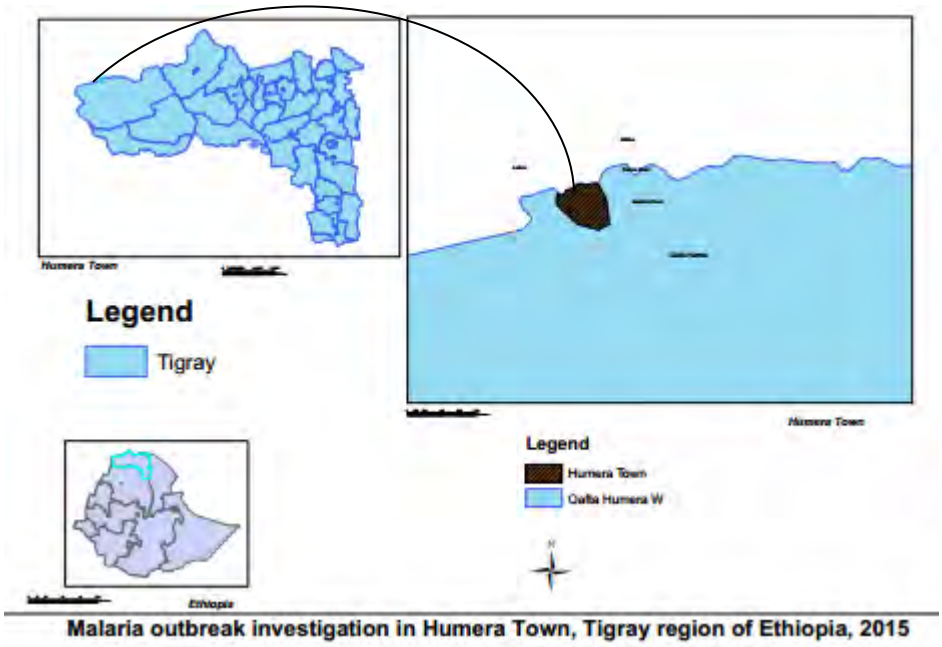
Specific Objectives

- To verify the existence of malaria outbreak
- To identify the gaps in prevention and control of malaria in the town
- To identify the risk factors for malaria outbreak
- To recommend possible prevention and control methods of malaria in the town

Methods and Materials

Study area

Humera is a town and separate woreda in northern Ethiopia, near the borders of Sudan and Eritrea. The town is located in the Western Zone of the Tigray Regional state 1000 km away from Addis Ababa. It was a center where maize, sesame and other oilseeds have widely been produced. This town has latitude and a longitude of 14°18'N 36°37'E. The town is divided into four administrative kebeles. The town has one hospital, one health center and three private clinics. The town has 30,231 inhabitants, which were 15,865 (52.5%) male and 14,366 (47.5%) female. There were 122 pregnant mothers. Humera is found below the altitude of 2000 meter above sea level, which has a seasonal malaria transmission. The total population of the woreda is at risk of malaria. According the surveillance report of the woreda malaria is the number one causes of outpatient cases, admission and deaths followed by malnutrition and diarrheal and acute respiratory infections. The previous efforts to prevent and control of malaria in woreda IRS and environmental management, new strategy of malaria prevention and control strategy as the rest of the country is applied in the woreda including using LLIN and treatment with ACT as well as the environmental management but no IRS. There was no official document why the IRS is excluded from the prevention strategy except non documented official information that decided to protect agricultural products from the decrement international market.



Map 1 Malaria Outbreak Investigation Area

Case Definition

Suspected case: - Any person with fever or fever with headache, rigor, back pain, chills, sweats, myalgia, nausea, and vomiting diagnosed clinically as malaria.

Confirmed case: - A suspected case confirmed by microscopy or RDT for Plasmodium parasites

Clinically treated cases: - A suspected case or negative lab result treated as malaria case.

Outbreak: - Number of malaria cases which arise above the threshold or doubling of the prior year.

Surveillance

During the WHO Epidemic Week 42 and 43 there was a malaria report from Tigray Regional State Humera woreda to National Public Health Emergency Management in EPHI, suspected information identified malaria outbreak of malaria cases in the woreda. More than doubling of malaria cases was seen in WHO Epidemic week 43 compared to the same week of the 2013. After discussion with the national and regional PHEM a team which has three members; one

from EPHI and two EFETP residences; was deployed to the woreda to investigate and control the outbreak on November 4, 2014.

Sample Size

The sample size was calculated using EPI-Info statistical package. The total calculated sample size were 246 including, 123 cases and 123 controls. It shows as follows

CI = 95%

Power = 80%

Ration of controls and cases = 1

Percent of controls exposed = 40%

OR = 2.06

Percent of cases with exposure = 57.9%

Study Population:

All residents of the town were the study population based on the source of selected case and control source population.

Data collection

Basic malaria surveillance data were collected from the Federal Ministry of Health, Public Health Emergency Management office that is routinely used for surveillance of malaria nationally. The data contains the total outpatients of clinical and confirmed cases and confirmed malaria cases diagnosed via microscopy or multi-species rapid diagnostic test (RDT) and were aggregated by malaria species (Plasmodium falciparum, Plasmodium vivax, and mixed infection).

The survey was conducted in the four kebeles of the township. The simple random sampling procedure was used to select a representative sample of households based on the HC malaria treated cases. Granting to the computation of the sample size the required fonts and control was 246. The number of cases and control were collected from the four kebeles using the

denominator of the health center cases. Line list was collected from one Hospital, three private clinics and one health center to understand the number of cases from where they were coming. Field investigation was conducted in November 2007 deploying one response team.

A structured questionnaire comprise based on demographic data (age, ethnic group, marital status, educational level and occupation), clinical bases (history of treatment, sign and symptoms and treatment outcomes), risk factors of the disease and knowledge assessment about the disease and mode of transmission and prevention method was developed. Closed and open questions were included in the questionnaire. All ages, genders and religious of the residences was the target respondents

The questionnaire was translated to Tigrigna while asking the respondents that took approximately 20-30 minutes to administer per each. Respondents were interviewed in their own homes and their own language.

Quality control:

Orientation and discussion was done among the data collectors of the study team based on the questionnaire and the way how to collect the data in house to house. Pretest was done before one day of data collecting. After minor correction mutual understanding was established among the team. Every day cross checking was conducted on the collected data among the team.

Inclusion and Exclusion Criteria:

New comers or a person who may not stay in the town in the prvious three weeks was excluded from the study.

Study Design

Descriptive followed by unmatched case – control study was conducted in the town.

Data Analysis

The questionnaire was projected into Epi info version 7.1.3.3 then coded, entered and cleaned using Epi info and analyzed using both Epi info and micro-soft excel. Descriptive data were analyzed for frequencies and proportion. Significance of the association was judging using the P-value and 95% CI for OR by two by two and logistic regression model.

Ethical consideration:

Permission of official letter was hand over to the regional and woreda health bureau from EPHI.

Dissemination of the Study:

Briefing and debriefing was conducted to the zone, woreda and regional health bureau. Final report will submit to the university and will present to the woreda and regional PHEM.

Result

Descriptive Analysis

The clinically and confirmed malaria report from Setit Humera in WHO Epidemic Week 42, 43 and 44, 2014 was 730, 1246 and 1446 respectively. The number of malaria cases was inclined to start from WHO Epidemic Week 39. But it was not higher than the previous year until week 41. The line which indicates the trends of malaria cases crosses by week 42 from the prior year. Investigation has done by WHO epidemic week 44 and 45.

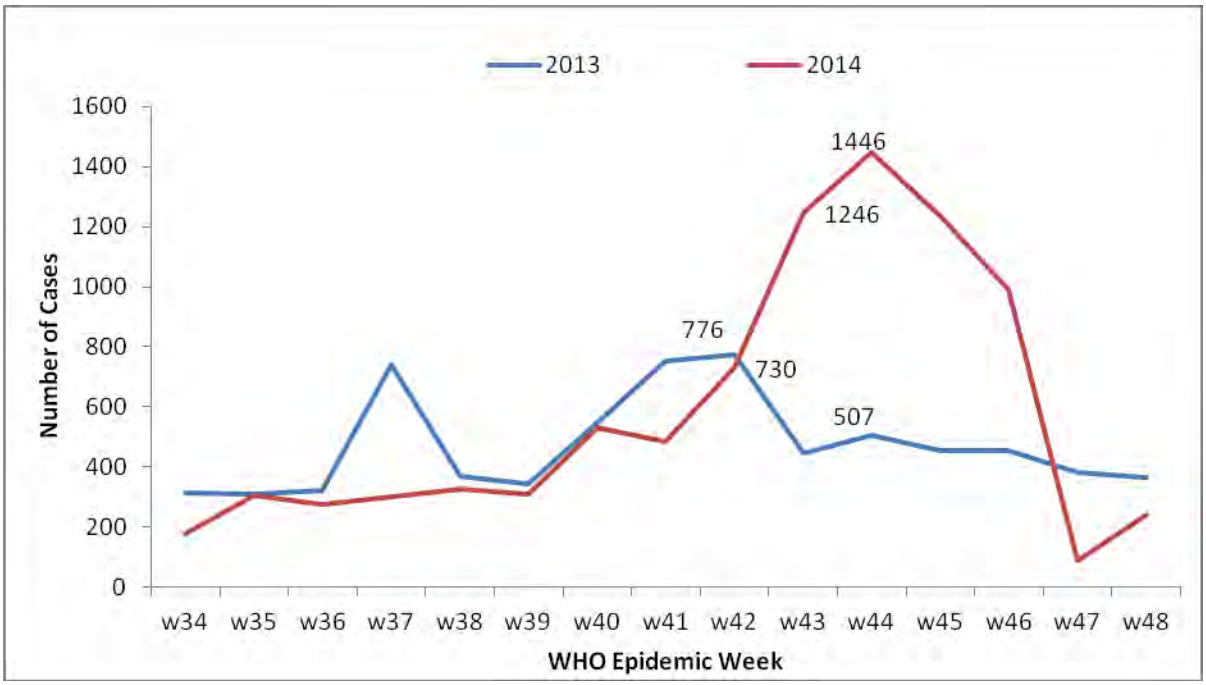


Figure 1.1 1. Trends of Malaria cases in Humera Woreda, Western Tigray, by WHO Epidemic Week in 2013 and 2014, Ethiopia

The number of malaria reported cases were more than two times compared to the prior year in WHO epidemic week 43, 2014. The peak magnitude of malaria cases showed in week 44, 2014. The outbreak was occurred from week 43 to week 46. Response for the outbreak was started in the beginning of the outbreak.

Table 1.1. 1 Demographic characteristics of the malaria outbreak investigation case-control study of Humera town, Western Tigray, Ethiopia, 2014.

Variable		Cases		Controls	
		N	%	N	%
Sex	M	55	44.7	25	20.3
	F	68	55.3	98	79.7
Marital Status					
Single		43	36.8	29	23.6
Married		63	53.8	72	58.5
Divorced		3	2.6	5	4
Widowed		8	6.8	14	11.4
Others		0		3	2.4
Educational Status					
Primary		52	42.3	39	31.7
Secondary		30	24.4	37	30.1

Territory	12	9.8	14	11.4
Illiterate	29	23.6	29	23.6
Non formal	0		4	3.3
Occupation				
Farmer	17	8.10%	9	7.3
Employed	10	8.1	9	7.3
Unemployed	40	32.5	51	41.5
Student	32	26	12	9.8
Others	24	19.5	37	30
Ethnicity				
Tigray	110	89.4	99	80.5
Amhara	12	9.8	23	18.7
Gurage	1	0.8	0	0
Oromo	0	0	1	0.8

Table1.1.2 Age and sex specific distribution of malaria cases in Humera Town, Western Tigray Ethiopia (October 10-23/2014).

Age	AR in %		Total AR in 1000
	M	F	
<5	1.9	1.4	17
5_14	3.1	1.5	23
15-59	25.5	8.1	172
>60	3.2	0.8	21
Total	12.3	4.2	84

The average incidence rate of malaria in Humera in the two weeks period of the malaria outbreak was 84 in 1000. The bulk of the cases were found in the productive age played along in the range of 15-59 with the incidence rate of 172 in 1000 followed by the age group 5 – 14 with the incidence rate of 23/1000. Males are more affected in all age groups than females those results, an average incidence of 12.3% which was three fold than female (4.2%).

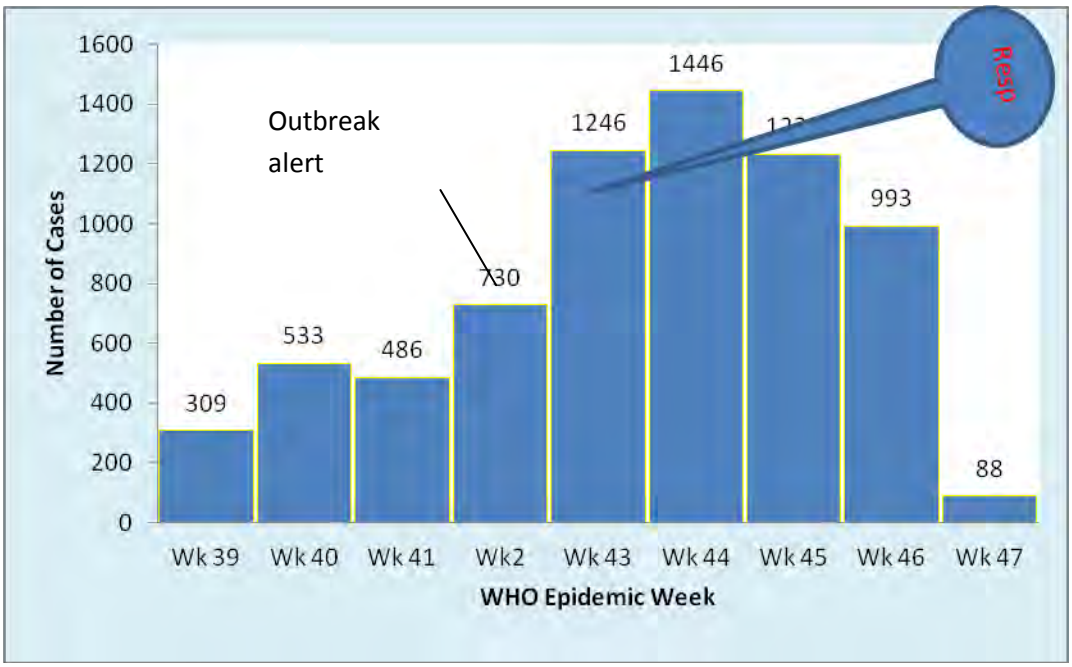


Figure 1.1. 2. Malaria Cases in Humera Woreda, Western Tigray, Ethiopia, 2014

The total number of cases reported from Setit Humera during our investigation (WHO epidemic Week 43 and 44) were about 2692. But the numbers of malaria cases investigated from the health facilities during our investigation were 2548 which were 601 (23.6%) females and 1947 (76.4%) males. The excluded number of cases was those whose were referred from clinics and health center to the hospital. This number was found from the records of one hospital (48.5%), one health center (39.7%) and three private clinics (11.8%).

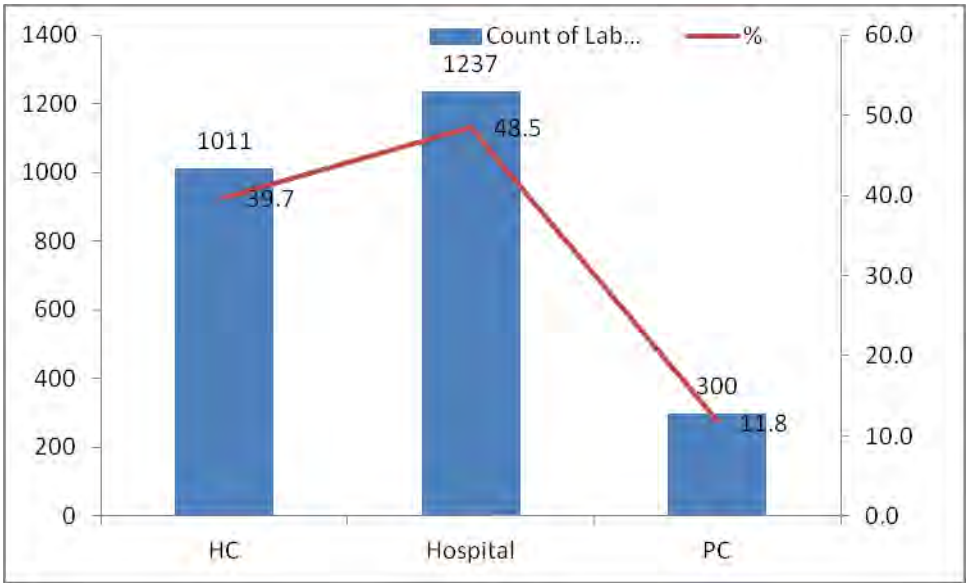


Figure 1.1.3. Distribution of Malaria Cases by Health Facilities in Setit Humera Town, Western Tigray, Ethiopia 2014

In able to know whether the cases are residences or not, we try to find the location of cases. But it was difficult due to the hospital records did not include the patients address. When we see the address of the cases from the HC and private clinics, 74.6% of the cases were from Setit Humera and the rest were from other Tigray woredas, Qafta Humera and Amhara Regional state with a percentage of 8.5, 8.1, and 7.1 respectively. Qafta Humera is the neighboring rural woreda located in the same geographic area.

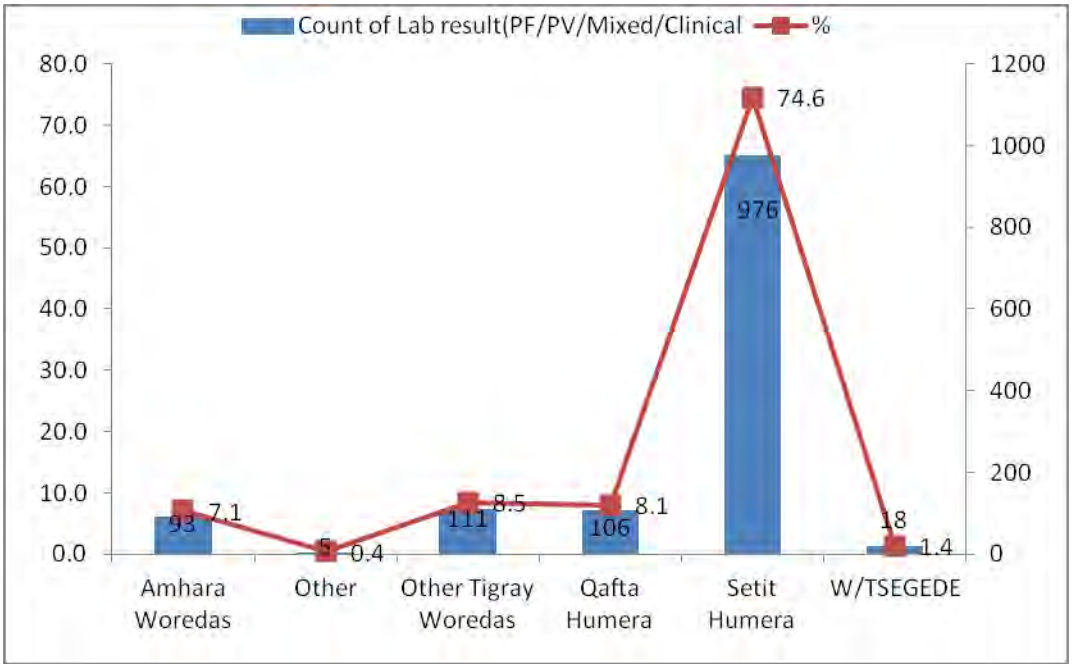


Figure1.1. 4 Malaria Cases in Humera HFs by Woreda, Western Tigray Ethiopia, 2014

Among the total malaria cases almost all (99.5%) were outpatients and the rest 0.5% were inpatients. There was no death report throughout the outbreak.

Table1.1. 2 Malaria Cases in Humera Town by Diagnosis of WHO Epidemic Week 43 and 44, 2014, Western Tigray Ethiopia

Diagnosis	Number of cases	%
Clinical	10	0.4
Mixed	21	0.8
PF	1831	71.9
PV	686	26.9
Grand Total	2548	100

Among the total malaria cases whose were treated in the health facilities, 99.6% were confirmed cases and 0.4% was clinically treated.

Analytic Analysis

The analytical study of the case-control study showed that out of the total case study participants, 83% of the cases were treated for PF. malaria that was higher than the reported malaria cases. Pv. accounts 14.75% and mixed malaria (PF. and PV.) treated cases were only 1.64%.

Table 1.1. 3 Types and Frequency of Malaria Cases in the Cases Study Groups of Humera Town, 2014.

Type of malaria	Frequency	Percent	Cum. Percent
Mixed	2	1.64%	1.64%
PF	102	83.61%	85.25%
PV	18	14.75%	100.00%
TOTAL	**122**	**100.00%**	**100.00%**

The identified causes of the malaria outbreaks in Humera Town failed into four general categories, which were not mutually exclusive including environmental factor, population factor, vector and host related factors and the prevention and control strategy gap of health service activities.

Table 1.1.4 Characteristics of Exposure in Case Control Study of Malaria Outbreak in Humera Town, 2014

Exposure	OR	95% CI	
		Odds Lower	Odds Upper
Presence of thick grass	2.107	1.186	3.7431
Repellent use	0.4876	0.0876	2.7128
Un-protective irrigation	2.7314	1.5389	4.848
presence of breeding sites	10.8947	4.6538	25.505
broken glass bottle	3.7864	1.4644	9.7904
Stagnant water	3.1176	1.628	5.8809

Environmental Factor

The principal classes of environmental elements were the climatic change and man-made breeding sites was significant (OR = 10.9 (95% CI 4.6 – 25.5)) factors for malaria outbreak in the township. There was a long lasting continuous heavy rain from July to October 7.2014 followed by interrupting rainfall until October 20, 2014. The last 13 days interrupted rainfall, including the town construction of new houses, roads and a new drainage system were suitable for mosquito breeding sites. There are interrupted rivers crossing the town and Tekeze river by itself makes here and there stagnant water with a significant (OR 3.1 (95% CI 1.7 – 5.9)) factor that was clearly seen mosquito larvae while the team were on the site. There were uncontrolled irrigation with thick grasses and water contained well that was suitable for malaria breeding site. Stagnant water and improper use of drainage system were also found in the town. Households with broken glasses in their surrounding were more (OR = 3.8. (95% CI 1.5 – 9.9)) affected than the others and damaged pipes as well as pipes which serve to fill water tracks were risk factors for mosquito bleedings.

Figure 1.1.5 Mosquito breeding sites in Humera Town, Northern Ethiopia, 1015

Prevention and control strategy gap

There were gaps in vector control measures in the woreda. Delayed distribution of ILLNs to the region was one factor that was not provided to the residences at the right time. The national malaria prevention and control strategy of continuous provision of malaria prevention method (IRS) seems to fail in Setit Humera. No IRS was done in the town due to the reason to prevent chemical spoiling to international marketing of agricultural products. Surveillance weakness was also one factor in the outbreak. Spraying larvae side chemicals, avoiding and identifying mosquito breeding sites was not early identified or done timely. Unprotected irrigation and breeding sites in the hospital, school and new constructed houses and roads not early identified and not early take measures. But other regions are spraying the chemical which has the same agricultural production (eg. Metema) and also anti pest was used by the agriculture sectors in the same field.

Vector and host related factor

Most of the population was living and staying outside home during the night (OR = 1.3 (95% CI 1.1 – 2.8)) due to high environmental temperature that exposes to mosquito bite. People who

used repellents (OR = 0.5 (95% CI 0.1 – 2.7)) and clothes to prevent mosquito bites are minimal. Exposing to mosquito bite is high during staying outside home and late to sleep under their bed nets during the time of increased mosquito capacity.

Population factor

An increasing number of people at risk whose were unplanned and non-immune (agricultural laborers) during the season was one of the factors to increase the number of cases and also may destabilize the immunity of the residences; because all activities by the laborers who worked in agriculture were during the night without any method of mosquito bite prevention.

Discussion

Malaria is endemic in Humera town that is located in law altitude. There was malaria outbreak in Humera. Even though there was no prior public study about malaria epidemic in the town, malaria outbreak was occurred occasionally in this woreda like the malaria endemic woredas of the country. But there were no malaria outbreak in the prior year. The descriptive and bi-variant analysis of this study characterizes the existent of the outbreak and the causes of the malaria outbreak. The existent of the outbreak characterizes by the magnitude of the malaria reported cases that was more than two times the prior year and the type of treated malaria cases, which was more than 80% P. falciparum. Malaria outbreaks are returning associated with high rise in *Plasmodium falciparum* and its related death cases [13]. The risk factors for the outbreak were characterized in to four categories.

Environmental factor was one of the major risk factor for the malaria outbreak. Living in the area of mosquito breeding sites or nearer to the vector breeding sites (OR = 10.9 (95% CI 4.6 – 25.5)) that had significantly risk compared to the study done in South Ethiopia (4.93 (95% CI: 2.59–9.35) [9]. The main vector risk factors includes, the Tekeze river (while decreasing its volume), intermittent small rivers crossing the town which made small water bodies, vector breeding areas caused by the construction of houses, roads and drainage system as well as unmanaged stagnant water, broken glasses, open deep wells and damaged water pipes. The irrigation[14, 15] from Tekeze river one risk factor with deep water container well observed

with mosquito larvae. The increment of mosquito density after the heavy long rain fall which is above the average, in the town was also a risk factor to the outbreak [16, 17]. After the heavy rain season when water is widely available such that vegetation increases, there is a greater likelihood for there to be available water for mosquito breeding. When the mosquito population increases, the likelihood of being bitten increases, as does the transmission of malaria Vegetations like thick grasses and maize with breeding sites may help to hide the larvae from their predators which leads to increase the mosquito density [6, 16].

There were gaps in vector control measures in the woreda. Ethiopia has had made a remarkable progress in scaling up intervention of ITN distribution and IRIS [18]. But the national malaria prevention and control strategy of continuous provision of malaria prevention method (IRS) seems to fail in Setit Humera. No IRS was done in the town due to the reason to prevent chemical spoiling to international marketing of agricultural products. But other regions are spraying the chemical which has the same agricultural production (eg. Metema) and also anti pest was used by the agriculture sectors in the same field. Delayed distribution of ILLNs to the region was one factor that was not provided to the residences at the right time. Surveillance weakness was also one factor in the outbreak. Spraying larvae side chemicals, avoiding and identifying mosquito breeding sites was not early identified or done timely. Unprotected irrigation and breeding sites in the hospital, school and new constructed houses and roads not early identified and not early take measures. Due to the local high temperature the residents stay outside home during night or they sleep outside their home (OR = 1.3 (95% CI 0.6 – 2.8)). In their staying outside their home those who use repellents ((OR = 0.5 (95% CI 0.1 – 2.7)) or other mosquito bite protective methods were more advantageous to protect malaria.

According to the health center and private clinic reports 25.4% of the cases were from other woredas may be endemic or non endemic high lands. The majority of these people were deployed in agricultural products that completely done at night. There were no malaria or mosquito bite prevention methods during their stay.

An active intervention response by the woreda and the team to control the outbreak such as establishing RRT and mobilizing the population in environmental sanitation campaign and

budgeting to control the outbreak, spraying chemicals for risk areas of mosquito breeding sites, early treatment of cases continuous surveillance had been made to prevent further devastating and control the outbreak.

Conclusion:

Humera woreda is located in the malaria endemic area. There was an existence of malaria outbreak. Seasonal instability, which was clearly observed by the long lasting rain fall staying until October, was one risk factor for the outbreak. In addition to the rain fall the environmental, the vector and host, the population and the gaps in the prevention strategy were the main risk factors of malaria outbreak in the town/woreda.

Recommendation

- Federal and Regional MOH should give especial attention in the malaria prevention strategy of Continuous provision of malaria prevention methods like LLINs and IRS in the woreda. Routing IRS should able to conduct in the town, which is one of the strategy to prevent malaria.
- Strengthening the surveillance system in capacity and manpower of the woreda may need special attention by the region
- The woreda responsible sectors including investment and health bureau should work in making awareness for construction contractors to protect mosquito breeding stagnant water and able to aware about the impact of malaria while they construct.
- Special attention may be needed for the new comers from high lands in prevention of malaria; Health Education, repellants utilization and also to have early treatment where they have worked. Investors should consider implementing the malaria prevention methods such as avoiding stagnant water, spraying chemicals in larvae breeding sites, providing buzz off repellent and etc.
- Introducing mosquito repellents to the residences and highly moveable people with cheap cost or free should able in consideration by the region and responsible sectors.
- The woreda should give more stress in community mobilization and empowerment in prevention and control of malaria

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1.2 Measles Outbreak Investigation of Kola Tembien Woreda, Central Zone-Tigrai Regional State, Ethiopia-2015

Background:- Measles is the highly contagious vaccine preventable global endemic diseases with fatality rate of 3-5% in developing countries during epidemics. Despite improvement of the prevention and control effort of vaccination coverage measles outbreak occurs in Ethiopia. We conduct measles outbreak investigation in Kola Tembien Woreda to determine the magnitude and factors associated with the measles outbreak.

Methods: - Unmatched case –control study of all 53 cases with two sets of controls of measles outbreak investigation was conducted in Kola Tembien Woreda of Tigrai Region from February 20 – March 4, 2015. A structured interviewer administered questionnaire that translated to local language was used to identify information from cases and controls. Ethical consideration like verbal consent from all participants was place in the ground. Epi info and Microsoft Excel was used to calculate frequencies, odds ratios and perform logistic regression to control for confounding variables.

Result:- Vaccination coverage of the woreda was more than 95% in the last three consecutive years. A total of 53 cases and 106 controls were recruited. History of travel prior two weeks OR 3.0 (95% CI = 1.1-13.0), contact history with measles case OR 7.1 (95% CI= 3.4-14.8) and being age five and below OR 10.4 (95 CI=3.8-28.1) were independent factors for contracting measles for measles outbreak in the Woreda. This study demonstrates measles contact was more than seven times the risk of contracting measles compared in vaccinated children (OR = 7.6 : (CI = 3.9 – 14.9)).

Conclusion:- Despite of the measles contact, the outbreak was occurred due to prior travel of people to areas with measles and traditional ceremonial activities facilitate person to person transmission. The recent measles outbreak in different areas of Ethiopia especially in high vaccination coverage of Tigray Regional State Woredas has raised question over the immunization program. We recommend strengthening of health education, coordinated vaccination in all woredas and improving surveillance system are vital areas in controlling and prevention of measles outbreak.

Key words: - Measles, outbreaks, Risk factors.

Introduction

Measles is the highly contagious systemic viral disease caused by measles virus in the family Paramyxovirus, genus Morbillivirus , transmitted primarily by respiratory droplets or airborne

spray to mucous membranes in the upper respiratory tract or the conjunctiva [1, 2]. Measles can cause serious illness, lifelong complications and death.

Measles is the global endemic disease. It is one of the communicable disease that causes the major health problem with nearly 4 million cases, one million deaths and between 15 000 and 60 000 cases of blindness occurring globally each year, a toll more than vaccine prevented disease [3-5]. According UNICEF 2013 report, more than 150, 000 people die from measles every year, majority are from low income countries. Measles in developing countries is the major killer among the vaccine preventable disease in less than five years of age [6]. Measles fatality rate in developing countries has been estimated to be between 3% to 5% during epidemics [7]. Despite the progress of controlling measles the disease remains endemic in many countries in Africa [7]. Measles deaths occur during outbreaks in areas where the disease is no longer endemic[2]. Measles can be eliminated due to the reservoir is human being that can develop long lasting immunity.

The acceleration of measles control activities to reduce measles death by half by 2005 compared to the estimated death in 1999 in African regions recommend the goal of the recommend the strategies led to reduction to a 75% estimated measles death by 2005 following the 2006 strategy adopted a goal to achieve 90% measles mortality reduction between 2010 compared with the estimate for 2000 [1, 3]. By improving routine vaccination coverage, providing a second opportunity for measles vaccination through supplementary immunization activities (SIAs), improving measles cases management and establishing case based surveillance, African regions by 2008 reported measles cases decreased 93% and estimated measles mortality decreased 92% compared with 2000 [1, 7]. The National Immunization Programme in Ethiopia was established in the 1980s, and currently delivers service through static and outreach sites nationwide. The current routine immunization schedule recommends measles vaccination at 9 months of age [1]. The WHO/UNICEF coverage estimates for measles vaccination in Ethiopia indicate an increase from 37 % in 2000 to 82% in 2010 [1].

Measles outbreaks occur in Ethiopia annually including Tigrai Regional State. Most of the cases in 2014 were reported from SSNNP, Oromia, Amahara and Tigrai. The surveillance data was detected an outbreak of measles in Kola Tembien woreda, whose were confirmed by laboratory. We investigate this measles outbreak in this woreda to identify factors contributing to this outbreak and risk factors for measles transmission, and to provide evidence-bases recommendation for measles prevention and control strategies in Ethiopia.

Objective:-

General Objective:-

To investigate the measles outbreak in Kola Tembien Woreda of Central zone of Tigray Region, Ethiopia, Feb 23 – March 9/2015.

Specific Objectives:-

1. To verify and confirm the outbreak in the woreda
2. To identify the risk factors associated with the measles outbreak in the woreda
3. To control the outbreak by taking appropriate control and prevent measures

Methods and Materials

Case Definition

Measles Case:- A measles case was any resident who met the WHO measles case definition – history of fever and generalized maculapapular rash, and one or more of cough, coryza or conjunctivitis, that is clinically suspected case or laboratory confirmed [8].

Suspected Case:- Any person with fever and maculopapular (nonvesicular) generalized rash and cough, coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles in the woreda [1].

Confirmed measles case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiologically linked to confirmed cases in an outbreak [1].

Epidemiologically linked case: A suspected measles case that has not had a specimen taken for serologic confirmation and is linked (in place, person and time) to a laboratory confirmed case; i.e., living in the same or in an adjacent district with a laboratory confirmed case where there is a likelihood of transmission; onset of rash of the two cases being within 30 days of each other[1].

Measles death: For surveillance purposes, 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 [1].

Vaccinated:- an individual who had received R1 dose of measles-containing vaccine. Vaccination was verified by vaccination card or history [9].

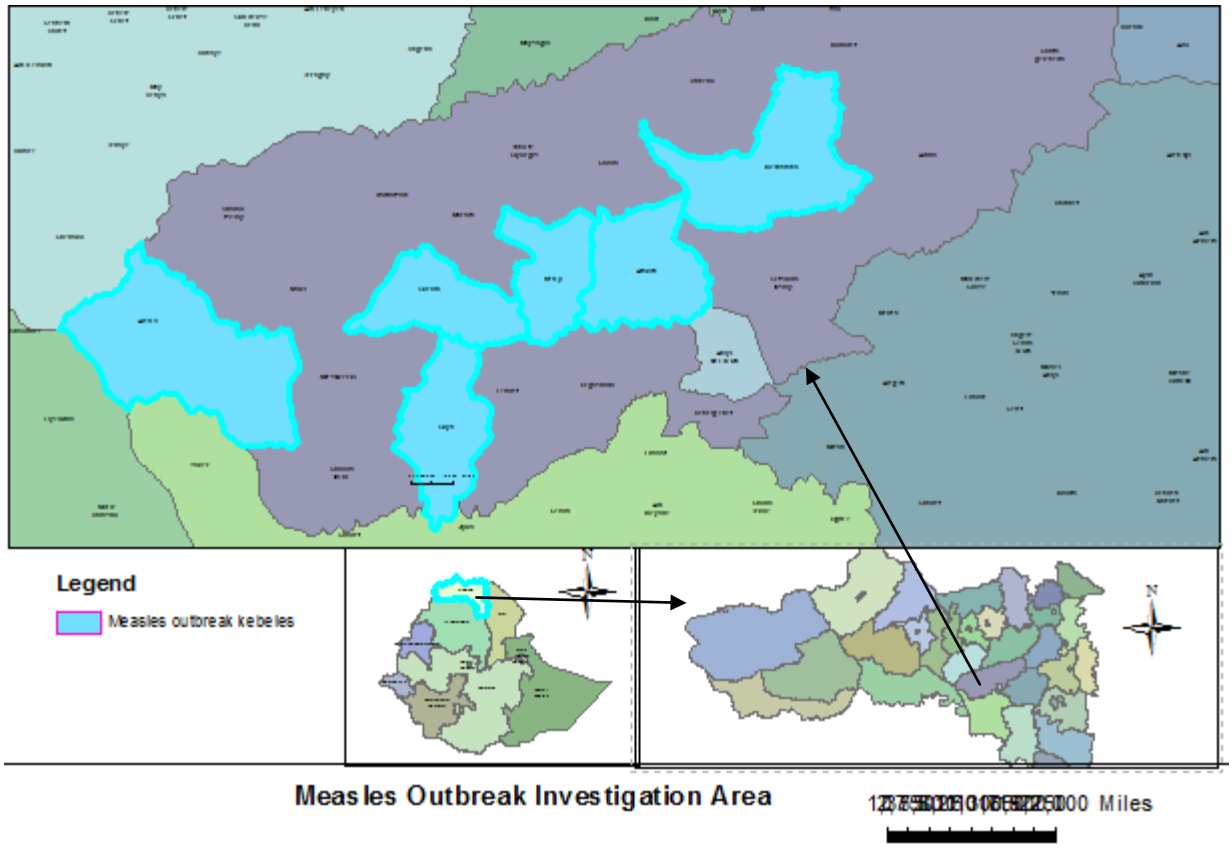
Unvaccinated:- an individual who had no vaccination card and whose parent or guardian confirmed on interview that she or he has received no measles vaccination [9].

Routine vaccination: an individual who had received a dose of measles-containing vaccine on the routine schedule. Routine vaccination was verified either by its registration on a routine vaccination card or by report during interview that the child had received the ‘‘9-months vaccine’’ [9].

Study area, population and period

Kola Temben is a rural woreda located in Northern Ethiopia, in Tigrai Regional State of Central zone, which is far away 1000 Km North of Addis Ababa. It is one of the 45 Tigrai woredas. Its administrative town is Abiyi Adi. The woreda is divided in to 28 administrative kebeles. It has 7 Health Centers and 25 Health Posts. The referral hospital if found in Abiyi Adi town. The woreda has a total of 146,676 inhabitants in 31,886 households of which 72,400(49.4%) were male and the rest 74,276(50.6%) were female. Kola Tembien woreda shared a border with Western Zone of Tselemti woreda in the West, with Eastern zone in the east, Weriee Leke and Adet of the same zone in the North, Tanqa Abergele and Degua Temben of the same Zone in South. All measles cases and two controls for each cases was the study subjects and the study population was the residents of the woreda.

The study was conducted in the period of February 25 to March 9, 2015.



Map 2 Measles Outbreak Investigation Area

Study design:

Descriptive and unmatched case control study was conducted using logistic regression model.

Data Collection:-

A standardized questionnaire was used to collect demographic data, vaccination status, vaccination history (place, date of vaccination, and injection site on the body), and reasons for non-vaccination, and history of travel to other woredas, history of measles contact included in investigation. We verified vaccination status retrospectively by vaccination cards provided either in the routine vaccination or in the mass vaccination interventions. Vaccination status of measles was evaluated by observing and reviewing the vaccination cards or in its absence, by querying the family vaccination history. When card verification was not possible, history was relied on. We also asked respondents their level of education and parent level of education and

family occupation, place of usual residence, and the number of families residing in the household.. The woreda health stuffs and administrative was participated in the study.

The designed questionnaire for case control study was completed during an interview. Local language was used during the interview with the subjects. Parents were interview for those aged less than 15 years old. Interview was conducted for case and pair of controls on the same day. The questionnaire includes demographic information, vaccination history, clinical history, treatment history, and knowledge on transmission and prevention methods as well as risk factors. History of vaccination was revised based on records from the vaccination cards and logbooks. History of traveling and destinations during the previous 3 weeks, history of contact with any kind of measles suspected or confirmed case with in the past three weeks, education level and occupation of the parents, and other economic indices, such as household size and number of rooms, type of house (wood, grass, iron and type of building) possession and availability of furniture (such as mobile and fixed phones, televisions, and type of bed), distance from health facilities and number of rooms were important variables of the questionnaire.

Sample Size:-

All measles case of the woreda was included in the study.

Analysis:

Data was analyzed from the surveillance data from all reported cases since the beginning of the first outbreak on January first 2015 until the outbreak is laboratory confirmed. Collected in a printed questionnaire was entered in to an epi info electronic data base. Following data cleaning check up, tables, rates, ratios and other statically analysis were performing using epi info version 7.1.3.3 and Excel spread sheet. For multivariate analysis, we used conditional logistic regression modeling and calculated the adjusted OR and 95% confidence Intervals (CI)

Ethical consideration

All investigation and data collection procedures permission was started after permission and providing written official latter to the regional PHEM. Permission approval was obtained from the regional PHEM following the explanation purpose and benefit of the study. Verbal informed

consent was used in the process of data collecting from the study participants. Confidentiality of responses maintained throughout the process.

Result

There were measles suspected reports since the beginning of the 2015 New Year from Kafta Humera, Tsegede and Kola Temben woredas of Tigray Regional State. Five cases of Kola Temben woreda were confirmed in EPHI National Laboratory. The weekly aggregated data and line lists of measles cases of the region and the woreda showed a situation of outbreak. By making discussion with EPHI PHEM and the regional PHEM a team was deployed for an investigation and control of the outbreak.

The team investigated using case based measles surveillance based the reported 17 cases and the five laboratory confirmed cases. Another 33 cases report found from the woreda and 3 active cases was found by the team during house to house investigation. We observed cold chains with challenge of electric interruption, the difficulty of the geographic areas with distant and difficult roads to arrive the health facilities. We observe the providing of varieties of foods, vegetables and fruits for cases.

Of the total 61 cases reported from January 1 to February 1, 2015 in the region 17(27.9%) were from Kola Temben Woreda. The Attack Rate and Case Fatality Rate of measles during this time in the woreda was 33/100,000 and zero respectively.

The median age of cases was 10 years while that of the controls was 21 years. The first cases was reported from Arena, Deder and Werk Amba kebeles, each reported one case of measles on January 19, 2015. There were religious holiday of epiphany and the month January was the time which has done many ceremonies like marriage and memorial ceremonies. The number of cases was gradually increasing in these Kebeles except Work Amba kebele and spreads to Guroro, Mengi, Newi and Delhi kebeles that seems in a line of rural road. The number of cases in a kebeles accounts 19(36.0 %) Deder, 16(30.%) Guroro, 7(13.0%) Arena, 5(9.0%) Mengi, 3(6.0%) Werk Amba, Newi 2(4.0%) and the rest 1(2%) Delhi Kebele. Among the total 28 kebeles

7(25%) were affected by the outbreak. Out of the total cases 21(39.6%) were females and 32(60.1%) were males.

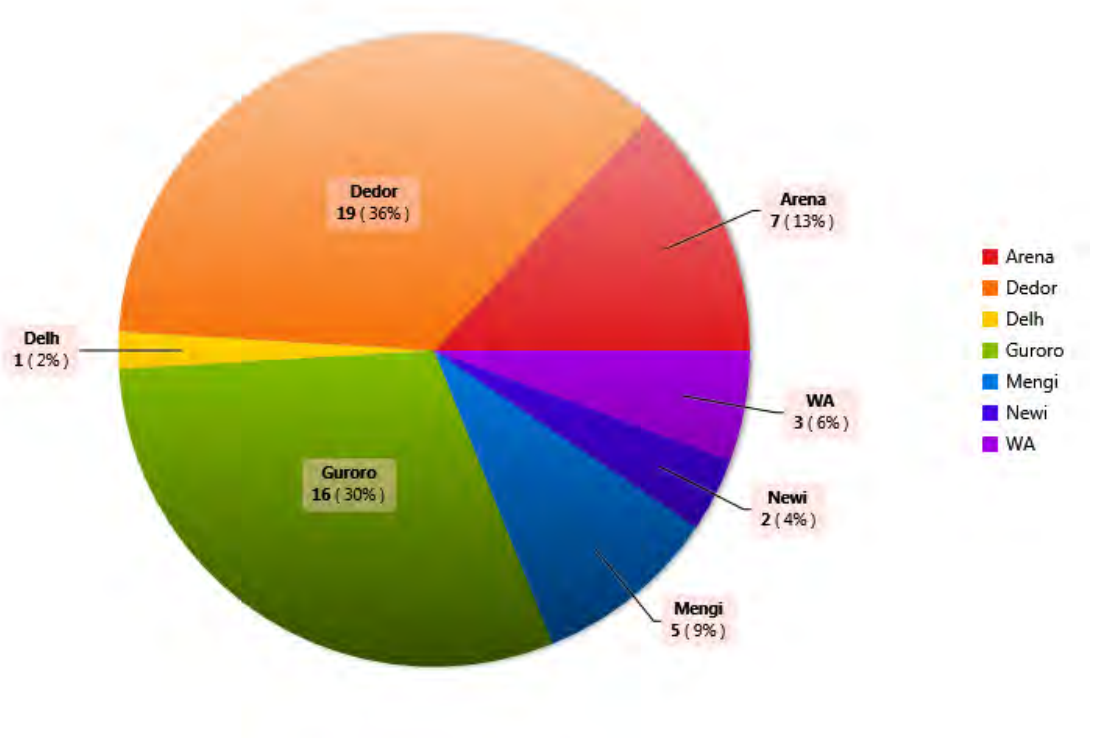


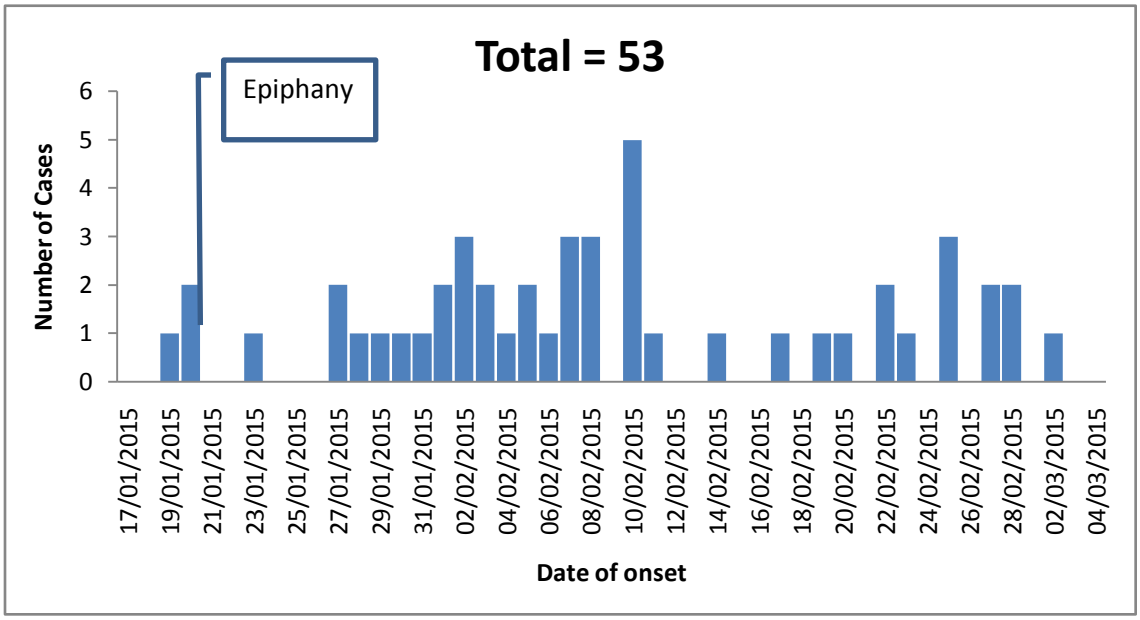
Figure 1.2.6 Distribution of measles cases by kebeles in Kola Temben woreda, Central zone of Tigrai, Ethiopia, March 2015.

Age group	Frequency	Percent	Cum. Percent	95% CI Lower	95% CI Upper
0 - <5	21	39.62%	39.62%	26.45%	54.00%
5 - <10	5	9.43%	49.06%	3.13%	20.66%
10 - <15	3	5.66%	54.72%	1.18%	15.66%
15 - <20	8	15.09%	69.81%	6.75%	27.59%
20 - <25	3	5.66%	75.47%	1.18%	15.66%
25 - <30	4	7.55%	83.02%	2.09%	18.21%
30 - <35	6	11.32%	94.34%	4.27%	23.03%
35 - <40	1	1.89%	96.23%	0.05%	10.07%
45 - <50	1	1.89%	98.11%	0.05%	10.07%
50 - < HIVALUE	1	1.89%	100.00%	0.05%	10.07%
TOTAL	**53**	**100.00%**	**100.00%**		

The Crude AR of measles in the woreda was 33/100,000. The most affected age group was of under five years children years with AR of 85/100,000 followed by age group 25-34, 15-24 and 5-14 with the AR of 48, 41 and 17 per hundred thousand respectively.

Table 1.2,2. 5Distribution of measles cases by age, frequency and attack rate in Kola Tembien Woreda of Central Tigray, Ethiopia, March 2015.

Age	Cases	%	Age specific AR/1000
<5	21	39.6	0.85
5_14	8	15.1	0.17
15-24	12	22.6	0.41
25-34	9	17.0	0.48
>34	3	5.7	0.07
Total	53	100	0.33



Clinical Characteristics

The most common clinical manifestations seen in the measles cases were fever (98.1%), rash and cough (92.5%) red eye (90.6%) and runny nose (81.1%). Koplik's spot was a sign seen in 54.7% of the

cases. Pneumonia (47.2%) was the frequent complication followed by vision change and diarrhea each scored 26.4% and convulsion (7.5%).

All (100%) cases were visited in health facilities, HPs and HCs. Among the measles cases 94.3% was treated with antibiotics, 96.2% were supplied vitamin A and 13.2 % were treated with tetracycline eye ointment. Out of five samples sending for laboratory conformation all (100%) are positive for IGM.

Vaccination Status

The vaccination coverage of the woreda in 2011/2012, 2012/2013, 2013/2014 was 95.5%, 99% and 94% respectively. Regarding the vaccination status of the cases 15.1 % were not vaccinated and 11.3% were unknown their vaccination status. Out of the total vaccinated cases 73.6% took the first dose, 47.2% took the second dose and 22.6% took the third dose. Among the controls 78.3% were vaccinated, 13.2% unvaccinated and 8.5% were not known their vaccination status.

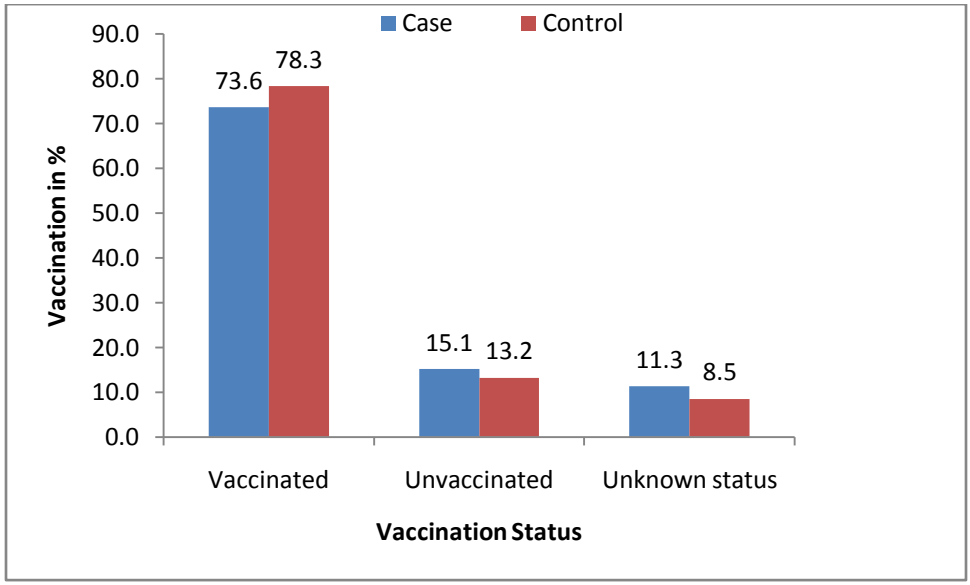


Figure 1.2 8 Vaccination status of cases and controls in % of Kola Tembien Woreda of Tigrai, Ethiopia, March 2015.

Table 1.2.6 Vaccination Status of measles cases in Kola Tembien Woreda, Tigrai, Ethiopia, March 2015.

Age	First dose	2nd dose	3rd dose	Unvaccinated	Not Known status
<5	23	17	9	1	0
5_14	10	6	2	1	1
15-24	3	2	1	1	1
25-34	2	0	0	2	1
>34	1	0	0	3	3
Total	39	25	12	8	6

In the bi-variant analysis history of travel prior two weeks OR 3.0 (95% CI = 1.1-13.0), contact history with measles case OR 7.1 (95% CI= 3.4-14.8) and being age five and below OR 10.4 (95 CI=3.8-28.1) were significant factors for contracting measles.

Table 1.2.7 Independent factors associated with contracting Measles in Kola Temben Woreda, Tigray Region, Ethiopia, 2015

Exposure	Yes/No	Cases	Controls	OR	CI
History of travel two weeks prior to illness	Yes	7	4	3.9	1.1-13.0
	NO	46	102		
Contact with measles case	Yes	33	20	7.1	3..4-14.8
	No	20	86		
Age five and less than five year	Yes	21	7	10.4	3.8-28.1
	No	32	99		

This study demonstrates measles contact was more than seven times the risk of contracting measles compared in vaccinated children (OR = 7.6 : (CI = 3.9 – 14.9)). There was no correlation between the attack rate and vaccination.

Table 1.2. 8 Interaction between vaccination status and contact history in cases and controls of Kola Temben Woreda, Tigrai, Ethiopia, March 2015.

		Case	%	Control	%
Vaccinated	Have contact	25	62.5	15	37.5
	No contact	17	20.24	67	79.76
	Total	37		74	
Not Vaccinated	Have contact	16	61.54	10	38.46
	No contact	6	13.64	38	86.36
	Total	16		30	

The main reason for non vaccination was lack of information (74.29%; 95 CI, 56.74%-87.51%). The second most frequent was absent during vaccination due to personal reasons (14.5%, 95% CI, 4.81%-30.26%).

Table 1.2.9 Possible Reasons for not vaccinated in Kola Tembien Woreda of Central Tigrai, Ethiopia, 2015

Main Reason for not vaccinated	Frequency	Percent	Cum. Percent	95% CI Lower	95% CI Upper
Absent during vaccination	5	14.29%	14.29%	4.81%	30.26%
Lack of information	26	74.29%	88.57%	56.74%	87.51%
Refusal	3	8.57%	97.14%	1.80%	23.06%
someone told me not to go	1	2.86%	100.00%	0.07%	14.92%
TOTAL	**35**	**100.00%**	**100.00%**		

Discussion

Measles cases were occurred followed X-Mass and Epiphany holidays in sporadic way from 1/19/2015 until March 2, 2015. There were more ceremonies after the x-mass, including marriages, birth ceremonies and traditional death memorial ceremonies especially Epiphany day (January 20, 2015). The index case was from Abiyi Adi hospital, of three of cases from Menji and Work Amba kebels, whose have contact with measles case in the hospital. Another index was from western zone, a case from Arena woreda whose have history of travel and measles

contact from Tsegede woreda. Interventions like treatment of cases, health education; isolation of cases, and advocacy by the woreda, health center and health post staffs to the outbreak was immediate response during the outbreak.

The recent measles outbreak in different areas of Ethiopia especially in high vaccination coverage of Tigray Regional State woredas has raised question over the immunization program. High number of failure of measles vaccination have also documented in other studies like 50% failure in Pakistan [10]. Increasing and sustaining measles routine coverage over 90% is essential for achieving a sustainable reduction in measles mortality[1] was successfully achieved in this woreda that was showed zero fatality rate. Even though. This study used recall by the parents in the absence of vaccination cards as indicator of what the child has had received vaccine, but this is not as it may seen, as unreliable indicator. Studies evaluating the recall of the parents regarding their children's vaccination have shown it to be a reliable measure.

People who have travel of history and have contact history with measles cases were more affected by measles. Even though index cases were from neighboring woredas where they had had measles outbreaks the transmission from kebele to other kebeles in the same woreda indicates that contact with measles cases showed having contact with measles case was also found a risk factor. Measles spread easily in crowed living areas like schools and crowded living conditions [11].

Failure of immunization program to control measles outbreak may be attributed to lack of information and due to personal reasons by the parents. Other reasons may be Influx of other unvaccinated people from other areas, inadequate awareness including parents and health professionals, may be failure of the vaccine itself and corrupt practice in reporting and practical activities on the ground. According the woreda health officials there had been influx of unknown vaccination status of population occurs every year from western zone settlements (Kafta Humra) that was also found index measles case.

Early treatment and providing of supplementary variety foods by their families (traditional believe) as well as the vaccination coverage decreases the severity of measles that results zero

fatality rate compared to developing countries of measles fatality rate of 3-5% [12]. The influx of unknown vaccination status of population occurs every year from western zone settlements (Kafta Humra) that was also found index measles case.

Health education was given to the population in churches, schools, and activities of soil and water conservations. Cases were isolated (make to stay at home) until a week after rash disappears. Active cases were detected and treatment was given properly. Awareness and initiation was conducted in health workers for continuous surveillance and to give health education about vaccination coordinating with administrative.

Conclusion

The vaccination coverage of this woreda and the region was greater than the worlds average (84%) vaccination coverage; it seems likely that there are additional factors that are contributing to the failure of achieving its goal controlling measles outbreaks. There is a need to assess whether any addition from the chain of handling the vaccine from the manufacturing, transportation and storage to the administration.. The traditional ceremonial activities of the woreda from the beginning of the New Year are also factors for spreading of measles.

Recommendation

- Cooperation with administrative and religion leaders are important issue to prevent and control measles outbreaks. Community ad religious leaders participation in prevention and control measles may help to assure the vaccinations, to solve the traditional harmful ceremonial practices and strengthen the usful traditional practices as well as to control the corrupt practice of the reporting and vaccination coverage of the woredas.
- Special and sealed vaccination card that cannot easily spoiled and tear and able to hung may better to prepare nationally
- In addition to strengthening of the surveillance till to health centers to identify outbreaks, one case of measles must be considered to be an outbreak and a rapid response should be initiated.

- Policy makers may able to include the vaccination program to adults in areas of measles outbreak with high number of adult cases.
- Strengthening and constructing the local roads and improving the electric system by the local and regional administrative.

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Chapter II- Surveillance Data Analysis Report

Five Year Malaria Surveillance Data Analysis Report of Ethiopia, 2009 – 2013

Back Ground

Malaria is the most widely distributed infectious disease and it is the major public health problem in Sub-Saharan Africa including Ethiopia. Malaria is one of the top ten diseases in outpatient and inpatient disease in health facilities in Ethiopia. More than 55 million people in the country are at risk for malaria. Malaria outbreaks had occurred in few woredas of the country, especially in 2012. The incidence of malaria had a significant number in the lowlands of the country. Despite the tremendous efforts that have been made to control malaria; it is still a challenging problem in this country. There are periodic outbreaks of malaria related to seasonal changes. It is important to analyze the magnitude of the disease to strengthening the control mechanisms and/or to fill the gaps in the intervention mechanism. This paper shows the trend of malaria in Ethiopia from 2009 – 2013. It will highlight the changes, the current status and the magnitude of the problems in-between to the policy makers and stakeholders.

Methodology

A retrospective secondary five year (2009 – 20130) malaria data analysis was conducted, after the data was officially requested and received from Public Health Emergency Management center. Data analysis and cleaning was conducted using Microsoft Excel 2010 and EpiInfo 7.1.3.3.

Result

A total estimate of 13 million confirmed and clinical cases were reported nation wide, from 2009 – 2013 in Ethiopia. The majority of cases were from SNNPR (39.3%), followed by Amhara 23.7%, Oromia 17.9% and Tigray 11.2%. Among these, 99% were outpatient and 1% were inpatient. Out of the 7,476,518 (57.5 %) confirmed malaria cases, 61.9% were due to P. Falciparum and 38.1% were due to P. Vivax. There was a substantial increase in the number of malaria cases from 2009 - 2012. The peak malaria report year was 2012, with 30.1% of the total cases in the five year period. Many woredas had an epidemic in 2012 like Qafta Humera in Tigray region from October to November, Konso Wereda in SNNPR region in March and 28 deaths in Somali region from Kebri Dehar hospital, September 2012. Average national incidence of malaria deaths (clinically and confirmed) per 100,000 population was 0.346. Among the regions Gambela and Benshangul have the great number of malaria incidences in the five year study period accounting 141 and 92 per 1000 population respectively. The magnitude of the species was different in different regions. The highest magnitude of P. Falciparum was in

Gambela, Somali, Afar, and Dire Dawa with the total percentage of 89.3, 78.9, 70.8 and 70.7 respectively.

Conclusion

Having ten million malaria cases per year in Ethiopia is now history. Due to the tremendous efforts in controlling and preventing malaria, devastating malaria epidemics has not been seen except small outbreaks like in Qafta Humera in Tigray region and Konso SNNP region in 2012. So even though trends of malaria are declining in this country, strengthening of surveillance in expansion and scaling up of data collection using modern technology are vital for early detection of epidemics and in preventive and control measures in order to achieve the goal of malaria elimination strategy by 2025. Strengthen of routine surveillance by improving quality, capacity and coverage of the surveillance system and also incorporating the health facilities, those which are not included to the PHEM network system are important issues for improving successive assessment of malaria.

Key words: Malaria, mortality, morbidity, confirmed and clinical, clinical, outbreaks

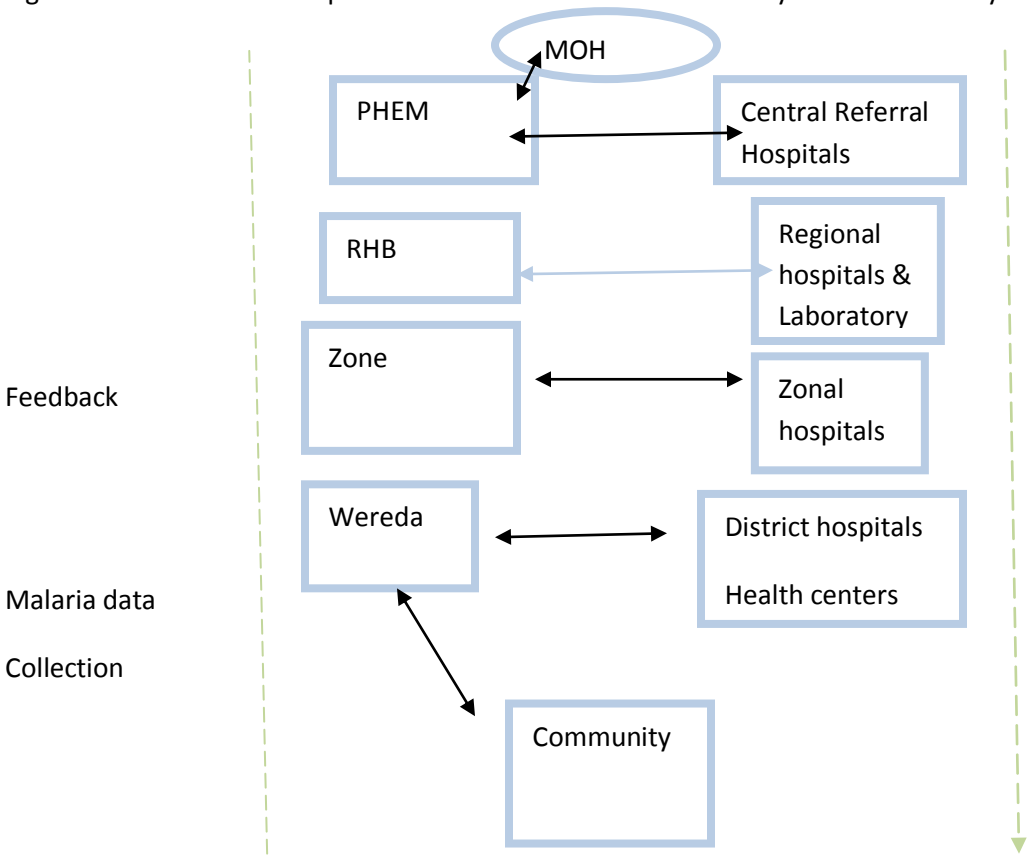
Introduction

Malaria is caused by any of the five species of Plasmodium (P. Falciparum, P. Vivax, P. Ovale, P. malariae and P. knowlesi in Asia) protozoan parasite infection [1]. It is transmitted by infected female anopheles mosquito. It is the most important of the life-threatening parasitic disease of humans with enormous medical, economical and emotional impacts in the world [2]. Malaria is transmitted in 108 countries containing 3 billion people and causes nearly one million deaths each year [1, 3]. Malaria is one of the leading causes of illness and deaths and the leading cause of under-five mortality in the world. In 2010 there was an estimated of 216 million malaria cases worldwide; [3] of these 91 % were P. Falciparum. Among these the vast majority were found in Africa (81%) followed by South East Asia (13%) and Eastern Mediterranean region (5%) [2]. Malaria is the most widely distributed infectious disease and it is the major public health problem in Sub-Saharan Africa including Ethiopia [4]. African health facility studies show that malaria constitutes 20-60% of the outpatient consultation and 10% of hospital admission [5]. According to the Ethiopian Federal Ministry of Health recordings, 75% of the country area is malarious [6], and 68% of the total population is at risk for malaria [7, 8]. That is more than 55 million of the population of the country [9-11]. Plasmodium falciparum *and* Plasmodium vivax are the two predominant malaria parasites, accounting for 60% and 40% of malaria cases, respectively [12]. Strengthening control and prevention intervention of malaria

is scaling up in Africa, including Ethiopia [13]. And morbidity and mortality of due to malaria is declining in East Africa including Ethiopia. The epidemiological situation of malaria has worsened in the last decades due to the environmental changes and global warming causing environmental degradation and instability of the rainy season. At this time there had been increasing of water irrigation, especially in Ethiopia, which may have an effect on the breeding site for mosquito and substantial incidences increase malaria near micro dams [14]. Malaria transmission occurs in the altitude of less than 2000 meters above sea level. Malaria transmission depends on rainfall and season. The main seasons for malaria transmission in Ethiopia are two. These are the Meher Season (September- November), which occurs after the summer heavy rainfall and the Belg season (March- May) , which occurs after the light rainfall of the winter season [15, 16].

The National Malaria Control Program (NMCP) was integrated in to the Ethiopian health services in 1993 based on Health Policy and Health Sector Program of the country. Despite tremendous efforts made to control malaria; it is still a challenging problem in this country. There are periodic outbreaks of malaria related to the seasonal changes. Despite the efforts to control of the disease; it is also important to analyze the magnitude of the disease to strengthening the control mechanisms and/or to fill the gaps in the intervention mechanism.

Figure 2. 9 Data collection process and feedback information way of surveillance system of Ethiopia



This paper presents and assesses the five year malaria reports from the country, including the regions and zones from 2009 to 2013 in Ethiopia.

This study aims to analyze the trends and the level of the magnitude of malaria in the country, including the regions and administrative cities of Ethiopia. It will highlight the changes, the current status and the magnitude of the problems in-between to the policy makers and stakeholders.

The goals are to determine the malaria risks by stratifying the magnitude into regions and zones; to find out the current status of the malaria burden; and find out the changes from the previous experience of the magnitude to able to scale up the malaria control efforts in the country.

This paper tries to assess all regions and administrative cities related to the magnitude of the malaria including the species. The relation of the magnitude of malaria case with season, the altitude and the trends of malaria in the specific zones also incorporates the study. The focus of this paper is on the descriptive secondary data analysis of the regional and city administrative malaria report.

Rationale of the Study

Even though tremendous efforts had been made to control and to prevent malaria, including establishing strategies, preparing guidelines and a collaboration of stockholders; had been declining devastating malaria epidemics; it is a major challenge in burden health facilities in the country. Malaria is a major challenge to Ethiopia and African countries due to climate changes and global warming. Continuous surveillance and data analysis is an important measure to evaluate the trends of malaria related to intervention measures in controlling and preventing of the disease.

Objective

General Objectives:-

To describe the five year malaria trend of Ethiopia from 2009 to 2013.

Specific objectives

- To characterize the incidence of malaria by region and nationally in the country
- Describe the distribution of malaria over time, in the country and regions.
- To describe the type of malaria in terms of type of malaria, laboratory result, morbidity and mortality in Ethiopia

Methods and Materials

Study area, population and period

The study was conducted in Ethiopia, which is located in Eastern Africa. Ethiopia has a great geographical diversity; its topographic features range from the highest peak at Ras Dashen, 4,550 meters above sea level, down to the Afar Depression, Dalul, 110 meters below sea level (CSA, 2009). The climate varies with the topography, from as high as 47 degrees Celsius in the Dalul to as low as 10 degrees Celsius in the highlands. Ethiopia's total surface area is about 1.1 million square kilometers with the total population of about 82,000,000. The total 75% surface area of the country is malaria endemic, which is 68% of the population, is at risk for malaria. Malaria is the most prevalent disease in the country, accounted in the top ten diseases of the country. The pick malaria transmission seasons are October to December followed by March to April. Both P. Vivax and P. Falciparum exist in all regions of the country. Ethiopia has 9 regions and 2 administrative cities. Djibouti, Eritrea, the Republic of the Sudan, the Republic of the Southern Sudan, Kenya, and Somalia are bordering the country.

Study design

A retrospective five year data analysis study was conducted by reviewing the PHEM reports at EHNRI.

Data Source

Five year secondary data were obtained from EHNRI (PHEM) surveillance data of 2009 -2013. Variables such as region, zones and woredas as well as, clinically and confirmed, conformed, inpatient, outpatient, P. Falciparum and P. Vivax, malaria suspected cases and malaria deaths are included in the data base

Sample size and sampling method

All malaria cases, including suspected, confirmed and deaths during 2009 – 2013 reported to PHEM center are included in this study. All regions are in the study.

Data Collection

We systematically identify all malaria cases and deaths recorded in the PHEM center. The data include reports of health facilities of all regional and administrative cities of the country. Health posts, health centers and hospitals are included in the PHEM network in the respective woredas, zones and regional administration hierarchy. All reported malaria cases (confirmed

and clinically treated), confirmed malaria cases, malaria outpatients, malaria suspected febrile cases, inpatients and deaths due to malaria are included in this study.

The malaria case distribution of time and place are presented here using line graphs, pie charts and tables in order show the descriptive trend method study.

Data Management and Analysis

Data cleaning had been done from the initial secondary data stored in Microsoft Excel in the Center using the same version. Descriptive analysis was computed using Microsoft office Excel 2007 and EpiInfo 7.1.3.3. The magnitude and frequency distribution of both dependent and independent variables was worked out by crosstab. Finally the data was described using tables and figures.

Ethical Consideration

Permission approval of the study was obtained from EHNRI PHEM center.

Definitions

Confirmed malaria case: A suspected case confirmed by microscope or RDT for Plasmodium parasite [17].

Malaria suspected case: - A person with a fever or fever with headache, chills, rigor, back pain, sweats, myalgia, nausea and vomiting diagnosed clinically as malaria [17].

Malaria outbreaks: - Crossing the norm line OR doubling the number of malaria cases compared to the prior year of reported WHO epidemic week [17].

Clinically and confirmed case: - malaria suspected cases plus confirmed malaria cases [17].

Results

Malaria Morbidity

Within the last five years (2009 – 2013) a total of thirteen million clinically and confirmed malaria cases were reported nationally. Among the total clinically and confirmed cases, 12873617 (99 %) were outpatients, 127193 (1 %) were inpatients and 7476518 (57.5 %) cases were confirmed.

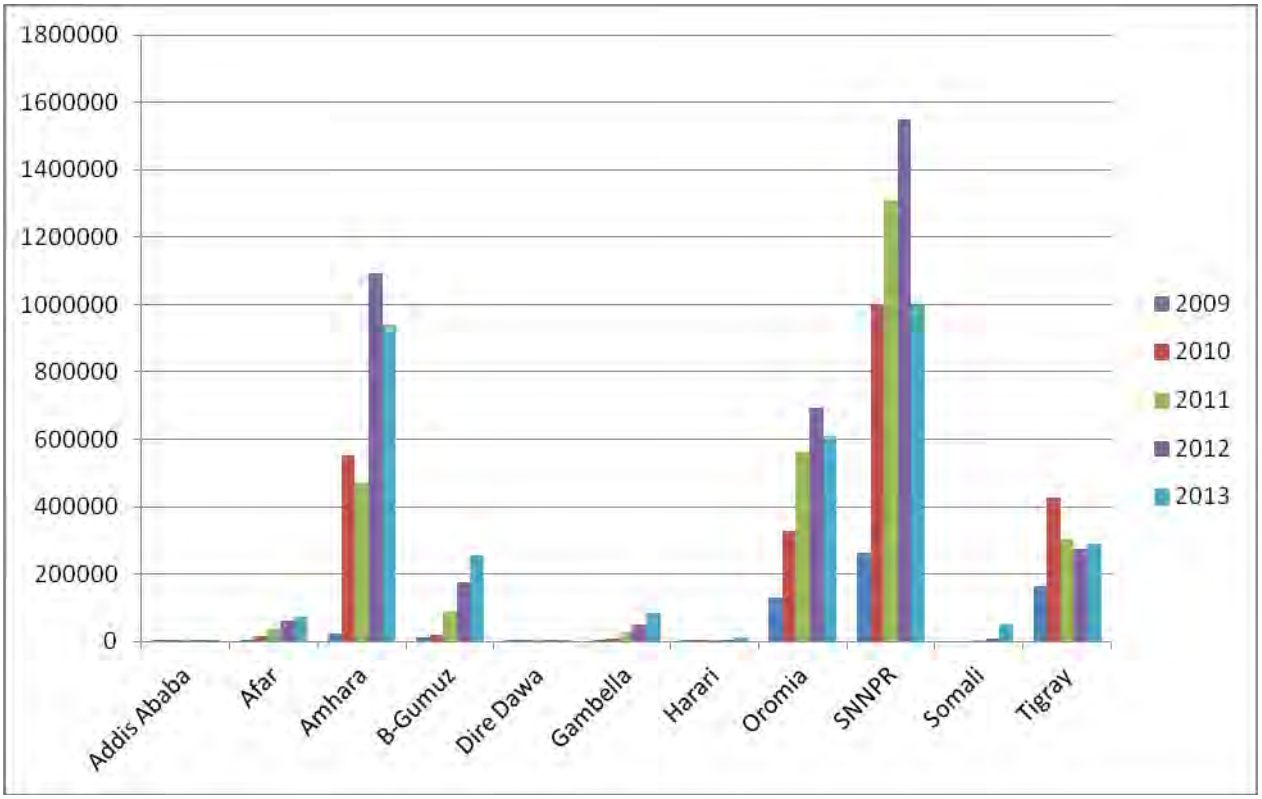


Figure 2.10 Distribution of Malria Morbidity by Year and Region in Ethiopia, 2009-2013

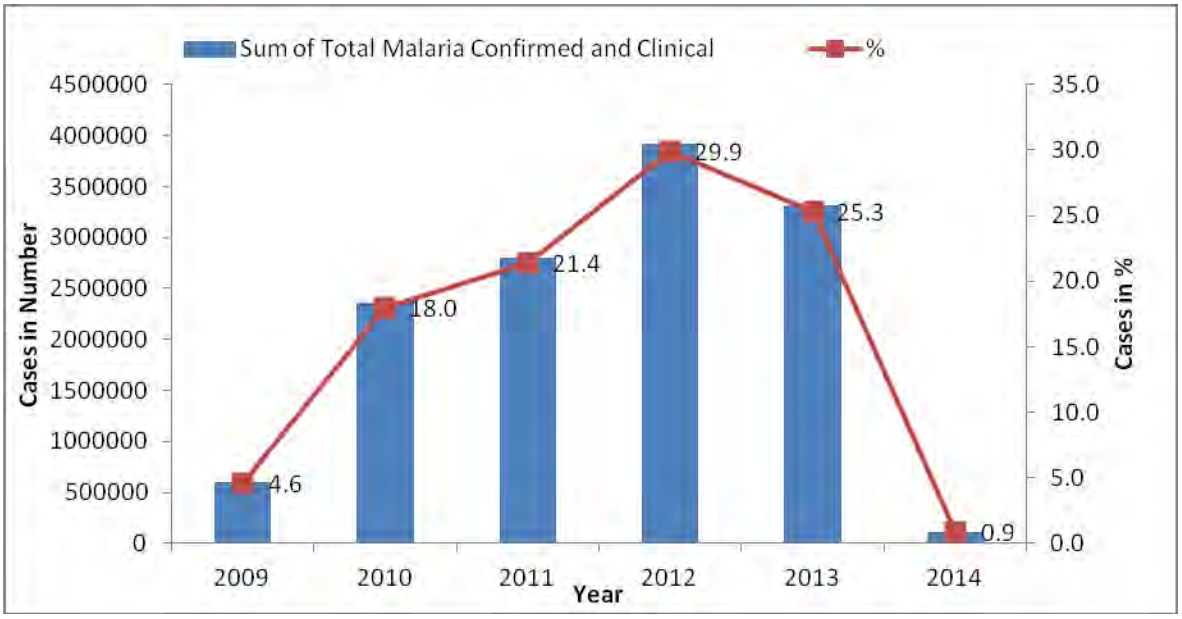


Figure 2.11 Number of malaria cases by year in Ethiopia, 2009-2015.

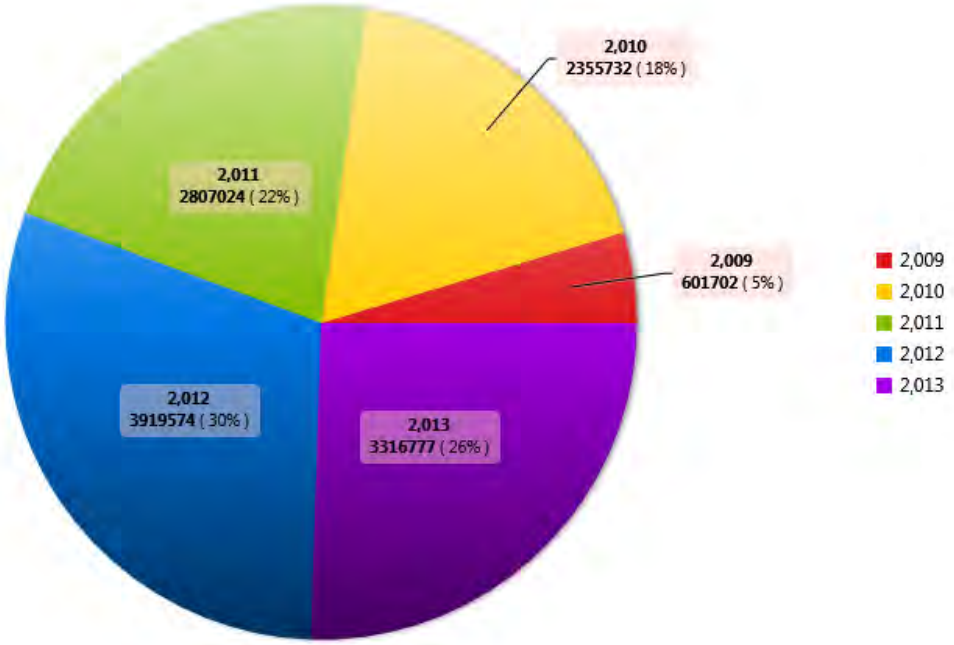


Figure 2. 12Total clinical and confirmed malaria cases by year, Ethiopia, 2009 - 2013

Nationally, there was substantial an increase in the number of malaria cases in the first four (2009 – 2012) years. The year with the most reported malaria cases was 2012 (3,919,574, 30.1%). The report shows a decline in the number of clinically and confirmed malaria cases by 15.4 % in 2013 (3,316,777 Figure 1, 2 and table 1).

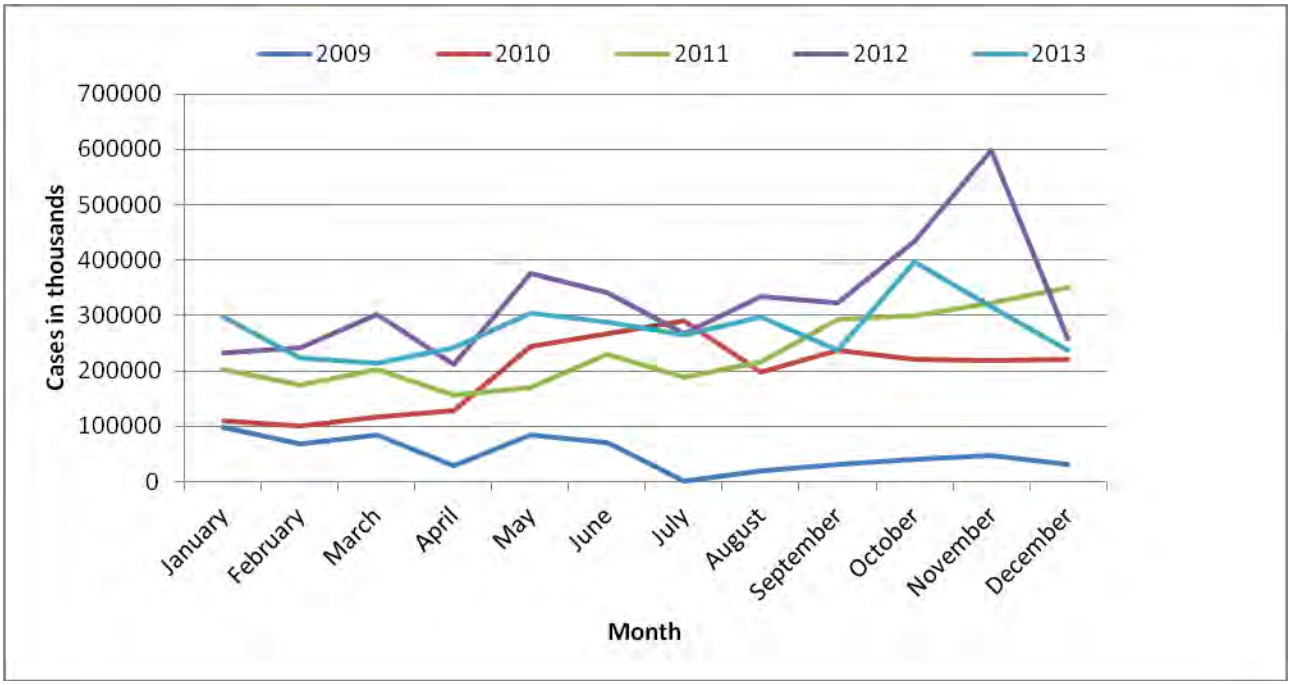


Figure 2.13 Nationals five year trend of malaria by month and year, Ethiopia, 2009 - 2013.

Figure 4 shows that the Meher season (September – November) have the most transmission of malaria in Ethiopia followed by the Belg season (March- May). Generally, May was the peak of the months with the highest malaria report secondary in November of the total five year clinical and confirmed malaria case reports.

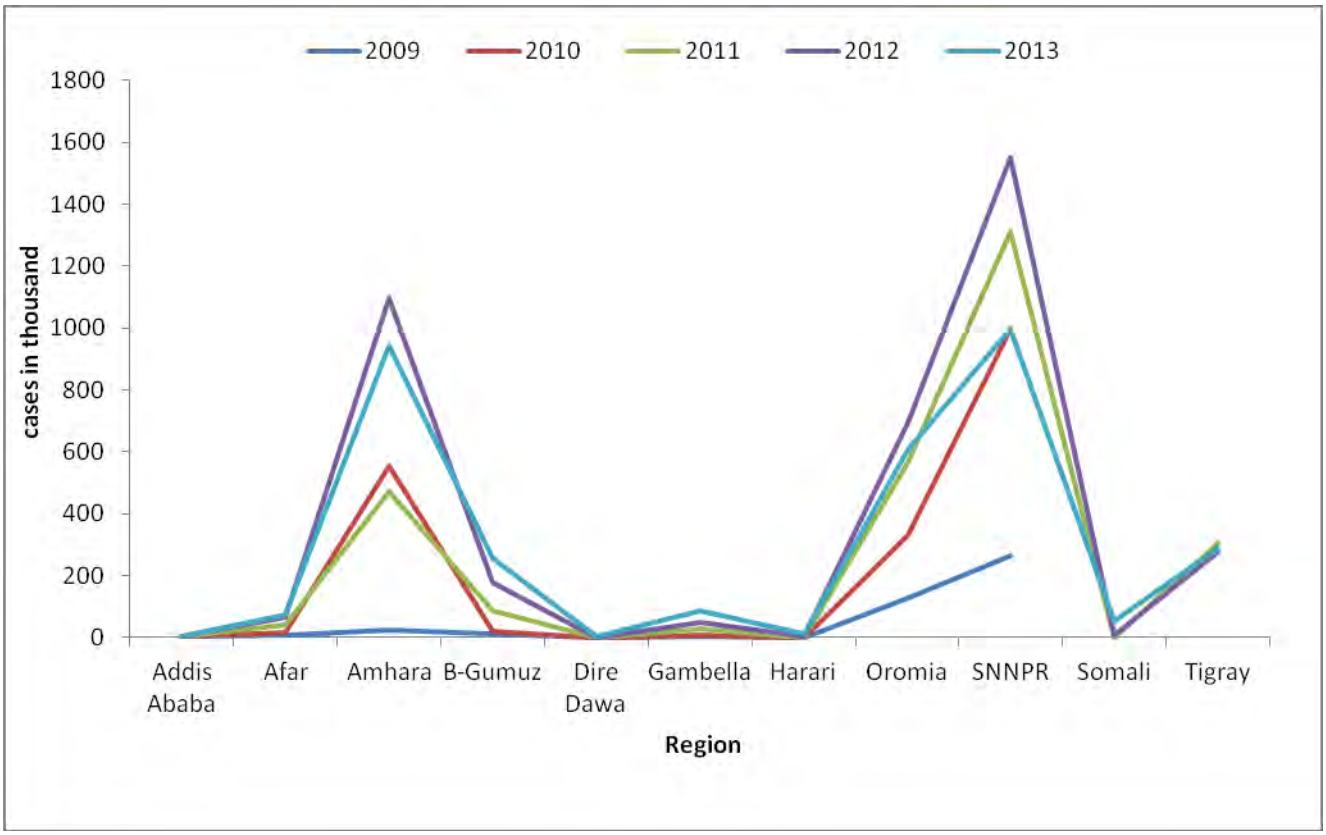


Figure 2. 14 National total five years clinically and confirmed malaria cases by year and region of Ethiopia, 2009 - 2013.

Regional reports show different magnitude of highest recording malaria cases in different years. Addis Ababa, Afar, Benshangul Gumuz, Gambela, Somali and Dire Dawa reported the greatest number of malaria cases in 2013. Amhara, SNNP and Oromia reported the greatest number of malaria cases 2012. Tigray region was the only region having the highest of malaria cases in 2010. And the following three years had been showing a declining of malaria cases in this region, except a one percent increase from 2012 - 2013. A total estimate of 13 million confirmed and clinical cases was reported nationwide in 2009 – 2013 in Ethiopia. The majority of cases were in SNNP (39.3 %), followed by Amhara (23.7 %), Oromia (17.9 %) and the Tigray (11.2 %, table 2.1).

Table 2. 10 Total five years confirmed malaria cases in the region and species, Ethiopia, 2009 - 2013.

Region	Total Positive	P.falciparum	%	P.Vivax	%
Addis Ababa	12314	4530	36.79	7784	63.21
Afar	87998	62313	70.81	25685	29.19
Amhara	2169735	1332234	61.40	837501	38.60
B-Gumuz	342399	242041	70.69	100358	29.31
Dire Dawa	3008	1786	59.38	1222	40.63

Gambela	86736	77426	89.27	9310	10.73
Hareri	12171	7446	61.18	4725	38.82
Oromia	1163952	664557	57.09	499395	42.91
SNNRP	2760772	1664737	60.30	1096035	39.70
Somali	33273	26256	78.91	7017	21.09
Tigray	810144	551422	68.06	258722	31.94
Total	7482502	4634748	61.94	2847754	38.06

Out of the total confirmed malaria case 61.9 % or 4,634,748 cases were due to P. Falciparum and 38.06 % or 2,841,770 cases were due to P. Vivax. There were no reports other than these two species. P.Falciparum is the highest in magnitude in all regions except Addis Ababa, with P.Falciparum (36.8 %) and (P. Vivax 63.2 %). The magnitude of the species was different in different regions. The highest number of P.Falciparum was in Gambela, Somali, Afar, and Dire Dawa with the total percentage of 89.3, 78.9, 70.8 and 70.7 respectively.

Indicators show that total confirmed and clinical malaria, total out-patient, total in-patient, suspected febrile cases and total malaria positive case per thousand for each and total malaria causes deaths per 100,000. In all indicators the first two years 2009 and 2010 have lower results than the rest years. That was the start of the PHEM program.

Table 2. 11. The total five year malaria cases incidence by indicators of Ethiopia, 2009 - 2013.

Total five year malaria cases and incidence by indicators, Ethiopia, 2009 – 2013						
Indicator	Year					Average incidence
	2009*	2010*	2011	2012	2013	
The total confirmed and clinical malaria cases/1000	8.2	31.5	34.391	46.827	38.640	31.835
Total outpatient malaria case/1000	8.1	31.2	34.027	46.385	38.324	31.524
Total in-patient malaria cases/1000	0.1	0.3	0.363	0.442	0.316	0.311
Total malaria deaths/100,000	0.4	0.4	0.296	0.329	0.346	0.346
Total malaria suspected febrile examined cases/1000	0.04	22.3	32.669	66.519	82.963	41.698
Total malaria positive cases/1000	3.3	10.3	15.205	30.828	30.828	18.323
Total P. Falciparum cases/1000	2.0	6.1	8.709	19.551	19.659	11.349
Total P. Vivax cases/1000	0.01	0.1	0.076	0.096	0.319	0.115

*Somali excluded in 2009 & 2010

The overall five year average of nationally confirmed and clinically reported malaria incidence was 31.8 per 1000, which was almost parallel to the out-patients reported cases. The trends of confirmed and clinically malaria cases incidence increase in the first four years, then declining from 46.8 per 1000 population in 2012 to 38.6/1000 population in 2013. The total malaria

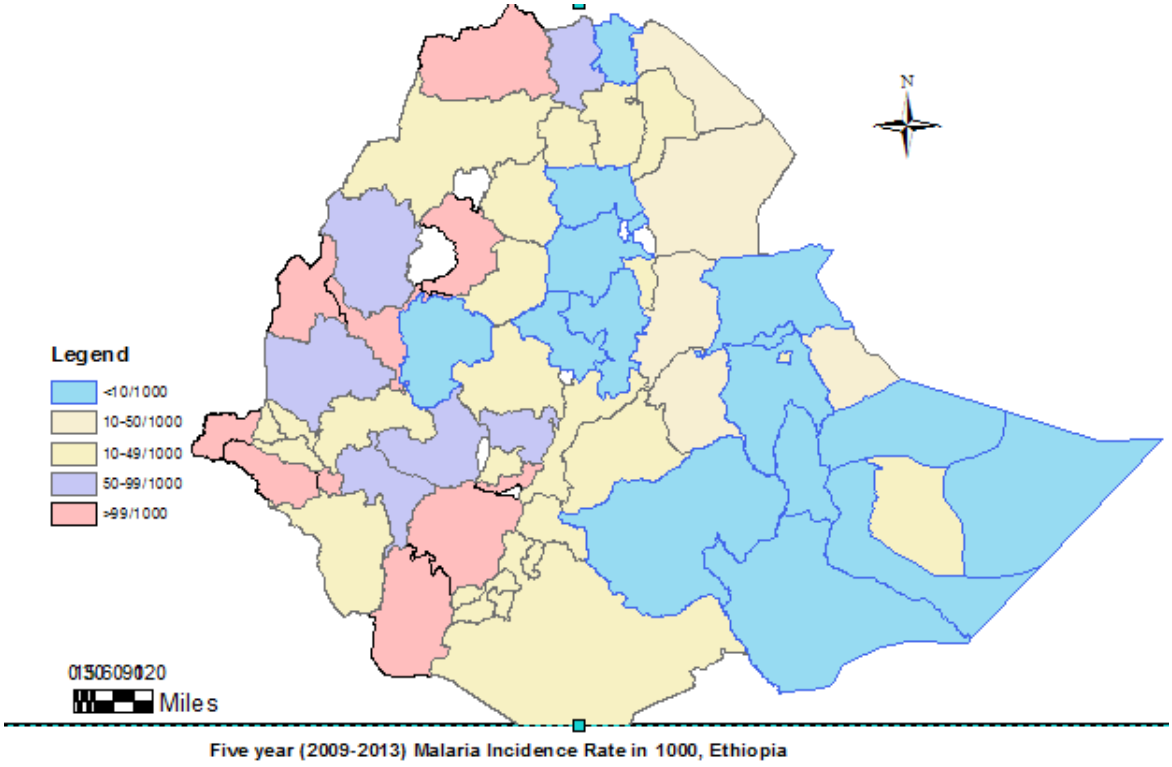
inpatients and total malaria deaths accounts 0.311 per 1000 and 0.346/100,000 respectively. Total malaria positive report shows an average of 18.323 per 1000; with P.Falciparum 11.349/1000 and P.Vivax 0.115 per 1000. Somali region was excluded in the report in the first two years.

Table 2. 12 Total malaria (confirmed and clinical) incidence in 1000, by year and region, Ethiopia, 2009 - 2013.

Region	2009	2010	2011	2012	2013	Average
Addis Ababa	0.486	0.650	0.996	1.119	1.297	0.909
Afar	4.369	11.513	25.050	40.451	44.842	25.245
Amhara	1.290	30.547	25.649	58.440	49.414	33.068
B-Gumuz	16.018	28.448	115.528	228.430	319.493	141.583
Dire Dawa	0.675	0.122	0.180	2.256	5.785	1.803
Gambela	7.715	24.506	76.556	134.504	219.641	92.584
Hareri	0.446	2.247	2.924	14.085	53.406	14.622
Oromia	4.473	11.138	18.532	22.118	18.870	15.026
SNNP	16.554	60.832	77.630	89.282	55.787	60.017
Somali			0.052	1.868	9.866	3.929
Tigray	36.250	91.895	63.820	56.199	57.637	61.160
Total Incidence	8.248	31.494	34.391	46.827	38.640	31.920

Table 2.13 Incidence of confirmed malaria cases in 1000, by region, 2009 - 2013, Ethiopia

Region	Year					Average
	2009	2010	2011	2012	2013	
Addis Ababa	0.195	0.591	0.962	1.037	1.297	0.816
Afar	1.573	7.894	9.496	15.745	21.393	11.220
Amhara	0.309	7.442	9.443	49.296	48.953	23.089
B-Gumuz	2.352	7.859	55.606	140.889	228.969	87.135
Dire Dawa	0.042	0.008	0.182	1.694	5.695	1.524
Gambela	1.521	7.573	20.761	44.453	152.194	45.300
Hareri	0.430	1.050	1.354	7.652	46.804	11.458
Oromia	1.698	4.275	7.531	10.730	13.124	7.472
SNNPR	7.392	23.859	38.649	52.563	38.528	32.198
Hareri	7.392	23.859	38.649	52.563	38.528	32.198
Somali			0.043	0.959	5.450	2.151
Tigray	14.552	20.926	24.886	50.707	56.145	33.443
Total Incidence	3.334	10.317	15.205	30.828	30.828	18.102



Map 3 Five year Malaria Incidence Rate

The average overall five year incidence estimation of clinical and confirmed malaria cases was 31.920/1000. The highest incidence occurred in 2012 (46.827/1000) followed by 2013 (38.640/1000) and 2011 (34.391/1000). The incidence of malaria cases (clinical and confirmed) in regions has a different magnitude from the lowest (Addis Ababa, 0.909/1000) to the highest Benshangul Gumuz (141.583/1000). Gambela (92.584/1000), Tigray (61.160/1000) and SNNP (60.017/1000) have the highest incidence followed to Benshangul Gumuz. The year 2009 and 2010 was the transitional period to introduce PHEM to regions and zones.

Somali region had missed reporting of cases in the first two years, 2009 & 2012, which was excluded in total and regional incidence calculation in those two years.

The average five year national incidence of confirmed malaria (P. Falciparum and P. Vivax) was 18.102/1000 that is reported less than half the incidence of the clinical and confirmed malaria cases. The highest recorded incidence rate of confirmed malaria cases was 2012 and 2013 having 30.828/1000 for each year. The incidence of confirmed malaria case was peaking in Benshangul Gumuz (87.135/1000) followed by Gambela (45.300/100), Tigray and SNNP estimated 33.443 and 32.198 per thousand population respectively.

The total of 7,482,502 or 57.6% of malaria cases were confirmed malaria cases that was out of the total 13,000,908 confirmed and clinically treated cases. Out of the confirmed case, SNNP accounts 36.9 % followed by Amhara (29%), Oromia 15.6 % and Tigray 10.8%.

Table 2. 14 total confirmed rate and SPR by region of Ethiopia, 2009 -2013.

Confirmed malaria cases			
Region	Grand Total	%	SPR* %
Addis Ababa	12314	0.2	28.1
Afar	87998	1.2	58.7
Amhara	2169735	29.0	43.0
B-Gumuz	342399	4.6	57.5
Dire Dawa	3008	0.04	8.5
Gambela	86736	1.2	45.0
Hareri	12171	0.2	72.2
Oromia	1163952	15.6	33.6
SNNP	2760772	36.9	49.2
Somali	33273	0.4	62.0
Tigray	810144	10.8	44.6
Grand Total	7482502	100	43.9

* SPR, slide positivity rate

There had been significant differences in slide positivity in the regions, ranging the list Dire Dawa 8.5 % and the highest Hareri 72.2 %. The average national estimation of the slide positivity rate is 43.9 % (Table 2.6).

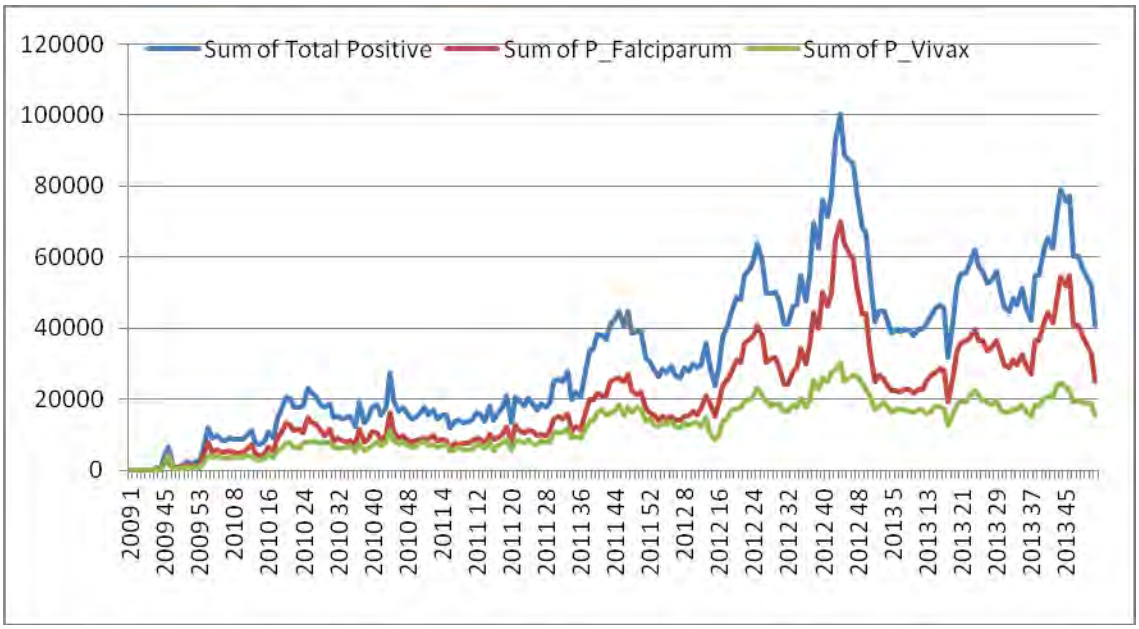


Figure 2. 15 Trends of confirmed malaria cases in species and WHO epidemic week, Ethiopia, 2009 - 2013.

Malaria mortality

In the period 2009 – 2013 there were 1413 nationally reported malaria deaths. The mean number of malaria deaths per year was 282. The national annual malaria deaths range between 275 (17.1%) in 2012 and 319 (22.6%) deaths in 2009 (Figure 9). The trend of malaria mortality shows with the highest number of deaths in 2013; epidemic week 12; reports of 65 (4.6 %) deaths followed by week 36, 2013 and week 51, 2010 reporting 34 (2.4 %) and 25 (1.8 %)deaths respectively (figure 2.8).

Table 2. 15 Malaria five year death and fatality rate, Ethiopia, 2009 - 2013.

Region	Year					Grand Total	%	Fatality rate/100,000
	2009	2010	2011	2012	2013			
Addis Ababa	0	0	0	4	0	4	0.3	2.927
Afar	0	0	14	1	0	15	1.1	0.757
Amhara	4	10	9	36	106	165	11.7	0.535
B-Gumuz	3	4	11	13	23	54	3.8	0.976
Dire Dawa	2	0	0	0	4	6	0.4	16.992
Gambela	3	0	5	27	37	72	5.1	4.117
Hareri	0	0	0	0	1	1	0.1	0.646
Oromia	40	63	50	48	36	237	16.8	1.020
SNNP	154	164	130	131	60	639	45.2	1.249
Somali			1	2	29	32	2.3	5.265

Tigray	113	39	22	13	1	188	13.3	1.290
Grand Total	319	280	242	275	297	1413	100	1.087

SNNPR accounts 45.2% (639) of the total malaria deaths followed by Oromia 16.8 % (237), Tigray 13.3 % (188), and Amhara 11.7 % (165). The fatality rate was higher in Dire Dawa (16.992/100,000 followed by Somali (5.265/100,000) and Gambela (4.117/100,000) (table 5).

March and April had the highest report of deaths with a total of 197 (14 %) and 155 (13 %) deaths respectively in the five year study period. A trend of malaria among zones was much different in magnitude. Most malarial deaths occur in SNNP zones like Gomgofa (116, 8.2 %), Segen (92, 6.5 %), Walayita (82, 5.8 %) and Sidama (67, 4.7 %), Tigray zones, like North West (128, 9.06 %) and from Amhara, North Shewa zone (63, 4.46 %) deaths. Most of the Northern West Tigray malaria death report was in 2009 (93, 49.46 %) and all the North Shewa zone of the Amhara death report was by March 2013. The Tigray Northern West Tigray zone death report was reported in April 2009 (85). The number of malaria death revealed in October, July and December with the total number of 79 (5.6 %), 78 (5.5 %) and 89 (6.9 %) respectively.

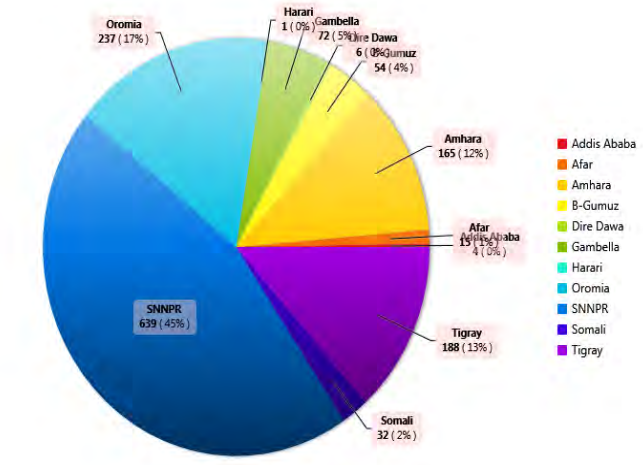


Figure 2. 16 Total five year malaria deaths by region and percentage in Ethiopia, 2009 - 2013.

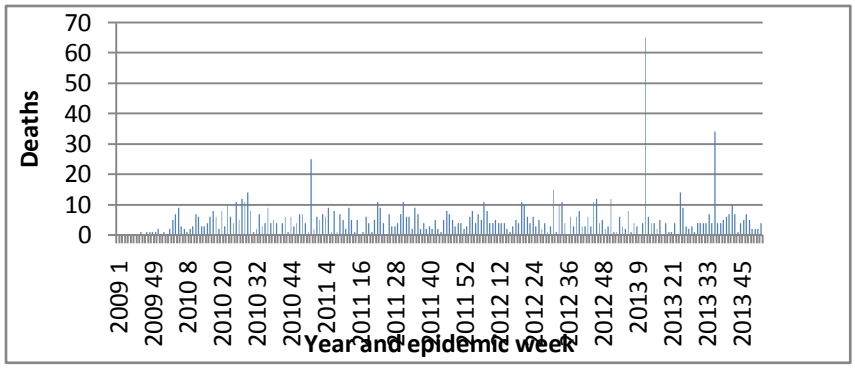


Figure 2. 17 Trends of malaria deaths in year and WHO epidemic week, Ethiopia, 2009 - 2013.

Discussion

According to the health and health related indicators bulletin report, malaria is one of the top 10 outpatient diseases since long time, which is almost having the same magnitude of malaria cases in this study except number of deaths were four times higher than this study in 2000 to 2012 (927 and 2173). The report shows increasing of magnitude of malaria from year to year like the PHEM report. But it seems unlikely to the ground of the practical trends of malaria in this country. It may be due to the improvement of reporting system rather than increasing of the malaria cases. Completeness of the PHEM report shows significant improvement, that is, from the list of about 18.9 % in 2009 to the peak of 89.1% in 2013. The year 2009 was the transitional period to introduce PHEM to regions and zones.

Nationally, the burden of malaria cases was highly concentrated within four regions (SNNP, Amhara, Oromia and Tigray), which accounts for 92 % and 80 % of estimated malaria cases and deaths respectively.

All regions had incorporated in the PHEM network by controlling and preventing epidemic disease center in 2009, except Somali region incorporated two years later.

In 2006 out of an estimated of 12.5 million worldwide suspected malaria cases, around 11 (88 %) million was confirmed through a microscope. The remaining 1.4 million (11 %) diagnoses were conducted using RDT. In Ethiopia it does not specify the type of confirmation to diagnose the malaria in the reporting system.

Prior to 2005 the ability of diagnosis of Ethiopia was 30 % [8], the current states of confirming malaria are above 44.6 %.

The study shows that Ethiopia was one of the three most malaria epidemic affected countries in 2003 with 2,064 deaths [19]. And 150,000 deaths in 1958 devastating malaria epidemic in the highlands of the country sides [20]. The average four years, 2005 – 2008, study showed incidence of deaths was 2.282 per 100,000 population, which is the highest magnitude compared to 2013 with incidence of 0.346/100,000 population and average incidence of five year incidence (0.329/100,000). Against morbidity the outpatient and inpatient cases seems 25% (31.524/1000 and 31.1/100000) higher than the 2005 - 2008 study [13]. This may be due to the improvement of reporting system. The average national five year deaths were 282.6 per year, reported with peak in SNNP (127.8) followed by Oromia (47.7) and Tigray (37.6).

Even though the species of malaria was different in different regions the general ratio of P. falciparum to P. Vivax was 62 % and 38 % respectively in this study that approximates with prior studies of 60 % and 40%. Addis Ababa has inverse result.

Limitation of the study

- The case data availability did not incorporate in the network for all health facilities like private sectors and organization like MOD, police and NGO health services. This may underestimate the malaria cases.
- Total malaria suspected febrile illness may not necessarily reflect the actual behavior of the health indicator. Some region overlaps and also exchange with the total malaria clinically and confirmed cases.
- The data had been lost important variables, including age and sex.
- Data surveillance coverage and quality were poor in some regions.
- The clinical cases increase the magnitude of the number that needs conformation to reach the exact diagnosis.
- The reporting system loses personal characteristics of age.

Conclusion

Having ten million malaria cases in Ethiopia seems now historic. Due to the tremendous efforts in controlling and preventing malaria, devastating malaria epidemics had not been seen in this study except small outbreaks like in Qafta Humera in Tigray region and Konso SNNP region in 2012. Even though an assessment of malaria burden and trends must rely on the combination of surveillance and survey data, accurate surveillance is the ultimate goal of for malaria control programs. To strengthening of surveillance requires taking constructive corrective measures of all types of error that have identified in this paper. The confidential assessment of malaria burden and trend is only certain by the strengthening of the surveillance system.

The malaria report system shows significant improvement from year to year. Initially the zones were included in the PHEM network, then followed woredas and health centers. Currently the majority of health facilities is incorporated into the PHEM network except MOD and police.

Generally the strategy for control and preventive of malaria had been on the right track, that results significant decline of morbidity and mortality, including decreasing the burden of malaria case in health facilities. The incidence of inpatient malaria cases had been declining since 2011. The study shows clinically and confirmed admitted malaria patients were lower in 2013 than 2011 and 2012.

The burden of malaria cases was aggregated in SNNP, Oromia, Amhara and Tigray. But the incidence of malaria cases generally shows higher in Benshangul Gumuz, Gambela, Tigray and SNNP.

Conformation of malaria cases shows improvement from year to year in the last five years but that was still unsatisfactory. Benshangul Gumuz was achieved a general of more than 80%. There are regions who achieved less than 5%. It is beyond of this study to investigate the gaps of the difference of the ability to confirm malaria in the regions. But policy makers should give better attention to it.

Malaria transmission is characterized by the bi - peak of the season, where the first occurs March up to May and the second season is from the September to November, indicating by inclining in malaria morbidity and mortality.

Malaria species are different in different regions. According to the result this may help for policy makers to look for the severity of the disease related to the malaria species and for distribution of funds, drugs and prevention and management materials. Even though the incidence of malaria was the least in Addis Ababa, P.Vivax rate accounts higher than the other regions. This may be due to migratory patients who may be relapsing of the disease or it may be due to the nature of malaria species. This needs further study, including burden of malaria in the highlands.

The number of deaths seems unrelated to the number of cases in each reporting year, which shows higher in the first year of the study. This may be due to the loss of reporting completeness.

Recommendation

- MOH and EPHI should able further Strengthen of routine surveillance by improving quality, capacity and coverage of a surveillance system for estimation of case incidence
- Routine annual data compiling should able to do by PHEM for the effects of changes in the array of factors that influence malaria incidence from region to region, zone to zone and among woredas and from season to season and from year to year, by giving attention to factors linked to climate variations and malaria control intervention.
- MOH should give stress in strengthening of continuous surveillance, that is an important issue to overcome effective control programs, funding budgets and expenditures for the distribution of commodities and to clinical and epidemiological outcomes

- RHB should able giving great attention regarding to have continuous surveillance and strengthening of building knowledge and strengthening of surveillance expansion to the health centers and health posts as well as to the communities.
- Every step of administrative including MOH, EPHI and RHB should take the responsibilities in improving laboratory diagnosis of malaria cases that helps to overlook other disease that are masked by malaria and to reach the diagnosis on suspected diseases in order to improve the overestimation by clinical cases.
- Incorporate facilities and organizations like MOD, police and private sectors in the PHEM network and other non including facilities should better give attention by PHEM and the facilities by themselves.

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Chapter III – Evaluation of Surveillance System

Evaluation of Mekele Hospital Severe Acute Respiratory Infection/SARI Sentinel Surveillance, 2014

Executive Summery

Influenza is one of the most common infectious diseases that are a highly contagious airborne disease that occurs in seasonal epidemics. Influenza results an estimated of up to five million instances of severe illness and 250,000 to 500,000 deaths worldwide each year. Ethiopia is one of the countries vulnerable to spread of novel influenza viruses having pandemic potential. The goal of this evaluation is to guarantee that influenza sentinel surveillance is being monitored efficiently and efficaciously in Mekele SARI sentinel site.

The cross sectional descriptive approach was taken from May 28 to June 12/2014 in Mekele SARI sentinel site to assess the most issued activities using semi structured interview and observations.

There were 234 (13.2%) of SARI cases among the total admission cases. Among the SARI cases 14 (6%) were from adult ward and 220 (94%) were from pediatric ward. A total of 135 (57.7 %) specimens were collected from the SARI suspected cases. There were 11 cases (8.1 %) positive for influenza. Influenza sub type A/H3 were 10 (7.4 %) and only one (0.7 %) influenza sub type B. Staffs, focal person and doctors, were trained two times have the responsibility to collect samples in the emergency department, pediatric ward and medical ward.

Generally sentinel surveillance regular data analysis, timely feedback; data storage and accumulation of aggregated data are some of the problems on the site and the down up surveillance system.

Establishing of linkages with Mekele Zonal Health Bureau and needs trained zonal focal person and integrated surveillance system should establish related to influenza surveillance sentinel system activities. Information should able breaking down and disseminated in each footstep of the responsible departments. The regional PHEM should able to give training and able to follow up in the weekly data aggregation, storage and data management. Computers training in data

storage and data management was mandatory to focal persons and data manager staffs. Routinely and scheduled reporting system should establish in the zonal health bureau, regional and national PHEM. Further training needs to hospital staffs to keep the quality of specimen collection and to have awareness on influenza sentinel surveillance.

Introduction

Influenza viruses are members of the Orythomyxoviridae family. They receive three separate genera based on antigenic characteristics of the nucleoprotein (NP) and matrix (M) protein antigen called Type A, B, and C influenza. Influenza A viruses are subtyped on the base of the surface hemagglutinin (H) and neuraminidase (N) antigen. Influenza A has 16 distinct H subtypes and 9 distinct N subtypes, of which only H1, H2, H3, N1, and N2 have been associated with epidemics of disease in humans [1]. The most extensively studied are influenza A and B, which are most pathogenic of human existence.

There are three types of seasonal viruses A, B and C. Among many subtypes of influenza A viruses, influenza A (H1N1) and A (H3N3) subtypes are circulating among humans. Human influenza virus circulates in all regions of the globe. Type C influenza cases occur a lot less frequently than A and B. That is why only influenza A and B viruses are included in seasonal influenza vaccines [2]. Flu pandemics are unpredictable, simply requiring that can have effects on human wellness and economic well-being worldwide.

The 2009 pandemic influenza was influenza type A (H1N1). The 20th century worst catastrophe pandemic influenza occurred in 1918-19 had an estimated mortality of 40 – 100 million deaths worldwide [3]. After ninety–one years two cases were examined by CDC in South California coursed by a novel swine influenza strain (H1N1) [4]. This disease was spread to 74 countries confirmed more than 30,000 cases and the WHO structured to full pandemic phase [5]

Surveys indicate that 289 pediatric deaths were reported to CDC in December 2009. The most affected people were children and youthful adults. The hospitalized and died age due to influenza H1N1 pandemic ranges from 20 to 37 age. The first avian origin influenza was found

for the first time in 1981 described as European swine. Swine influenza, avian and human influenza component influenza had found in North America in recent years [3]. Asthma cases was most common for the hospital admission cases in USA [6].Poor living conditions and malnutrition and hunger were difficult to overcome over in many developing countries that are risk factors for pandemic influenza. Case fatality of H1N1 influenza in 2009 was 0.005 % in New Zealand; and in New York City 0.0094-0.0147% for person above 64 years old and for those of 0-17 years old, 0.0008-0,0012% [7].

Influenza is one of the most common infectious diseases that are a highly contagious airborne disease that occurs in seasonal epidemics. Even though the extent and severity of influenza vary widely outbreaks are virtually widely recorded [1]. Influenza results an estimated of up to five million cases of severe illness and 250,000 to 500,000 deaths worldwide each year [8]. It is not well known in Africa, Ethiopia. Localized outbreaks takes place at variable intervals, usually 1-3 years and global pandemics have occurred less frequently than inter pandemic outbreaks. The most recent pandemics were emerged in March of 2009, caused by an influenza A/H1N1 virus. Ethiopia is one of the countries vulnerable to spread of novel influenza viruses having pandemic potential.

The Ethiopian government has initiated influenza sentinel surveillance since 2008 in order to identify the circulating strains of the influenza in the country and to determine the burden, seasonality and population at risk. Mekele hospital is one of the sentinel sites for influenza surveillance. However sentinel surveillance regular data analysis, timely feedback; data storage and accumulation of aggregated data are some of the problems on the site and the down up surveillance system. It is expected to identify the gaps and weakness of the site and recommend the possible solution from this study.

General objectives

To evaluate that influenza sentinel surveillance is being monitored efficiently and efficaciously.

Objective of the Surveillance Evaluation

- To assess the influenza sentinel system performance as settled of its target
- To assess influenza burden to assist decision- makers prioritize resources and plan public health interventions.
- To understand locally circulating virus types and subtypes and their relationship to planetary and regional practices.
- To evaluate the key attributes of the surveillance organization

Materials and methods

Study Design

The cross sectional descriptive approach was conducted from may 28 to June 12/2014.

Study areas and Sample size

Mekele hospital is one of the oldest hospitals that were located in the Mekele Special Zone, Tigray Regional State, in Ethiopia. Mekele is a capital city of the Tigray regional state. The 2005 projected total estimated population of Mekele was 301,642, male population 147,805 and female population 153,837. Out of the total estimated population the total under five children were 44,040 and under one 8,778.

Purposefully and convenience was used to choose the study areas for surveillance evaluation. The survey was conducted in Mekele Hospital, Mekele Special Zone in Tigray Regional State, Ethiopia from June 1-15.2014. Mekele Sub-city Health Bureau, Regional PHEM, National PHEM and Laboratory were assessed in order to evaluate the connections in between them.

Data collection Method

The CDC Guideline for Evaluating Public Health Surveillance System tool was updated in order to able evaluates the centennial activities and gathers information. Semi structured interviews were guided in the selected sectors, National and Regional PHEM and National Laboratory, hospital focal person and responsible staffs as well as with the Mekele Sub-city Health Bureau. Observations and secondary data collection were conducted from Mekele Hospital Influenza sentinel center, pediatric and medical wards and the internal lab.

The influenza sentinel surveillance scheme was selected to evaluate by this field. We assessed the sentinel surveillance of influenza specific in Mekele Hospital and generally the horizontal and vertical links with the zonal health bureau, regional and national PHEM and with a national lab. The most issued activities and elements included were case definition, flowcharts of the sentinel surveillance system, case detection, data collection and storage, reporting, information analysis and interpretation and result dissemination.

The attributes of surveillance system, including usefulness, simplicity, sensitivity, flexibility, acceptability, representativeness, data quality and stability are used as main pillars to evaluate the organization.

We explained the design of the evaluation of influenza surveillance system was based on the performance of the organization, but not individual performance for every focal person.

Document review

We reviewed records in influenza sentinel office, records of inpatients in the pediatric ward and medical wards during the site visit. National data records were compared with the hospital report. Electronic files, records were also compared with SOP of the national influenza guideline. Document review was managed for the purpose of to assess the reporting process and identify the any problem in the data quality, completeness and aggregation.

Data Management

After data collection, using a prepared questionnaire, Excel 2007 was used to examine the information. The report will disseminate to responsible departments and relevant bodies and to EFTEP supervisors and coordinators.

Operational Definition

Acceptability: Willingness of persons and organizations to participate in the surveillance system. And it will be measured quantitatively through the reviewing completeness of report forms for the past three months and timeliness of information coverage.

Accessibility: - Ease which statistical data can be received from the office. This lets in the ease with which the existence of information can be found out, as good as the suitability of the shape or medium through which the data can be accessed. The monetary value of the information may also be an aspect of accessibility for some users.

Accuracy: - Degree to which a measurement or an appraisal based on measurements represents the genuine value of the attribute that is being evaluated.

Completeness: - Proportion of all expected data reports that were actually submitted to the public health surveillance scheme**.**

Information Quality: - Data quality reflects the completeness and robustness of the data entered into the public health surveillance scheme**.**

Flexibility: - A flexible public health surveillance system can conform to changing data needs or operating conditions with little extra time, staff office, or allocated funds**.** Flexible systems can accommodate, for instance, new health-associated effects, changes in case definitions or technology, and variations in funding or reporting sources. In accession, organizations that utilize standard data formats (e.g., in electronic data interchange) can be well mixed with other arrangements and therefore might be considered flexible.

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

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

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.

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.

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.

Timeliness: - Interval between the occurrence of an adverse health event and (i) the report of the event to the appropriate health agency, (ii) the identification of that agency of trends or outbreaks, or (iii) the implementation of control measures.

Usefulness:- How helpful the system is to public health staff in taking actions as a result of interpreting and analyzing its data.

Validity:- Degree to which statistical information correctly describes the phenomena it was designed to measure

Results

Engagements of stakeholders

A brief discussion was led by the national PHEM staff and PHEM focal person of influenza sentinel surveillance to conduct the surveillance, evaluation in order to identify the weakness of the system, to evaluate the carrying out of the objective of the scheme. They assisted us to speak the appropriate inquiries and assess pertinent attributes. They also provided us the guidelines and the aim of the system execution. EPHA helped us in supplying the funds or transport and for data collectors. Mekele hospital staffs and focal person, Mekele special zone health bureau and regional PHEM supports provided us data and important information.

Description of Influenza Sentinel Surveillance Evaluation

Africa, Ethiopia has limited data regarding the burden and the impact of influenza. The spread of novel influenza virus is the pandemic potential of the region and the continent. Lower respiratory tract infection/pneumonia is among the common causes of morbidity and mortality

in Africa, especially among the children <5 year of age, but few data are still allowed to estimate the how the respiratory tract infection burden, that is due to influenza.

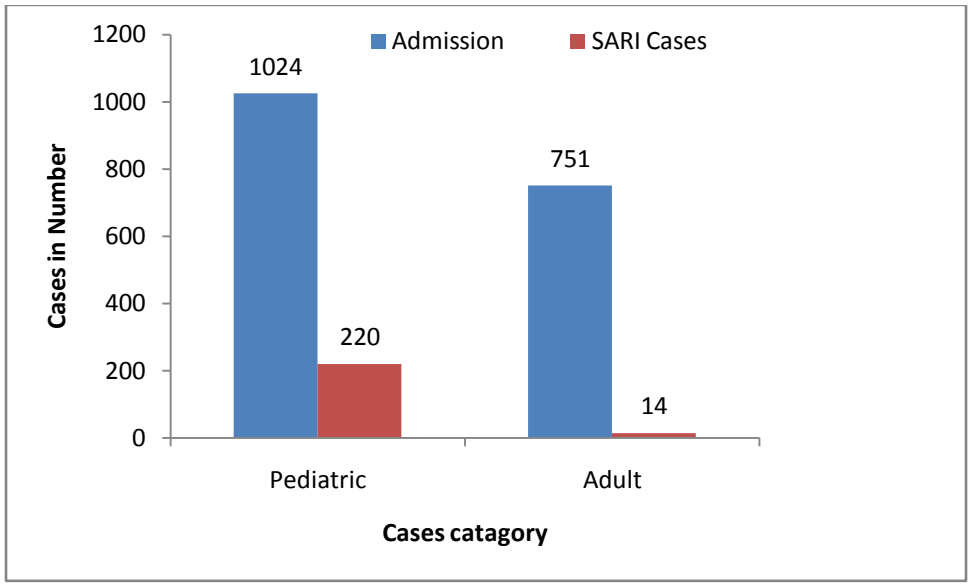


Figure 3.18 The 2005 EFY Categorized Total Admission of Cases Verses SARI Admission of Mekele Hospital, Tigray, Ethiopia, 2014

In Mekele general hospital there were about 1775 inpatients, of these 1024 (57.7%) was admitted in the pediatric ward and the rest 751 (43.3%) was adults. Out of the total admitted patients 234 (13.2 %) was SARI/sever pneumonia cases. Among the SARI cases 14 (6%) were from adult ward and 220 (94%) were from pediatric ward. A total of 135 (57.7 %) specimens were collected from the SARI suspected cases.

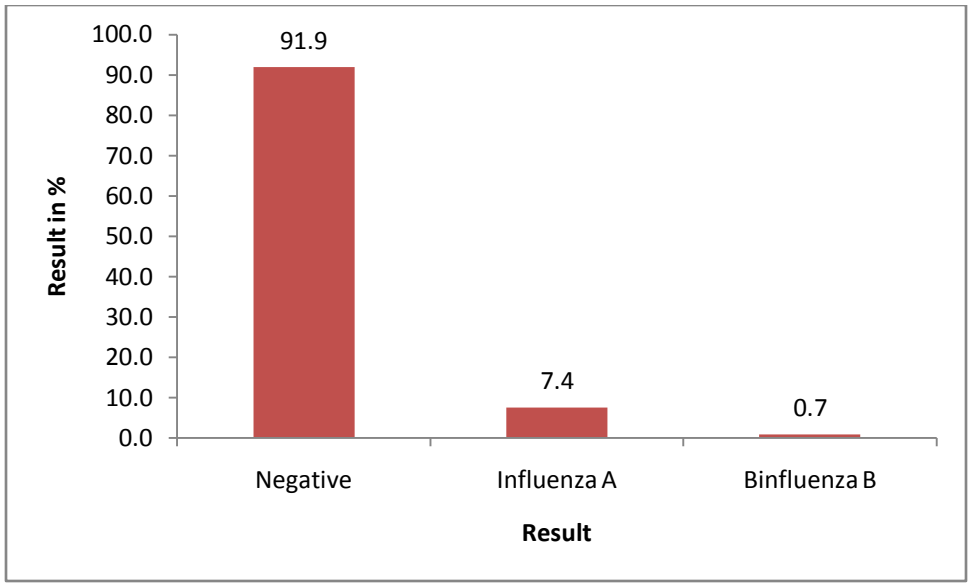


Figure 3.19 Mekele Hospital SARI Specimen Collected from June 2005 t0 May 2006 EFY Result, Tigray, Ethiopia, 2014.

Mekele hospital was collected about 135 specimens from the SARI suspected cases of in 12 months (June 2005-May 2006 EFY). There were 11 cases (8.1 %) positive for influenza. Influenza sub type A were 10 (7.4 %) and only one (0.7 %) influenza sub type B.

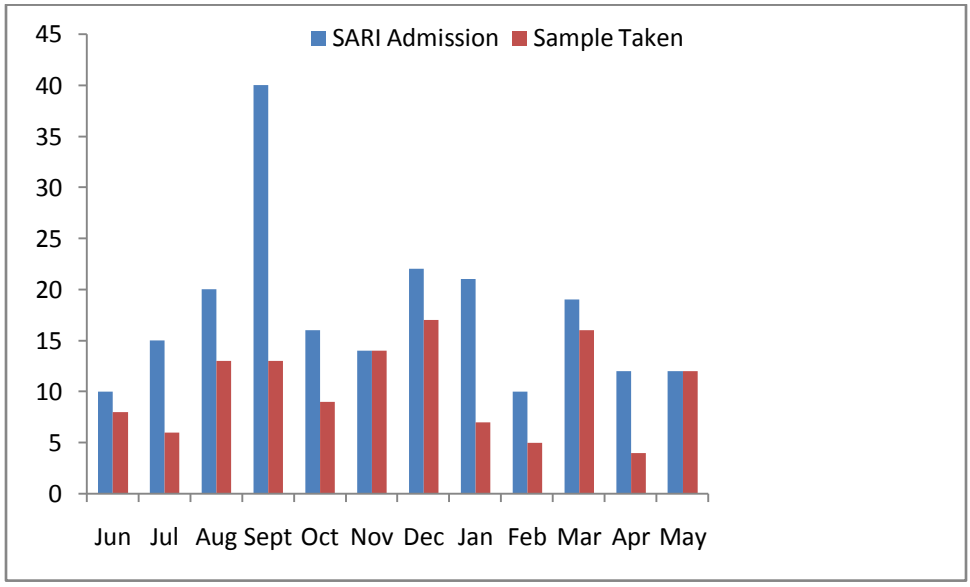


Figure 3.20 Pediatric SARI Admission Cases & Sample Collected for Influenza of 2005 EFY, Tigray, Ethiopia, 2014

More SARI suspected cases reported in September and June was the least reported SARI cases. Out of the total influenza positive cases 45.5 % (5) were reported in December 2006 EFY.

Purpose and Operation of the Surveillance System of *Influenza Sentinel*

They throw a protocol for SARI surveillance or a set of standard operating procedures developed by the national PHEM together with national Lab and CDC. The protocol includes clearly defined targets for the surveillance organization. The surveillance site has a copy of guideline and SOPs and also broadcast to all participating staffs. The objectives were stated as follows.

Objective of surveillance system in PHEM

- Ensure rapid detection of any public health menaces
- To ensure preparedness related to logistics and fund government activities
- Prompt response and recovery from diverse public health emergencies, which range from recurrent epidemics, emerging infections, nutritional emergencies, chemical spills, and biological terrorism

The Objective of Influenza Sentinel Surveillance

- Detect new influenza strains capable of or having the potential to cause the pandemic
- Determine the characteristics of influenza and other respiratory disease
- Characterize and monitor trends in illness and deaths attributable sever acute respiratory infections
- Determine the proportion of confirmed cases of influenza among SARI inpatients and/or among ILI out-patients
- Collect data which will be useful for determining burden-of-disease estimate due to influenza in the rural area
- Supply data to distinguish and supervise groups at high risk for serious disease
- Offer data on the contribution of influenza to the burden of respiratory disease in order to prioritize and plan public health interventions
- Provide the platform to monitor impact of control schemes

Case Definition for Sever Acute Respiratory Infection (SARI)

For person ≥ 5 years:

Any severely ill person presenting with manifestations of acute lowers respiratory infection with

- Sudden onset of fever (>38^{o}C) AND
- Cough or sore throat AND
- Shortness of breath or difficulty of respiration, with or without clinical or radiological findings of pneumonia AND
- Requiring hospitalization OR
- Any individual who died of unexplained respiratory illness

For Children under five years:

Clinical IMCI definition of pneumonia

Any child presenting cough with cough or difficulty of breathing AND:

- 50 or more breaths per minute for infant age 2 months up to one year
- 40 or more breaths per minute for child 1 year up to 5 years

Confirmed influenza cases: - A case that meets the clinical case definition and laboratory result positive for influenza virus.

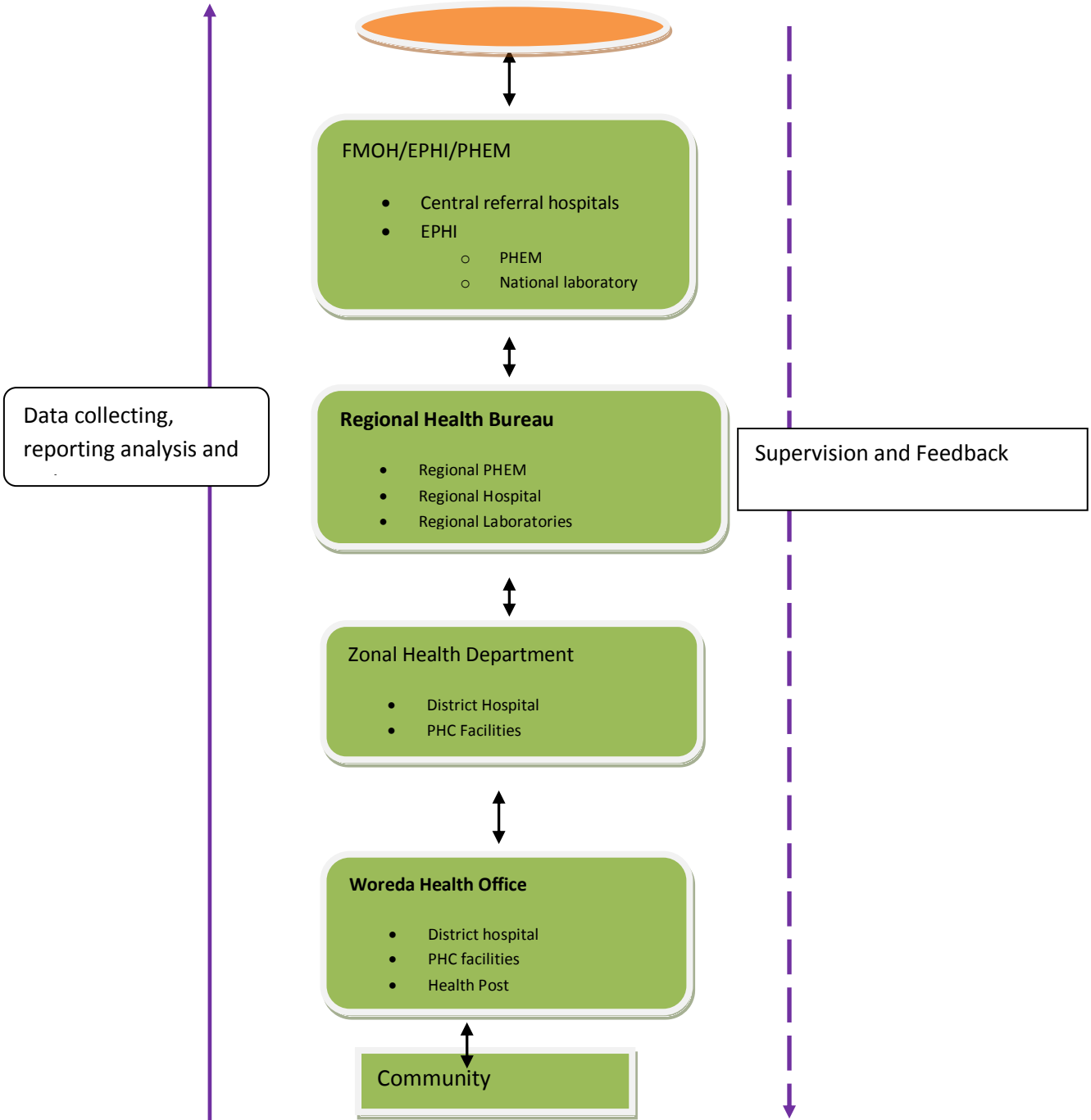
Population under surveillance

The National PHEM guideline stated that influenza is one of the twenty priority diseases set to be under the surveillance of the population living throughout the countryside. Mekele hospital was one of the influenza surveillance sentinel site served to 301,604 populations.

Mekele Zonal Health Bureau has no the same follow up as of the other disease in influenza surveillance. At that place was no vertical coordination link in follow up of the surveillance organization. The hospital SARI sentinel surveillance links with regional PHEM and also with national Lab and national PHEM.

The influenza sentinel surveillance of Mekele Hospital has lack of integration with zonal health authority like with the zonal health surveillance department. There was no Influenza/SARI focal person in the zonal health department. The integrated surveillance system was not established related to the influenza surveillance sentinels system activities of the infirmary with the zonal health department. The established connections were with regional PHEM and national PHEM as well as national Lab was based on supportive supervision and feedback, training and supplying funds. The second established link was with national lab that was grounded on the sample collection and investigation of samples and sharing of sample investigation result.

Figure 3. 21 Flow of information and feed back in Mekele General Hospital, Tigray, Ethiopia, 2014



Specimen collection from suspected SARI cases was started in June 19, 2013. A total of 135 cases was taken specimen until June 19/2014. Information was stored in hardcopy according to influenza SOP procedures. The sample was gathered up by trained focal persons. Information was not breaking down and disseminated in each footstep of the responsible departments. Policies and procedures were not applicable to ensure patient privacy. Data aggregation, computer memory and transmitted from the sentinel site to the site to the regional health bureau, zone/sub city and PHEM were stated as a duty for the focal site person/coordinator. But data transmission to Mekele sub city and the regional health agency was not even started. Weekly data aggregation and storage and management, data using a computer were not practiced by the time of this survey. At that place was no skilled manpower in the computer. Even though in that respect was a computer and internet access, the focal persons can't use these access due to lack of skilled in the management of the computer.

Resource Used to Operate the System

The funding resource to run the influenza sentinel surveillance was from the government and CDC. The hospital was provided 160,000 Birr in the beginning of the program (2013) and they utilized for computer and printer, furniture, telephone and necessary supplies/equipments for ample collection and temporary sample storage until transportation to EPHI occurs. At that place was no important software like Epi info.

Focusing the Evaluation Design for Influenza Sentinel Surveillance System

The specific objection of this evaluation is to define the gaps in the influenza sentinel surveillance of Mekele Hospitals in order to able strengthen the organization. The data generated from this survey will serve to prepare recommendation for stakeholders around the surveillance sentinel of influenza. It will able to answer the questions about communication and accounting system, availability of surveillance documentation, registration and forms, data analysis, computer skill and training, outbreak investigation and case confirmation, supervision and feedback and attributes of the surveillance organization. We applied to modify WHO standard tools to evaluate the surveillance organization.

Evidence Regarding the Performance of the surveillance system:

SARI/pneumonia hospital-based sentinel site surveillance system was operating in the Mekele Zonal hospital since June 19, 2013. The main responsibility was in the shoulder of the hospital assisting with regional, national PHEM and national Lab. Mekele hospital was the fifth sentinel site in hospital level in national. There were five HCs of influenza sentinel sites nationally, but not in Mekele city. The national sentinel service includes, ILI outpatients, hospital based SARI/pneumonia and event based/outbreak surveillance. All system shares their specimens with national influenza laboratory and share clinical and epidemiological data with national surveillance. The primary measures applied to select the site were due to the voluntary to participate in the sentinel surveillance program, availability of health resources, patient flow and geographical distribution. At that place was no incentive provided to the facility from the national level for undertaking the surveillance organization. The responsibilities of site surveillance staff were case team coordinator and PHEM expert.

Facts

Communication and reporting system

The hospital employs to communicate with national laboratory with post office in transporting the VTM, telephone with regional and national PHEM and Laboratory. The focal person communicates with the regional and national PHEM as wanted and weekly with zonal health officials. At that place was no set time scheduled to convey. They send weekly report and collected samples every Tuesday and Monday to regional PHEM and national Lab respectively. A little summary of planning, prevention and control activities addressing important matters at the community level that have arisen through surveillance system sent to zone health bureau.

Documentation Register and Forms

The hospital has the Influenza surveillance sentinel office. SARI/ILI National Guide line was applied with a standard case definition posted in the pediatric ward, medical ward and in the focal person office. The guideline includes specimen collection, handling and shipping of the specimen to the national lab. The hospital staffs were aware about the SARI.

There were cases based formats for the lab reports. A maximum of five specimens was collected per week. Cases selected for specimen collection were randomly selected by the criteria of SARI definition, new sever pneumonia.

Staffs, focal person and doctors, were trained two times have the responsibility to collect samples in the emergency department, pediatric ward and medical ward. The specimen was stored in controlled temperature below 4 ^{o}C and transported in ice box in a sealed method. The specimen was transported weekly to the confirmatory national laboratory. The site has a standard operating process for specimen collection, shipping, and storage written, accessible in printed, available and in exercise, that was provided by the national surveillance coordinator.

The details included in the specimen collection forms were unique identifier, hospital name, the person collecting specimen, age, gender, date of symptom onset, date of specimen collection and the type of specimen collected.

The case of the specimen collecting method was initially throat swab and currently used both throat swab and nasopharyngeal swab. The hospital staffs routinely use PPE like gloves, gown/lab coats, safety glasses and masks for respiratory protection. There was hand washing requirement before and after specimen collection. About 50 specimen collection materials like a tongue depressor, swabs, and vials containing VTM at 4^{o}C, alcohol/bleach and packaging materials for transport were readily available.

Specimen sent to a national science laboratory for confirmation weekly, then the maximum specimen being stored before sent to test was one week. The specimen was stored in the refrigerator in controlled ambient temperature of below 4 ^{0}C. The laboratory results were reported back to the site once per year and immediately reported to clinicians.

Data analysis, computer skill, and training assessment

Training of SARI/ILI surveillance system was awarded based on application of standard case definition and assignment of cases; case sampling and enrollment procedures (eg. Random sampling, etc.), specimen collection, storage and shipment, completion of specimen collection and clinical/epidemiological data forms and recording and reporting of aggregated weekly

hospital admission, SARI admissions, and patient enrollment was given to focal persons of the sentinel site, the zone health bureau and regional PHEM focal persons. The training was imparted in 2012 and 2013 for about a week.

The site has its own functional computer and printer, but no photo copy machine. Data was manually collected. The surveillance sentinel site focal persons have no computer skills. They can't analyze data of the surveillance system.

The influenza sentinel surveillance data were obtained in different databases other than ANC and HIV surveillance system to distinguish from one another. The data were collected weekly at the site, but not in the zonal or regional. There were no reports describing national influenza activity produced at central office using data reviewed from the participating sites. There were a total of eleven positive influenza cases. Out of the total influenza positive cases, 10 were influenza sub type A/H3 and 1 was Influenza sub type B. The site has received such type of report once a twelvemonth from the national lab.

Outbreak investigation and case confirmation assessment

The regional and national PHEM have a plan for epidemic response and preparedness with emergency stocks of drugs and supplies. An epidemic committee was built in the office and has a monthly scheduled meeting. The agency has also rapid response team (RRT) that has done regularly scheduled time meeting during epidemics. They engage in a case management protocol for epidemic prone diseases and have multisectral emergency preparedness and response task force and partners working together during emergency situation providing funds, equipments and drugs. There were budget for epidemic response provided nationally. Partners like UNICEF, WHO and others participate in technical and resource mobilizing and funding activities. The woreda health department expert, regional technical staff and regional pharmacy department mobilize the emergency finance. The regional PHEM staff has no assigned car for emergency, but address emergencies in integrated with the other sectors that were a challenge to arrive as early as possible.

Even though there had no outbreak check lists there was no an investigated influenza outbreaks in the last two years. The laboratory confirmation of cases was done in EPHI, national laboratory department. The national and regional RRT, staff of zone health office, HEW was responsible to investigate the outbreaks.

Supervision and feedback assessment

The sentinel site of Mekele hospital was supervised one time per year by national PHEM and provided feedbacks and every two months by regional PHEM. The national supervision was supported by checklists in order to able to evaluate quality control and assess the performance. In that space was no scheduled and checks list influenza specific supportive supervision of regional and zonal PHEM and health authority. No feedback documents in the regional PHEM. Most of feedbacks were verbal. It was incorporated with other disease. Challenges identified by the supervision were; unable to mix data, lack of computer skill and lack of scheduled supportive supervision by regional PHEM.

The regional PHEM staff didn't able to monitor the quality and completeness of the epidemiologic data received from the site. In that location were no regional / national staffs following up with the site when timely submissions of aggregated data were not received. No weekly basis of SARI sites submits their complete information by the due date on weekly themes.

Performance of the surveillance system

Usefulness

The surveillance system was helpful to detect seasonal influenza outbreaks timely and to permit accurate diagnosis. It is too useful to gauge the magnitude of morbidity and mortality due to SARI/ILI including the essence of health facilities. It also permits to evaluate the effectiveness of the prevention and control program and intensify researches based on prevention and control of disease.

Simplicity

The case definition of SARI was easy for case detection by all tiers of health professionals of the hospital staffs. The surveillance system allows filling the data in all strata of the professionals. It serves to record and report on them. The surveillance system has significant information for investigation and allows updating the data of cases. The system takes 10 to 1 5 minutes to fill the format.

Data quality

The staffs were trying to keep the quality of the data, storing in Logbooks, files and trying also to store in soft copy. The hospital can't able to aggregate data in the form of the influenza protocol formats. It was due to lack of skill and knowledge. The hospital was sent the specimen collection formats to national Lab without copies with it. Missing of sex, type of patient, age, and temperature were observed in the laboratory formats.

Acceptability

At all levels of the responsible focal persons they consider that the surveillance is important for public health intervention. The focal persons and the staff have awareness about the influenza surveillance system. There were eight active staff, participants who well engaged in influenza surveillance activities in the hospital. The reasons not to accept more participants were lack of apprehension of the relevance of the information to be collected and no early feedback given by the higher bodies for their donation. All participants were able the standard case definition to identify SARI causes. The hospital sends specimens with file formats. The hospital was able to send the reporting agents using the appropriate surveillance reporting formats except the collection information. The health professionals were aware about the surveillance organization. At that place was no influenza surveillance report from regional PHEM.

Representativeness

The surveillance system enables to follow the health and health related issues in the community majority of the rural region of the Mekele residents. Socio demographic variables included in the surveillance system were sex and age group and those who were not included were an ethnic group and religion.

Timeliness

Mekele hospital was the only site in the Tigray region. It timely sent the samples with file formats weekly.

Completeness

The staff has committed to keeping the completeness and quality of the data. It was collected about 135 samples. Out of these samples 17 (12.6%) was incomplete and five (3.7%) were unreadable.

Stability

In that location were no new restructures affected the operations and activities of the surveillance. There was a lack of VTM for short time at the time of the beginning due to expired VTM, otherwise no lack of resources that interrupt the surveillance organization.

Sensitivity

The case definition was able to pick all SARI cases. There were a total of 222 SARI suspected cases. Out of these 67(49.6%) were males and 68(50.4%) were females. A total of 135 (60.8%) cases was taken specimen and 11(8.15%) were positive for influenza.

Conclusion

The Ethiopian government has initiated influenza sentinel surveillance since 2008 in order to identify the circulating strains of the influenza in the country and to determine the burden, seasonality and population at risk. Mekele hospital is one of the sentinel sites for influenza surveillance. However sentinel surveillance regular data analysis, timely feedback; data storage and accumulation of aggregated data are some of the problems on the site and the down up surveillance system.

The influenza sentinel surveillance of Mekele Hospital has lack of integration with zonal health authority like with the zonal health surveillance department. At that place was no focal person in the zonal health department. The integrated surveillance system was not established related

to the influenza surveillance sentinels system activities of the infirmary with the zonal health department.

Information was not breaking down and disseminated in each footstep of the responsible departments.

Data transmission to Mekele sub city and the regional health agency was not even started. Weekly data aggregation and storage and management, data using a computer were not practiced by the time of this survey. At that place was no skilled manpower in the computer. Even though in that respect was a computer and internet access, the focal persons can't use these access due to lack of skilled in the management of the computer.

The focal person communicates with the regional and national PHEM as wanted and weekly with zonal health officials. At that place was no set time scheduled to convey. A little summary of planning, prevention and control activities addressing important matters at the community level that have arisen through surveillance system sent to zone health bureau.

Staffs, focal person and doctors, were trained two times have the responsibility to collect samples in the emergency department, pediatric ward and medical ward.

Specimen sent to a national science laboratory for confirmation weekly, then the maximum specimen being stored before sent to test was one week. The laboratory results were reported back to the site once per year.

The site has its own functional computer and printer, but no photo copy machine. Data was manually collected. The surveillance sentinel site focal persons have no computer skills. They can't analyze data of the surveillance system.

There were no reports describing national influenza activity produced at central office using data reviewed from the participating sites.

The national supervision was supported by checklists in order to able to evaluate quality control and assess the performance. In that space was no scheduled and checks list influenza specific supportive supervision of regional and zonal PHEM and health authority. No feedback

documents in the regional PHEM. Most of feedbacks were verbal. It was incorporated with other disease. Challenges identified by the supervision were; unable to mix data, lack of computer skill and lack of scheduled supportive supervision by regional PHEM.

Recommendation

- Establishing of linkages with Mekele Zonal Health Bureau and needs trained zonal focal person and integrated surveillance system should establish related to influenza surveillance sentinel system activities.
- Information should able breaking down and disseminated in each footstep of the responsible departments.
- The regional PHEM should able to give training and able to follow up in the weekly data aggregation, storage and data management of the Mekele Hospital influenza/SARI sentinel surveillance
- Training based computer skill and data storage, data management and analysis to focal persons, hospital staffs who have relation with the surveillance activities.
- Routinely and scheduled reporting system should establish in the zonal health bureau, regional and national PHEM
- Further training needs to hospital staffs to keep the quality of specimen collection and to have awareness on influenza sentinel surveillance
- Early feedback about the specimen results from National Lab to the hospital.
- Providing of photocopy machine will help the site to disseminate data, educational materials etc.
- Regular and scheduled supervision, review meeting and training needs by regional and National PHEM and CDC and national Lab.

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Chapter IV- Health Profile Description Report

Health Profile Assessment Report of Kilte Awlaelo Wereda, Eastern Tigray Zone, Ethiopia 2011/2012

Executive Summery

Health profile engages health care suppliers, health maintenance facilities, health related activities and governing bodies and broader communities by providing a base for making informed conclusions, with a firm emphasis on preventive diseases and reducing health disparities. The intent of this assessment in this Woreda is to receive a baseline health profile data and to assess the disease risk factors and at the last as well as to suggest the preventive methods and incorporate the result for the incorporate in their future plan.

Cross sectional study was conducted from May 7-15, 2014 based on health profile assessment using tool prepared by EFETP having mixed method data collection approach in Kilte Awlaelo Wereda, Eastern Tigray Zone.

The population pyramidal age structure reflects the large number (46.9%) of children under age 14, and accounts for almost half of the entire population, which is a feature of population with high fertility levels.

The gross enrolment in primary school was 97.2 % and 97.9 % in secondary school. Drop out of primary school was 2.83 % that was the same as the previous year and 2.1 % in secondary school that was more eminent than the previous year (1.5 %).

Pentavalent 1 was less than 2011 regional achievement of 93.8 %. Pentavalent 3 was higher than the regional achievement (73.4 % in 2011). 77 % of the infants of the district took in fully immunized including to measles that was above the national performance in 2010/2011 (74.5%) but less than the regional that was 83.7 % in 2011. BCG immunization was the least achievement (72%) in the district much lower than the regional performance of 95.9. In over all, immunization in the district was achieved under the internal objective. Pneumococcal immunization had been inserted in the immunization program.

Even though maternal death was not occurring during this year, emergency obstetric care, skilled birth attendants and postpartum care are important measures to reduce maternal

mortality. Antenatal coverage at least one visit was below the country target of this year. Mother assisted by skilled persons and those attended by HEW were better achieve than the regional of the same year and the previous years. And also 284 (10.4 %) of mothers of this wereda had delivered at home assisted by trained birth attendant, which was not acceptable which was less than the 2011 regional 12.5 % record. Those delivered by HEW may not need to deliver out of health facilities. Stillbirth accounts 8 (0.23 %) and live birth accounts 1813 (99.77 %). Postnatal coverage was 73.6 %, achieving the national target. TT2 vaccination, providing for non pregnant and pregnant women was 19 and 44 percent respectively. But 60.3 % of mothers give birth at this year had provided TT2 vaccination. Contraceptive Acceptance Rate (CAR) in this woreda was 41 % that was beneath the internal target of EFY 2010/11 (66%).

URTI was the leading and the second leading cause in adults and children recording 21 % and 17 % respectively. Watery diarrhea was the leading case in pediatric outpatients followed by URTI and pneumonia with 17 and 14.5 percent respectively. Gastroenteritis and skin disease were the second and third top disease in adult outpatients followed by watery diarrhea.

Average safe water of the district was 64.5 % rural households better than average national access in 2011(39 %) and 69.8 % in urban household that was less than the national access (87%) in 2011. The source of water utilization in rural was hand dag well, shallow well, deep well including pipe water and rivers. Many water sources were non functional (21 % to 33.3 %). More than 35 % of the kebeles had less than 50 % safe water coverage.

Responsible sectors and the community should need providing health educations based environmental and hygiene and improving safe water coverage and utilization. Respected sectors and the WHB of Kilte Awlaelo should maintain continuous activities to ascertain improvement and to achieve the goal of immunization. Continuous education to create awareness in ANC was expected to ascertain zero maternal death and to prevent stillbirth. All mothers should give birth in health facilities belong to safe deliveries. Continuous awareness in ANC and PNC as well as immunization TT in the community needs further work. Improving data storage and preparation of standard POP having issued health indicators should able develop by WHB and RHB and referral linkage from HP to HC of some kebeles was too long and this may

lead people to go to private clinics or absence from the referrals, so it needs construction of near HCs.

Introduction:-

Health profile assessment is an advance of identifying roadblocks to the health and welfare of residents and residential districts. Health profile assessment findings will be related to clinical decision making with the health care scheme every bit well as strengthening community disease prevention efforts. Health profile engages health care suppliers, health maintenance facilities, health related activities and governing bodies and broader communities by providing a base for making informed conclusions, with a firm emphasis on preventive diseases and reducing health disparities.

Health is influenced by many factors, including the environmental condition, socioeconomic condition, educational status, and the power to access the health readiness. Understanding and accessing which of these genes determine the health of the community at most and planning the proper strategies and partnership to improve them are the results of health profile assessment.

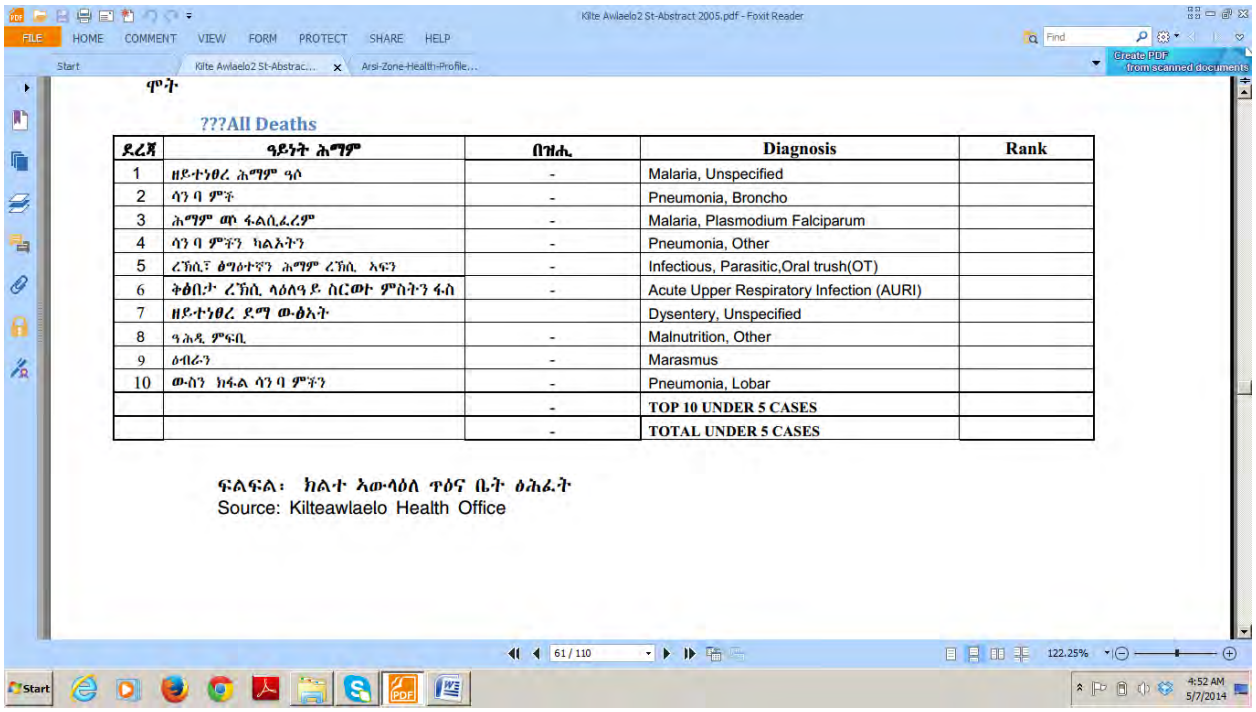
Health profile assures prioritizing health and wellness related resources and manpower in the head of diagnosing of health problems in the residential district. It is a foundation for health planning, mobilizing health resources and manpower as well as calling for appropriate public health interventions. Health profile is significant information for stakeholders, including NGOs, investors and community members in order to have clear and compiled health information about the regions.

Wereda is the most practical unit to achieve universal health coverage, while implementing a wide variety of national and international health policies like HIV preventing, Health Extension

Package and Malaria prevention strategies that underpin the development of national policy and health sector reforms [1].

The intent of this assessment in this zone/Wereda is to receive a baseline health profile data and to assess the disease risk genes and at the last as well as to suggest the preventive methods and incorporate the result for the interruptions in their future plan. Eastern Zone/ Kilte Awlaelo Wereda is a nature center of tourism and since it is confined by the lowest realm of the country/Dalul/, and also one of the woredas with a dearth of rainfall; and then it may be better to evaluate and to document health risks and advantages of that country.

In Kilte Awlaelo Wereda there was no well compiled all round health related document at specific department or establishment. Different health related data profile was trying to organize in different ways and in their-own way in different district sectors. Data of different sectors were trying to compile in the district planning sector, which was incomplete and hard to apply. Many sectors were also lost to compile their data in this bulletin. Important indicators had been also lost the data as they were prepared tables. See example below



ሞት

???All Deaths

ደረጃ	ዓይነት ሕማም	በዝሒ	Diagnosis	Rank
1	ዘይተነፀረ ሕማም ዓሶ	-	Malaria, Unspecified	
2	ሳን ባ ምች	-	Pneumonia, Broncho	
3	ሕማም ወባ ፋልሲፈረም	-	Malaria, Plasmodium Falciparum	
4	ሳን ባ ምችን ካልኦትን	-	Pneumonia, Other	
5	ረኽሲ፣ ፅግዕተኛን ሕማም ረኽሲ ኣፍን	-	Infectious, Parasitic,Oral trush(OT)	
6	ቅፅበታዊ ረኽሲ ላዕለዓይ ስርዐተ ምስትን ፋስ	-	Acute Upper Respiratory Infection (AURI)	
7	ዘይተነፀረ ደማ ውፅኢት		Dysentery, Unspecified	
8	ዓሕጺ ምፍቢ	-	Malnutrition, Other	
9	ፅብራን	-	Marasmus	
10	ውስን ክፋል ሳን ባ ምችን	-	Pneumonia, Lobar	
		-	TOP 10 UNDER 5 CASES	
		-	TOTAL UNDER 5 CASES	

ፍልፍል፡ ክልተ ኣውላዕለ ጥዕና ቤት ፅሕፈት
Source: Kilteawlaelo Health Office

In order to clearly understand and properly use the data and the district efforts this data display incomprehensively and in an organized way in all health and health related information for Kilte Awlaelo woreda. Community health need may clearly understand for district sectors and other health partners. Evidence based information is provided by this paper to governmental and non-governmental health stakeholders who are working in this district.

Objectives

General Objectives

To develop well organized and compiled district health profiles that indicate the community health needs in order to use the district governmental health sectors and partners where to concentrate and prioritize their programs of Kilte Awlaelo Woreda in 2011/2012.

Specific Objectives

- To have baseline health information about the district
- To assess the health status of the district
- To identify health risk factors of the territorial dominion
- To determine the strength and gaps and able to share experiences with other woredas
- To recommend solutions for identifying gaps for health workers and policy shapers

Methodology

From May 7-15 health and health related data was taken in from all sectors of Kilte Awlaelo Wereda Eastern Tigray zone, Tigray Region Ethiopia. Consent letter was written from national PHEM and Regional Health Bureau to the respected sectors. The health profile assessment was prepared by using health profile assessment tool prepared by EFETP having mixed method data collection approach that includes master data such as key informant interview, community focus groups, and a community assets assessment. Secondary data include outcomes like ANC, PNC, CMR, top 10 diseases, immunization coverage and other health related from Woreda Health Bureau , demographic data, behavioral data and environmental data was collected from Weredas' responsible sectors like woreda Agriculture and Development, Capacity Building,

Water, Mines and Energy, Urban Development, Construction and Design, Trade, Industry and Transport, Youth and Sport, Women's Affairs, Information, Rehabilitation and Social Affairs, Administration, and Woreda plan, etc. The data was analyzing and interpret by using Microsoft Excel

District Brief

Kilte Awlaelo is one of the 36 Weredas in Tigray Region of Ethiopia. Kilte Awlaelo is located in the Eastern Zone of Tigray, Northern Ethiopia and is bounded by Atsbi district in the east, Saesie Tsaeda Emba in the North, a Hawzen district in the west and an Enderta district in the south. It is located from 13˚33'- 13˚58'North latitude and 39˚18-39˚41' East longitude [2]. It is found in the elevation of ranging from 1980 to 2300 meters above sea level. The total area of the district is 1,016.sq km. The name Kilte Awlaelo had been gotten from the two hills called Awlaelo which are found in the north of the woreda in Saesie Tsaeda Emba and southern part in Enderta. Kilte means two. So the name Kilte Awlaelo literally means between the two Awlaelo hills. Kilte Awlaelo has more than 10 historical areas including eight Rock-hewn churches, Negash Built up mosque and one Almoqah Temple.

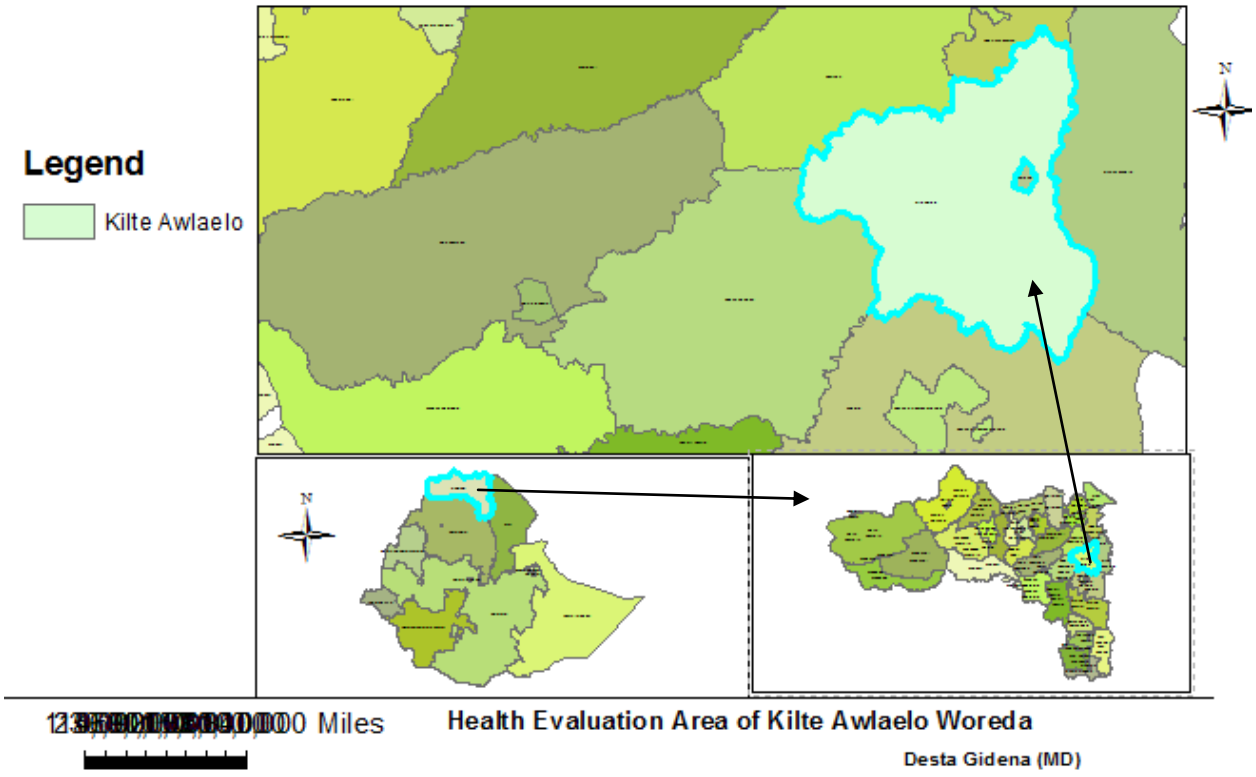
Kilte Awlaelo is known for rock-hewn churches, which most impressive are in Gerealta Mountain. Most of these Orthodox churches were built around the 14th century. Abrha WA Atsbha is one of the best and largest of the rock churches dedicated to the famous of the king of Axum, the brother Abraham and Atsbha found in Kilte Awlaelo weirdo. Another church supposed to have been constructed by the 4 C by the two kings Abrha and Atsbha is the rock-cut church of Wukro Cherkos found in a knoll of red rock in this woreda. Kilte Awlaelo woreda is known as the earliest Muslim settlement in Africa, in Negash Kebele also known as Negash Ahmedin Mesgide, Mosque.

It is one of the districts affected by low rainfall, but had fertile lands with rivers called Genfel, Suluh and Brooke river. It is highly motivated to thrive from poverty. It contains the internationally awarded kebele called Abrha Atsbha, in environmental reservation and threatens in 2011 in Brazil, Rio de Janeiro. It is also known with qualified honey products and irrigation activities.

Government and Administration

Kilte Awlaelo made up of 17 rural and one urban administrative kebeles (tabias), the smallest administrative unit in the country, and has a total population of approximately 119,772 people. It has 27,049 households; more than 30.9% are headed by women. The administrative town is Wukro which is found 820 km away from Addis Ababa. Its geographical nature is midland area. It has administrative council and federal and regional parliament representatives and also district cabinet.

All sectors and ministry office are found in Wukro town. The main supporting organizations are HABP, FAO, HELVTAS, World Vision, REST, St. Marry, and Orthodox.



Map 4 Kilte Awlaelo Wereda, Eastern Tigray Zone, Tigray Region, Ethiopia, 2014

Population

The 2005 EFY projected population of Kilte Awlaelo Wereda was 119,772. Out of the total population 58, 438 (48.8 %) accounts male and 61,334 (51.2 %) were female, which arrives at almost equal (0.95:1) male to female ration. Out of the entire population of the wereda 5572 (4.7 %) live in urban and 114200 (95.3 %) of the population live in rural regions. The population density was 118 people per sq. Km.

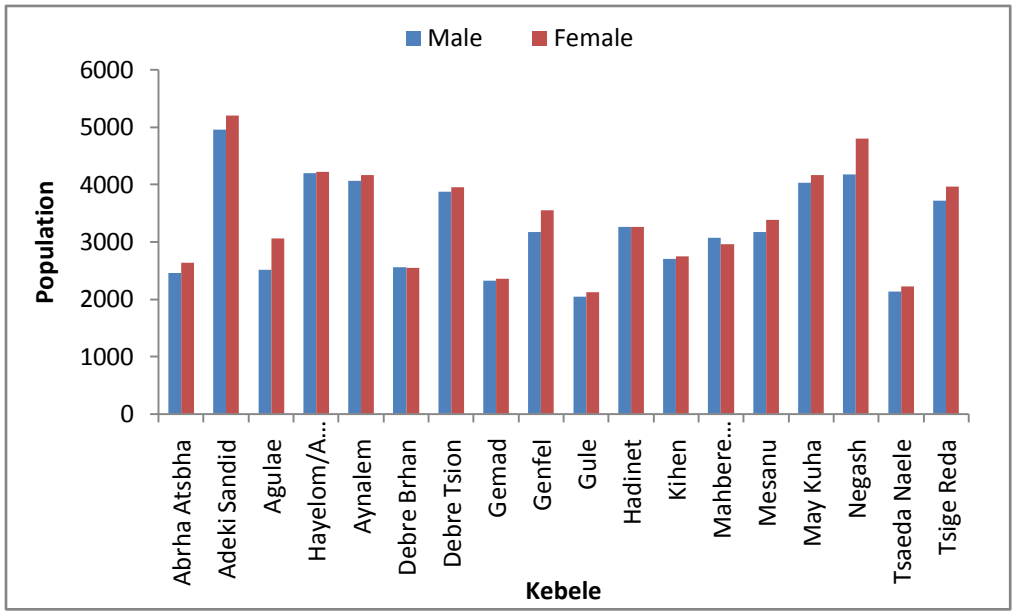


Figure4.22 Population of Kilte Awlaelo Wereda by Kebele and sex of 2011/2012, Eastern Tigray, Ethiopia, 2014

Table4. 16 Total projected population of Kilte Awlaelo Wereda by Kebeles, sex and households of 2011/12 Eastern Tigray, Ethiopia, 2014.

S,No	Kebele	Sex		Total	%	Households			Households %
		Male	Female			M	F	Total	
1	Abrha Atsbha	2458	2632	5090	4.2	794	355	1149	22.6

2	Adeki Sandid	4959	5210	10169	8.5	1588	709	2297	22.6
3	Agulae	2512	3060	5572	4.7	869	389	1258	22.6
4	Hayelom/Awal	4206	4218	8424	7.0	1314	588	1902	22.6
5	Aynalem	4065	4168	8233	6.9	1285	574	1859	22.6
6	Debre Brhan	2555	2546	5101	4.3	796	356	1152	22.6
7	Debre Tsion	3877	3950	7827	6.5	1221	546	1767	22.6
8	Gemad	2319	2356	4675	3.9	729	327	1056	22.6
9	Genfel	3171	3551	6722	5.6	1049	469	1518	22.6
10	Gule	2042	2121	4163	3.5	649	290	939	22.6
11	Hadinet	3260	3262	6522	5.4	1017	455	1472	22.6
12	Kihen	2703	2748	5451	4.6	851	380	1231	22.6
13	Mahbere Weyni	3070	2959	6029	5.0	941	421	1362	22.6
14	Mesanu	3173	3388	6561	5.5	1024	457	1481	22.6
15	May Kuha	4029	4166	8195	6.8	1279	572	1851	22.6
16	Negash	4182	4807	8989	7.5	1405	628	2033	22.6
17	Tsaeda Naele	2135	2223	4358	3.6	680	304	984	22.6
18	Tsige Reda	3722	3969	7691	6.4	1201	537	1738	22.6
Total		58,438 (48.8%)	61,334 (51.2)	119,772	100	18692	8357	27049	22.6

The age structure of population in Kilte Awlaelo Wereda was reflected in a typical company with a youthful population. The population pyramidal age structure reflects the large number (46.9%) of children under age 14, and accounts for almost half (46.9%) of the entire population, which is a feature of population with high fertility levels. Over age 64 accounts 5.4 %. Average household (family heads) of the Wereda was 22.6 percent. About 30.9 % of the Weredas

households were headed by women. The median household size of the Wereda was 4.4 persons that were the same in rural and urban.

Table 4.17 Population pyramid of 2011/2012 by age group of Kilte Awlaelo Wereda, Eastern Tigray, Ethiopia, 2014

Age Group	M	F	Total	%
<5	9254	8971	18225	15.0
5_9	9882	9803	19685	16.2
10_14	9718	9261	18979	15.7
15-19	6742	6789	13531	11.2
20-24	4013	4548	8561	7.1
25-29	2751	4095	6846	5.7
30-34	2446	3389	5835	4.8
35-39	2483	3178	5661	4.7
40-44	1884	2271	4155	3.4
45-49	1933	2024	3957	3.3
50-54	1592	1793	3385	2.8
55-59	1559	1510	3069	2.5
60-64	1265	1453	2718	2.2
>64	3648	2904	6552	5.4
Total	59170	61989	121159	100

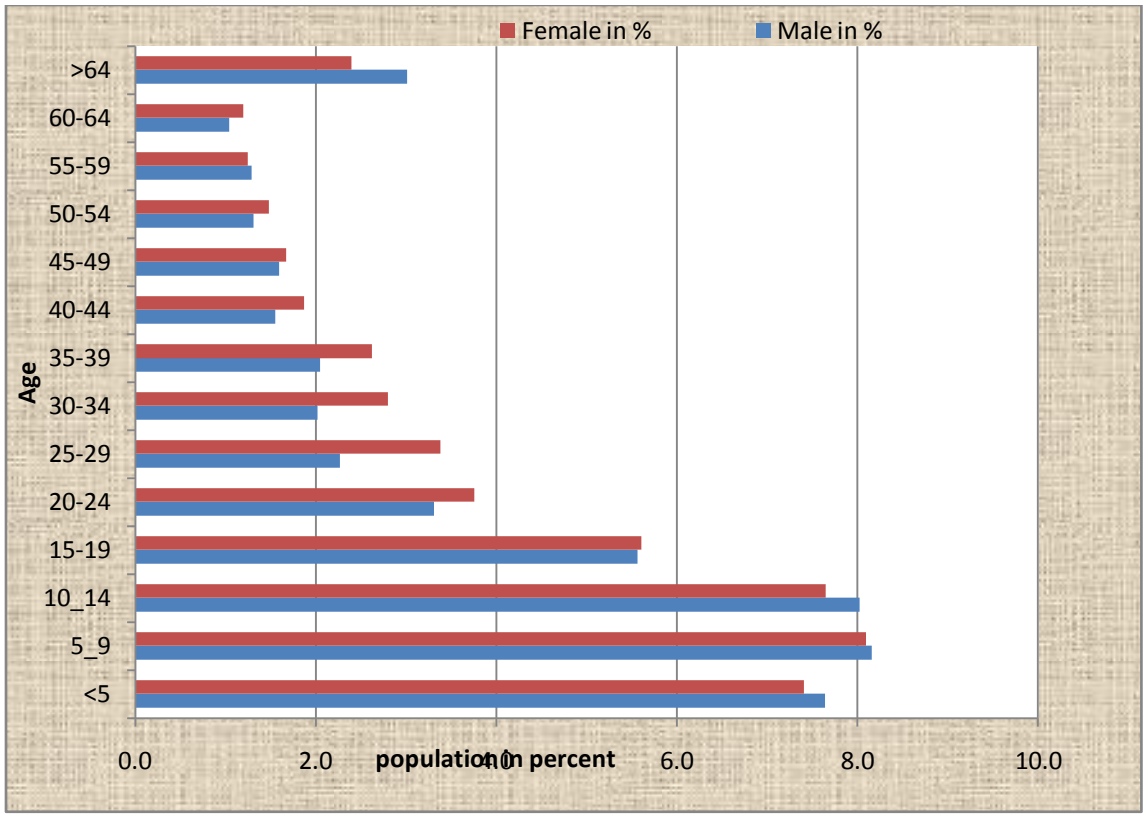


Figure4. 23 Demographic data by sex and age group of Kilte Awlaelo District, Eastern Tigray Zone, Ethiopia 2005 EFY

Transport and Power Supply and other facilities

All kebeles are connected by dry and rain available to transport roads. Kilte Awlaelo was connected to three weredas by main roads. All kebeles had the approach to telecommunication. Three kebeles had provided electricity.

Economic

The main economic source for the population was agriculture. The main production produce by rain season were crops like maize, sorghum, millet, wheat, barley, etc. The main products by irrigation were tomato, onion, garlic, potato etc. A total of 115,420.7 hectares was used in irrigation consuming 15 842 population. Honey production was one of the incomes of those who have no farm land youth and women. A sum of 24594 people were participating in honey production produced 6,600 kg honey per year.

Educational Status

Education is the primary source of knowledge which has direct influence on health in the prevention of preventable disease. The legal age of rural people had not educated, therefore, to charge his children is one means of gathering knowledge and practice in environmental and personal hygiene to further wellness and prevent infectious disease. The district received a total of 64 schools, including 63 governmental and one private school. In that location were no colleges or universities other than 61 primary schools and 3 secondary schools. A total of 262204 (13148) students were in primary schools and 3019 (1579) students were in secondary school. The gross enrolment in primary school was 97.2 % and 97.9 % in secondary school. Drop out of primary school was 2.83 % that was the same as the previous year and 2.1 % in secondary school that was more eminent than the previous year (1.5 %).

Table 4.18 Vital Statistic and Health indicators in Kilte Awlaelo, 2013

No	Indicator	%
	Child Mortality Rate	0.21
	Crude Birth Rate	2.01
	Maternal Mortality Rate zero	0
	Contraceptive prevalence rate	41
	Contraceptive acceptance rate	42
	ANC rate (how many of the total expected pregnancies attended 1st ANC)	78
	Percentage of deliveries attended by skilled birth attendants	85
	Percentage of deliveries attended by HEWs	4.3
	Percentage of deliveries attended by TBA	10.4
	Average family size	4.4 per house
	Crude Birth Rate (per 1000)	20.3
	Age dependency ratio (%working age population)	52.3
	Age dependency ratio; old	5.4
	Age dependency ratio in %; young	46.9

No data for IMR and CDR

District Health Service

Kilte Awlaelo Wereda has its own health department headed by an Executive District Officer. The officer was assisted by Deputy District Officer (DDO), Plan Officer, Human Resource, HMIS, Regulatory officer and secretary. Health Promotion Disease Promotion department had five departments under it.

Organogram

The district organization health department structure seems as below.

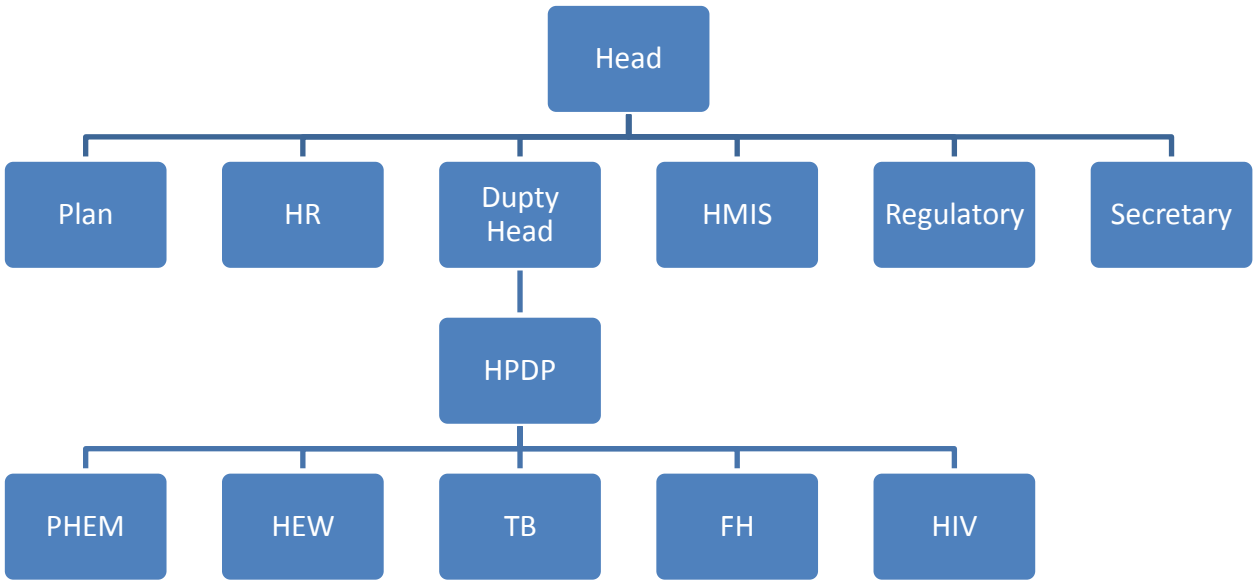


Figure 4.24 Health Oregano graph of Kilte Awlaelo Wereda, Eastern Tigray, Ethiopia, 2004

b. Health Facilities

There were five HCs and about 17 health posts (HP) constructed since 1996, launching health extension program, in Kilte Awlaelo Wereda. These HPs serves to the population addressing the primary prevention by mobilizing the population to protect and prevent environmental and private hygiene, including the household, water and community sanitation primarily giving health educations and establishing healthy army units. These were clearly expressed in front of the HP in local language. See figure 5a.

- Pregnancy test
- PNC
- ANC
- Weighting children
- Providing Vitamin A supplement
- Health education
- Outpatient service
- Wound care

The woreda has 5 health centers (HC) serving in primary curative services, ANC services, FP and supporting in the prevention of infectious disease in the community.

All health posts have two HEW and the health centers have each one health officer, five nurses and about three midwives.

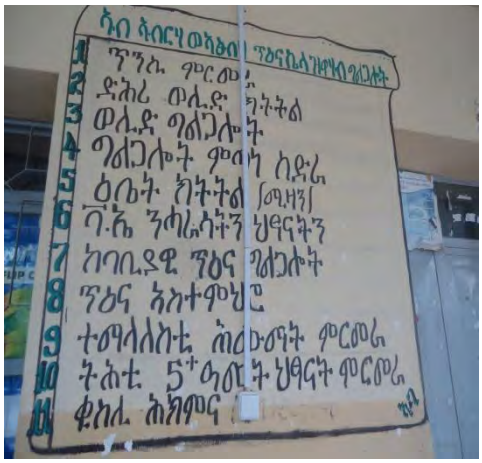


Figure 5A Figure 25B

Figure 2.5, List of Health Providing Services of Abrha we Atsbha Kebele HP figure 5A, and Abrha We Atsbha HC referral documents, Figure 5B , Kilte Awlaelo Wereda, Eastern Tigray, Ethiopia, 2014

b. Human resource distributions

Table 2.19 Number of Health Professionals in Kilte Awlaelo Woreda, 2014

Se.No	Profession	Number		Total	HP: population Ratio	Remark
		Male	Female			
1	Specialist	-	-	-	-	
2	GP	-	-	--	-	
3	HO	4	1	5	1:23.954	
4	All Nurses	22	17	39	1:3071	
9	Midwife BSC	-	-	-		
1o	Midwife diploma	4	10	14	1:8555	
11	Lab.Technology	-	-	-		
12	Lab. Technician	3	7	10	1:11977	
13	Pharmacist					
14	Pharmacy	3	7	10	1:11977	

	technician					
15	Environmental HO	1	1	2	1:59886	
16	X-ray technician	--	--	--		
17	Anesthetist	--	----	---		
18	Health assistance	-	-	-		
19	HEW	-	34	34	1:3522	
20	Supportive staffs	37	37	74	1:1619	
Total		74	114	188		

c. Child Health

Improving child health is one of the national strategies which set a set a target for reduction of under five mortality rates from 101 to 68 per 1,000 live births and the infant mortality rate from 77 to 31 per 1,000 live births [3]. To reduce the under-five mortality rate by two third between 1999 and 2015 is one of the target of MDGs [4]. Child mortality rate in this district was 13.9 per 1,000 (38/2735*1000) in 2011/2012 that was below the regional achievement 23 per 1,000 in 2011 [4].

Table 4.20 EPI coverage of Kilte Awlaelo Wereda, Eastern Tigray, Ethiopia of 2005 EFY, 2014

	BCG	Penta 3	Penta 1	PAB	Measles	Pneumococcal 1	Pnemo-2	Pneumo-3	Fully Immunized
Planned	3713	3485	3485	3485	3485				3485
Achieved	2674	2806	2768	2768	2668	2768	2747	2806	2668
Achieved in %	72	81	79	79	77				77

Pentavalent 1 and Pentavalent 3 achievement was 79 % and 81 % respectively. Pentavalent 1 was less than 2011 regional achievement of 93.8 %. Pentavalent 3 was higher than the regional achievement (73.4 % in 2011). 77 % of the infants of the district took in fully immunized including to measles that was above the national performance in 2010/2011 (74.5%) but less than the regional that was 83.7 % in 2011. BCG immunization was the least achievement (72%) in the district much lower than the regional performance of 95.9. In over all, immunization the

district was achieved under the internal objective. Pneumococcal immunization had been inserted in the immunization program.

d. Maternal Health

Table 4.21 Maternal Health activities of Kilte Awlaelo Wereda 2005 EFY, Eastern Tigray, Ethiopia, 2014.

No.	Activities	Illegible	Achievement In		Remark
			Number	%	
1	TT2 for non pregnant mothers	24076	4676	19	
2	TT2 for pregnant Women	3713	1649	44	
3	New FP acceptors	9843	3996	41	
4	Repeat FP acceptors	14061	5975	42	
5	First antenatal acceptors	4072	3159	78	
6	Deliveries attended by skilled attendant	3713	2332 (85%)	62.8	
7	Attended by HEW		117 (4.3%)		
8	Delivered at home (by tTBA)		284(10.4%)		
9	First post natal care	3713	2733	73.6	

An effort to reduce or eliminate maternal death focuses on assessment of risk mothers and risk factors, increasing access to skilled delivery care and strengthening reproductive health and family planning. Antenatal coverage at least one visit was 78 % in 2011/2012, that was below the country target (>80 %) of this year. The percentage of deliveries assisted by a skilled health, personal was above the national target (>27% in 2003 EFY). Mother assisted by skilled persons during this year was 2332 (62.5 %) and those attended by HEW were 117 (4.3 %) in 2011/2012 and the achievement of the region was 11.6 0. % and 0.9 % respectively in 2011 [4]. And also 284 (10.4 %) of mothers of this wereda had delivered at home assisted by trained birth attendant, which was not acceptable which was less than the 2011 regional 12.5 % record [4].

Those delivered by HEW may not need to deliver out of health facilities. Even though maternal death was not occurring during this year, emergency obstetric care, skilled birth attendants and postpartum care are important measures to reduce maternal mortality. Stillbirth accounts 8 (0.23 %) and live birth accounts 1813 (99.77 %). Postnatal coverage was 73.6 %, achieving the national target. TT2 vaccination, providing for nonpregnant, and pregnant women was 19 and 44 percent respectively. But 60.3 % of mothers give birth at this year had provided TT2 vaccination, which was achievable, more than this magnitude.

Contraceptive acceptance rate (CAR) is the proportion of women of reproductive age who were not pregnant and accepting the modern contraceptive method. CAR in this woreda was 41 % that was beneath the internal target of EFY 2010/11 (66%).

Table4. 22 Antenatal activities and results by attendant of Kilte Awlaelo Wereda, Eastern Tigray of 2005 EFY, Ethiopia, 2014

ANC attendance	Attended by skilled attendants		Attended by HEW		Birth by TTBA		PNC attendance
3159	Live Births	Still Births	Live Birth	Still Birth	Live Birth	Still Birth	2133
	1732	7	81	1	266	0	
Percent	99.6	0.4	98.8	0.2	100	0	

The success of “no Mother has to die to give birth” slogan the people of the woreda and each hierarchy of government were in hard working. The woreda had three ambulances; two bought by the woreda and one provided by the government; which give service in the first place for pregnant mothers. The residential district was organized in units to transport cases and pregnant mothers to health facilities. Traditional ambulances and stretchers had been made in each kebeles and communities. Away of the 7 administrative cars there was one standby to support for transportation of emergency events.

The woreda HCs and HPs facilities didn’t have the responsibility to admit patients except emergency waiting for 24 hours in HCs. A total of 62,256 cases had been experienced in the outpatient section. Out of them 48930 (70.6 %) were adults and 13,326 (21.4) were pediatrics.

In the adult OPD 44.3 accounts the top disease and 41.6 % accounts the tent top disease in pediatric OPD.

e. Top 10 Disease

Table4.23 2005 EFY Top Ten causes of Outpatients in Kilte Awlaelo Wereda, Eastern Tigray Region, Ethiopia, 2014.

Sr.No	Adult			Pediatrics/ <5 year		
	Disease	Cases	%	Disease	Cases	%
1	URTI	4520	20.9	Watery Diarrhea	1697	30.6
2	Gastro Enteritis	3027	14	URTI	934	16.9
3	Skin Disease	2405	11.1	Pneumonia	801	14.5
4	Watery Diarrhea	2373	11	Eye Disease	506	9.1
5	Arthritis	2086	9.6	Bloody Diarrhea	379	6.8
6	Eye disease	1890	8.7	Skin infection	330	6
7	Intestinal Parasites	1867	8,6	Unidentified skin disease	262	4.7
8	Trauma	1825	8.4	Dehydrated diarrhea	233	4.2
9	Pneumonia	1023	4.7	AFI	234	4.2
10	Others	647	3	Intestinal Parasite	167	3
Total of leading causes		21663	44.3		5543	41.6
Total all causes		**48930**	**78.6**		**13,326**	**21.4**

URTI was the leading and the second leading cause in adults and children recording 21 % and 17 % respectively. Watery diarrhea was the leading case in pediatric outpatients followed by URTI and pneumonia with 17 and 14.5 percent respectively. Gastroenteritis and skin disease were the second and third top disease in adult outpatients followed by watery diarrhea.

HIV related activities

Table4.24 Kilte Awlaelo woreda 2005 EFY HIV/AIDS activities and achievement in percent, Eastern Tigray, Ethiopia, 2014

No.	Activities	Eligible	Achievement		%	Remark
1	Condom users	38000	31027		82	
2	HE for HIV/AIDS	59885	25544		44	
3	HIV test	12935	VCT=4383	8920	69	
			PIHCT=4537			
4	HIV positive	375	VCT=18.	35 (0.1%)	9	
			PIHCT=17			
5	PMTCT	4079	2919		72	
6	HIV positive for PMTCT	140	8 (0.27 %)		5.7	
7	Providing prophylaxis pregnant	140	7		5	
8	Prophylaxis to new born	140	5		3.6	
9	DBS investigation	15	6		40	
10	Partner HIV test	2040	1457		71.2	
11	Partner HIV positive	79	1		1.3	
11	HIV and TB tests	181	13		7.2	
12	Pre ART	275	174		63	
13	ART users	107	82		77	
14	Total HIV positive	515	44		9	

The woreda had low achievement in health education for HIV/AIDS. Wellness education is the primary tool to combat HIV and other health related troubles. PMTCT achievement 72 % and Partner HIV test was 71.2 %. A sum of 13287 people had been examined for HIV in PIHCT, VCT, PMTCT and partner HIV test. Out of them 44 clients were for HIV, that 0.33 %. The total PLWHA was 426 (0.36 %).

TB and Leprosy

HCs have the obligation to screen TB, HIV and TB and HIV collaboration. The woreda was the lowest in achieving its annual program. All TB cases have done an HIV test (100%). In this report HIV/TB collaboration shows that 4.9 % (4/82*100).

Health Extension Program Activities

Table4. 25 HEP activities in Kilte Awlaelo Wereda in 2005 EFY, Easter Tigray, Ethiopia, 2014

No.	Activities	Plan	Work done	%	Remark
1	New toilet building in household	1027	968	94	
2	Proper utilization of toilet in Household	25222	23885	95	
3	100 % avoiding field defecation communities	21	11	52	
4	Graduate in health extension package	1027	968	94	
5	Proper storing of clean water in household	2439	2246	92	
6	Household with Smoke outlet	1796	1719	96	
7	Household with Drainage	2439	2246	92	
8	Household with solid waste garbage	2439	2246	92	
9	Household using soap hand washing	2509	2095	83	
10	Visited houses	23903	23903	100	
11	Poultry building separately	1889	1467	78	
12	Separating Animal housing	1889	1776	94	
13	Building Shelves for house equipment	1002	1096	109	
14	Environmental Sanitation	864	698	81	
15	Experience sharing	48	48	100	

HEP is a package of basic and essential promotive, preventive and selected high impact curative health services targeting households to improve the health status of families with their full participation, using local technologies and the community's skill and wisdom to produce and maintain their own health [5]. Kilte Awlaelo district was in the right truck to achieving health package program using as an instrument of all organizations especially Health Development Army. Avoiding field defecation was with the least achievement (52 %) watched over by assuring environmental sanitation and household using soap hand washing with 81 % and 83 %

achievement. We respect the separation of separate house for animals and poultry, shelves for house equipments and functional household toilets with soap and water at the gate in Abrha We Atsbha and Aynalem Kebeles. Health education was one of the main activities to deliver knowledge and awareness in the health extension package. Health education was managed in health facilities, school, Religious areas, youth, women and farmer associations.

We observe sewerage running outside the compound to the farm lands and sniffing odor to people passing thorough the surrounding. Further investigation and intervention may need about the management of municipality.

Health Education

Table 4.26 Number of People provided Health Education activities in Kilte Awlaelo Wereda in 2005 EFY, Eastern Tigray, Ethiopia 2014

No	Health Facilities			School			Female Association			Youth Association			Farmer Association			Religious areas			Total
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	
	49355	34784	84139	7843	11259	19102	8342	14244	22586	19233	15319	34552	33491	22774	56265	1000	7894	17894	234538

Water Access

Ace of the MDGs that Ethiopia has adopted was increasing access to improved drinking water. Water has a direct relationship with health. Water related disease had been discovered in this woreda like intestinal parasites and skin disease.

Average safe water of the district was 64.5 % rural households better than average national access in 2011(39 %) and 69.8 % in urban household that was less than the national access (87%) in 2011 [4]. The source of water utilization in rural was hand dag well, shallow well, deep well including pipe water and rivers. Many water sources were

non functional (21 % to 33.3 %). More than 35 % of the kebeles had less than 50 % safe water coverage.

Figure 4.7 Hand dug well source of water of Kilte Awlaelo Wereda, Eastern Tigray, Ethiopia, 2014rn Tigray, Ethiopia, 2014

Tabl 4.27 Water access of Kilte Awlaelo Wereda rural area in 2005 EFY, Eastern Tigray, Ethiopia, 2014

S,No	Kebele	Hand dug well		Shallow well		Spring		Deep		Coverage
		Functional	Non functional	Functional	Non functional	Functional	Non functional	Functional	Non functional	
1	Abrha Atsbha	6	1	18		0	1	1	1	80.5
2	Adeki Sandid	15	2	30	7					86
3	Hayelom	8	3	16	2	2	1	1		72
4	Aynalem	4	2	8	6			1		54.2
5	Debre Brhan			8	2					46.8
6	Debre Tsion	16	4	16	2					60
7	Gemad	6		22	2	1				91
8	Genfel	12	3	1						63
9	Gule	10		16	2					85
10	Hadinet	6	3		2			1		45
11	Kihen	6	2	1		1				40.2
12	Mahbere Weyni	4	2	1	3	0			2	48.5
13	Mesanu	5	5	1	1	0				42
14	May Kuha	9	7	12	3	0				89.1
15	Negash	11	5	34	13	0		3		93
16	Tsaeda Naele	16	2	10	6	0				83
17	Tsige Reda	7	3	1	2	0		1		43
Total		141	44	195	53	4	2	8	3	64.5
Percent		76	24	78.6	21.4	66.7	33.3	72.7	27.3	

Source: Kilte Awlaelo Office of water resources, mines and energy

It is better to give attention on the education of the community to maintain the water sources to protect from damage, the caliber of the materials and to able to participate the community in repairing the damaged and broken water sources.

Table4.28 Safe water coverage of urban area of Kilte Awlaelo Wereda in 2005 EFY, Eastern Tigray, Ethiopia, 2014,

Town	Water product in M^3 per day	Functional Water in M^3 Per day	Daily requirement in Littre per person	Safe water coverage in %
Agulae	84.2	78.22	20	69.8

Orphans

Kilte Awlaelo had a substantial number of full orphans who luck their mother and father with different positions. The orphans account 0.34 % of the entire population with an around an equal proportion of male and female. The highest range was with age groups 10 to 18 years old accounted 76.5 % of the total orphans.

Table 4. 29 Full Orphan in Kilte Awlaelo Wereda in 2005 EFY by age and kebeles, Eastern Tigray, Ethiopia 2014

Kebele	Age				Sex		Total	%
	<5	5_9	10_14	15_18	M	F		
Abrha Atsbha	4	8	5	4	9	12	21	5.1
Adeki Sandid	2	5	7	14	12	16	28	6.8
Agulae	1	4	14	12	11	20	31	7.5
Aynalem	2	4	5	7	12	19	31	7.5
Debre Brhan	2	3	5	5	7	8	15	3.6
Debre Tsion	1	2	4	9	7	9	16	3.9
Gemad	1	1	5	3	6	4	10	2.4
Genfel	1	2	4	8	7	8	15	3.6
Gule	0	3	9	2	7	7	14	3.4
Hadinet	4	2	13	9	20	8	28	6.8

Hayelom/Awal	2	2	6	9	11	8	19	4.6
Kihen	0	4	10	6	14	6	20	4.8
Mahbere Weyni	0	3	7	10	12	8	20	4.8
May Kuha	0	2	14	13	16	13	29	7.0
Mesanu	2	2	3	11	11	7	18	4.3
Negash	0	4	19	10	16	17	33	8.0
Tsaeda Naele	0	3	6	24	15	18	33	8.0
Tsige Reda	2	6	5	20	17	16	33	8.0
Total	24	60	141	176	210	204	414	100
%	5.8	14.5	34.1	42.5	50.7	49.3	100	

Source- Social Affair of Kilte Awlaelo

Disability

There were a total of 1737 (1.45 %) disabled people in the territory. Out of these disabled people 56.2 % (976) were male and 43.8 % (761) were female. Different disease accounts the major movement of disability (45.7 %) followed by war and lands mine injuries and other injuries with 29.9 and 24.4 % respectively. Kilte Awlaelo was one of the most woredas passed through different and repeated war against the Dergue government.

Table 4. 30 Disabled people in Kilte Awlaelo Wereda Eastern Tigray, Ethiopia, by cause, sex and kebele.2014

			War and Land mines			Other Injuries			Other Disease		
Ser.No		M	M	F	Total	M	F	Total	M	F	Total
1	Abrha Atsbha	0	32	0	32	3	21	24	10	15	25
2	Adeki Sandid	0	61	11	72	26	15	41	20	36	56
3	Agulae	0	36	0	36	15	20	35	15	21	36
4	Aynalem	0	17	0	17	0	10	10	10	12	22
5	Debre Brhan	0	18	0	18	9	11	20	9	30	39
6	Debre Tsion	0	17	0	17	2	10	12	8	11	19
7	Gemad	0	36	0	36	10	15	25	20	16	36

8	Genfel	0	35	0	35	10	20	30	15	30	45
9	Gule	0	16	3	19	3	11	14	7	15	22
10	Hadinet	0	37	0	37	13	20	33	17	35	52
11	Hayelom/Awal	0	31	0	31	20	30	50	20	39	59
12	Kihen	0	30	0	30	8	15	23	14	41	55
13	Mahbere Weyni	0	8	0	8	4	5	9	41	29	70
14	May Kuha	0	30	0	30	4	1	5	28	57	85
15	Mesanu	0	33	0	33	6	11	17	24	19	43
16	Negash	0	24	2	26	4	8	12	9	20	29
17	Tsaeda Naele	0	18	3	21	24	19	43	27	31	58
18	Tsige Reda	0	21	0	21	6	15	21	15	28	43
	Total	0	500	19	519	167	257	424	309	485	794
	%		96.3	3.7		39.4	60.6				
			29.9			24.4			45.7		

Table 4. 31 Summery of disabled people in type of injury and sex in Kilte Awlaelo Wereda in 2005 EFY, Eastern Tigray, Ethiopia, 2014

Type of injury	M	F	Total	%
Polio	0	0	0	
War and Land mines	500	19	519	29.9
Other Injuries	167	257	424	24.4
Other Disease	309	485	794	45.7
Total	976	761	1737	100.0
%	56.2	43.8	100	

Endemic Disease

Malaria

Kilte Awlaelo is not in high risk for malaria due its altitude and hard working in prevention. There were total 474 malaria cases in 2005 EFY, 40 % P. Vivax, 25 % P. Falciparum and 34 % clinically treated. The trend of malaria in this woreda showed significant decrement in each year for the last three to four years.

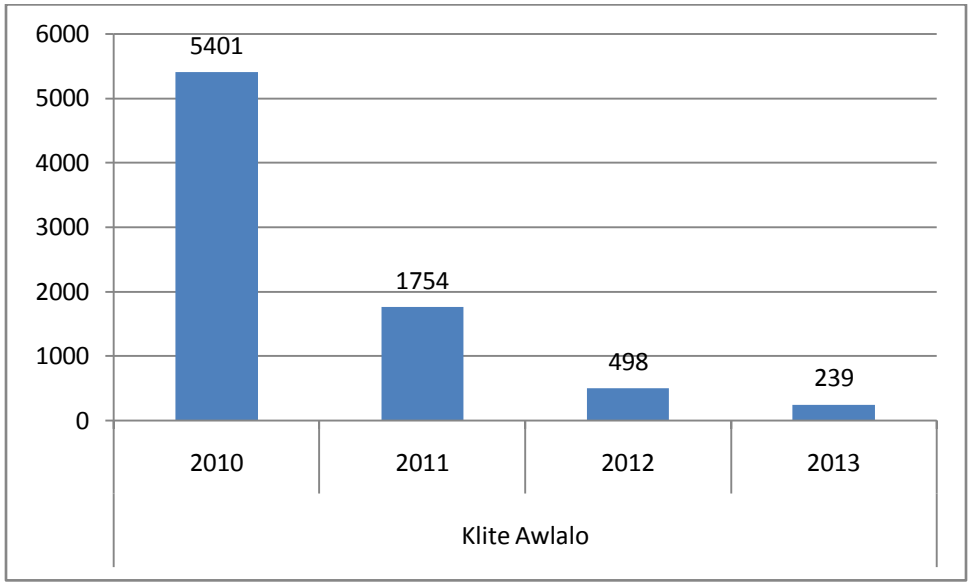


Figure 4. 26 Trends of Malaria from 2010 to 2013 in Kilte Awlaelo Woreda, Eastern Zone, Tigray, Ethiopia, 2014

Table 4. 32 Malaria prevention activities in Kilte Awlaelo Wereda in 2005 EFY, Eastern Tigray, Ethiopia, 2014

Sr. No	Activities	Plan	Achievements
1	IRS	22500	18201 (81%)
2	Number of population, avoiding from malaria risk	43650	40233 (92.2%)
3	IRS communities	40	40 (100%)
4	Number houses provided LLITN	4252	2000 (47%)
5	Environmental sanitation (m2)	385000	100%
6	Malaria HE	118,000	111,054 (94.1%)

House to house inspection had been performed to assure properly using of mosquito nets. Micro dams and irrigation were risks of malaria, which may need continuous, follow up.

Roughly 47 % population was provided LLITN and indoor residual spray was done for the sum of 81 % of the population.

Essential drugs and other provisions

Out of the total budget 11.9 % (9831465.92) was used for health. At that place was no budget gap by this year.

Other endemic diseases

The Kilte Awlaelo woreda was more affected by preventable disease that causes due to lack of safe water and poor environmental sanitation like intestinal parasites, watery diarrhea and also different skin disease as shown in the ten top outpatient disease tables.

Nutrition

There were a total of 254 SAM cases in the woreda who admitted in the HCs and HPs centers of OTP. Out of the total cases 157 (61.8%) were discharged improved. There was no death due to SAM in the study period.

Weakness:-

1. Lack of organized, standardized information collection and warehousing
2. Missing of important variables in compiling data, like child or IMR
3. Difference of data information between DHB and HMIS
4. Lack of important data/information like number of beds, deaths, admission and referral
5. Lack of important health indicators like IMR, CMR, CDR, CBR, and FR
6. Lack of linkage between referral hospital and the DHB, this makes difficulties because of the woreda didn't have its own hospital.
7. Lack of referral linkage between HPs and HCs, due to long distance inbetween, which they immediately refer to the infirmary.

Conclusion

The population pyramidal age structure reflects the large number (46.9%) of children under age 14, and accounts for almost half of the entire population, which is a feature of population with high fertility levels. Over age 64 accounts 5.4 %. Average household of the Woreda was 22.6 percent. About 30.9 % of the Weredas households were headed by women. The median household size of the Wereda was 4.4 persons that were the same in rural and urban.

The gross enrolment in primary school was 97.2 % and 97.9 % in secondary school. Drop out of primary school was 2.83 % that was the same as the previous year and 2.1 % in secondary school that was more eminent than the previous year (1.5 %).

Child mortality rate in this district was below the regional achievement. Pentavalent 1 was less than 2011 regional achievement and measles immunization was achieved below the regional but better than national achievement. BCG immunization was also much lower than the regional performance. In over all, immunization the district was achieved under the internal objective.

Even though maternal death was not occurring during this year, emergency obstetric care, skilled birth attendants and postpartum care were important measures to reduce maternal mortality. Antenatal coverage at least one visit was below the country target of this year. Mother assisted by skilled persons and those attended by HEW were better achieve than the regional of the same year and the previous years. And also 284 (10.4 %) of mothers of this wereda had delivered at home assisted by trained birth attendant, which was not acceptable which was less than the 2011 regional 12.5 % record. Those delivered by HEW may not need to deliver out of health facilities. Stillbirth accounts 8 (0.23 %) and live birth accounts 1813 (99.77 %). Postnatal coverage was 73.6 %, achieving the national target. TT2 vaccination, providing for non pregnant and pregnant women was 19 and 44 percent respectively. But 60.3 % of mothers give birth at this year had provided TT2 vaccination, which was achievable, more than this magnitude. CAR in this woreda was 41 % that was beneath the internal target of EFY 2010/11 (66%).

URTI was the beginning and the second leading cause in adults and children recording 21 % and 17 % respectively. Watery diarrhea was the leading case in pediatric outpatients followed by URTI and pneumonia with 17 and 14.5 percent respectively. Gastroenteritis and skin disease were the second and third top disease in adult outpatients followed by watery diarrhea. Average safe water of the district was 64.5 % rural households better than average national access in 2011(39 %) and 69.8 % in urban household that was less than the national access

(87%) in 2011. Many water sources were non functional (21 % to 33.3 %). More than 35 % of the kebeles had less than 50 % safe water coverage.

Recommendation

- The top 10 disease indicates that sanitation and water utilization condition of the woreda. Responsible sectors and the community should need providing health educations based environmental and hygiene and improving safe water coverage and utilization.
- Respected sectors and the WHB of Kilte Awlaelo should maintain continuous activities to ascertain improvement and to achieve the goal of immunization.
- Continuous education to create awareness in ANC was expected to ascertain zero maternal death and to prevent stillbirth. All mothers should give birth in health facilities belong to safe deliveries. Continuous awareness in ANC and PNC as well as immunization TT in the community needs further work.
- The Leather factory sewerage running outside the compound to the farm lands and sniffing odor to people passing thorough the surrounding. Further investigation and intervention may need about the management of municipality of the Sheba Leather Factory.
- It is highly recommended to have at least one hospital for the woreda.
- Improving data storage and preparation of standard POP having issued health indicators should able develop by WHB and RHB and referral linkage from HP to HC of some kebeles was too long and this may lead people to go to private clinics or absence from the referrals, so it needs construction of near HCs.
- HPs and HC should able to distribute with geographical availability to utilize them, example the Aynalem Kebele's HP was far away from some communities for transport especially in summer season, no bridges to pass through. They can use their neighboring HPs that were Agulae HC. The HC (Abrha We Atsbha HC) was far away from the HP and may need to grow to HC.

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Chapter V- Scientific Manuscripts for Peer reviewed Journals

Malaria Outbreak Investigation in Humera Town, Western Tigray Zone, Tigray Regional State, Ethiopia 2014

Background: Malaria is a major public health problem in Humera. The purpose of this study was to identify the risk factors for the outbreak in the town.

Method: We conducted unmatched case – control study. Data collected on clinical bases, risk factors of the disease and knowledge assessment on mode of transmission and prevention method were managed and analyzed using a statistical computer program Epi info version 7.1.3.3 and Microsoft excel.

Result: The AR of malaria was 8.4%. The attack rate were high in the age group 15-59 (17.2%) followed by the age group 5 – 14 (2.3%). Among the cases P.falciparum accounts 71.9% , P.vivax (26.9%) and the rest 2.0% account mixed (P.falciparum and P.vivax) malaria. The principal classes of environmental elements were man-made breeding sites (OR = 10.9 (95% CI 4.6 – 25.5)) that was suitable for mosquito breeding. The provision of malaria prevention method of indoor residual spray was not in place in the town. The odds of illness in those who work during the night (OR = 2.3 (95% CI 1.1 – 4.8)) was higher than those who working during the day time.

Conclusion: Living near to the man- made and natural vector breeding sites, working during night, failure of indoor residual spray and increasing non immune population were the risk factors for the malaria outbreak in the town. Sound of prevention and control program designed by the country should able to implement in the town to reduce the prevalence of malaria. The malaria breeding sites in the town should be destroyed by mobilizing the

community and the people who working during the night should use anti mosquito repellents or take chemoprophylaxis.

Introduction

Malaria is the most common parasitic and vector born disease caused by the plasmodium species (1), which is transmitted by infected Anopheles mosquitoes. It is one of the disease targeted for elimination by WHO (2). An estimated of 3.4 billion people are at risk of malaria, of whom 1.2 billion are at high risk. Among the high risk areas, more than one malaria case occurs per 1000 population. The WHO 2012 report shows that an estimated 219 million malaria cases were from 104 countries and territories in 2011 (5). Malaria death is ranked at 5th among the infectious disease (after respiratory infections, HIV/AIDS, diarrheal diseases, and tuberculosis) globally and second (after HIV/AIDS) leading cause of death from the infectious disease in Africa (5). The global malaria cases decrease from 222 million to 207 million between 2009 and 2012, whereas the estimated deaths during the same period were decreased from 691,000 to the 627,000 respectively (1, 5). Worldwide, between 2000 and 2012, estimated malaria mortality rates fell by 42% in all age groups and by 48% in children under 5 years of age Approximately 90 % of the deaths caused by malaria in the world are from Africa of South of Sahara which is due to the severity of P. falciparum (6).

Almost 110 million of Africa people live in areas at high risk for seasonal malaria outbreak brought by spatial and temporal alterations, changes in the environment caused in great function made by regional climate changes (5, 6). The approximate Ethiopian population living in a malaria risk area was about 68% (two-third) of the entire 94 million people of the country (2, 7, 8). Approximately 75% of the geographic regions of the country have significant malaria

transmission risk. Among the leading communicable disease in Ethiopia, malaria accounts for about 30% of the overall Disability Adjusted Life Years lost (8).

Malaria is the leading health problem in Ethiopia (9). That is among the ten top diseases that deaths among the children of less than five years age and adults. Ethiopia has succeeded to prevent the malaria prevalence and in decreasing the number of areas affected by malaria outbreak outbreaks (10). Ethiopia has taken a massive expansion of malaria control programs since 2005 such as distribution of long-lasting insecticidal nets (LLINs), and the shift of malaria treatment to Artemether-Lumefantrine as first line treatment for PF in July 2004 (9, 11). At least one LLTN was provided for household in a percentage of 53.8% and 72% in 2007 and 2010 respectively as well as 20% of household below an altitude of 200 meters above sea level was subjected to IRS (9). The population living between an altitude of 1,500 and 2,500 meters above sea level are at risk of malaria and the areas experience outbreaks in Ethiopia (10, 12). The major risks of malaria are associated with environmental factors such as rainfall, altitude and temperature mainly caused due to climate change, that makes the occurrence of malaria is unstable and seasonal (10). Area, near houses to breeding sites, lack of windows or screens, and open eaves are also certain in current studies as malaria risk factors (12). Even though no deaths were reported, the weekly report of malaria cases from Humera town showed abnormal increment during WHO epidemic week report of 43, 2014. Humera town is located in malarious altitude but it was unexpected time to occurred malaria outbreak during this season. The aim of this paper is to investigate the cause of the malaria outbreak in Setit Humera town, the gaps in malaria control intervention, the risk factors of malaria outbreak and also attempt to assess other factors which may made to account in the prevention and control of malaria..

Methods: Weekly surveillance report and medical were reviewed. The current reports were compared with the previous years' surveillance data. Clinical and confirmed malaria cases were identified from the report using the standard definition. A retrospective data analysis was conducted followed by unmatched case control study. Simple random sampling procedure was applied to select a representative sample of households. Using the Statcalc of epi info, the sample size was calculated and was found to be 246 case and controls.

Data Analysis: The questionnaire was projected into Epi info version 7.1.3.3 then coded, entered and cleaned using Epi info and analyzed using both Epi info and micro-soft excel. Descriptive data were analyzed for frequencies and proportion. Total Incidence Rate (IR) and Age Attack Rate (AR), percentage and ratios were calculated. Relationship between number of cases and risk factors were calculated. Significance of the association was judging using the P-value and 95% CI for OR.

Results

A total of 2692 cases (AR 8.4%) without deaths (CFR = 0%) were reported from the woreda. Among the total cases 76.4% were males and 23.6% were females. Males were more affected in all age groups than females with average attack rate of 12.3%, which was three fold than female (4.2%). The bulk of the cases were found in the productive age played along in the range of 15-59 with the AR of 17.2% followed by the age group 5 – 14 with the AR of 2.3%.

The trend of the cases report showed increment since week 42 to week 46, 2014 that was doubling from the previous year. The peak magnitude of malaria cases showed in week 44, 2014. The outbreak was occurred from week 43 to week 46, 2014. Response for the outbreak was started in the beginning of the outbreak.

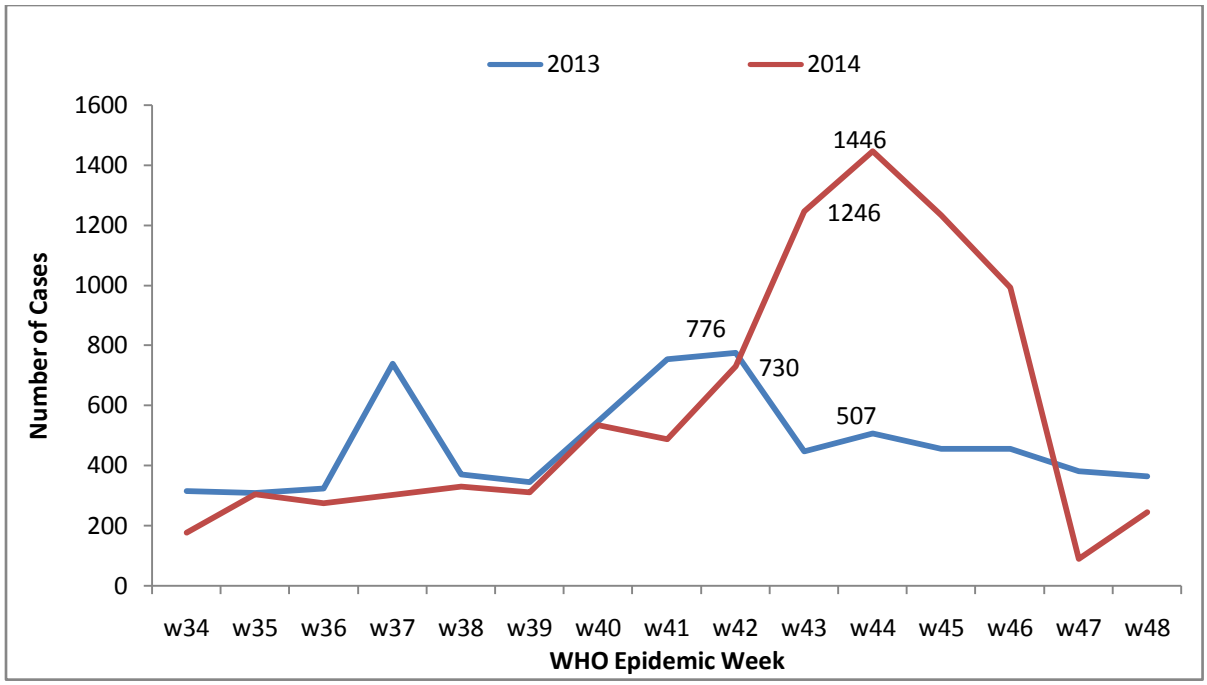

Figure 5.27. Trends of Malaria cases in Humera Woreda, Western Tigray, by WHO Epidemic Week in 2013 and 2014, Ethiopia

There were 1446 malaria cases in WHO Epidemic week 44, 2014 that were more than two times of cases compared to the prior year. The peak magnitude of malaria cases showed in week 44, 2014. The outbreak was occurred from week 43 to week 46. Response for the outbreak was started in the beginning of the outbreak.

The total number of cases reported from Setit Humera during our investigation (WHO epidemic Week 43 and 44) were about 2692. But the numbers of malaria cases investigated from the health facilities during our investigation were 2548 which were 601 (23.6%) females and 1947 (76.4%) males. The number excludes the number of cases who were referred from clinics and health center to the hospital. This number was found from the records of one hospital (48.5%), one health center (39.7%) and three private clinics (11.8%).

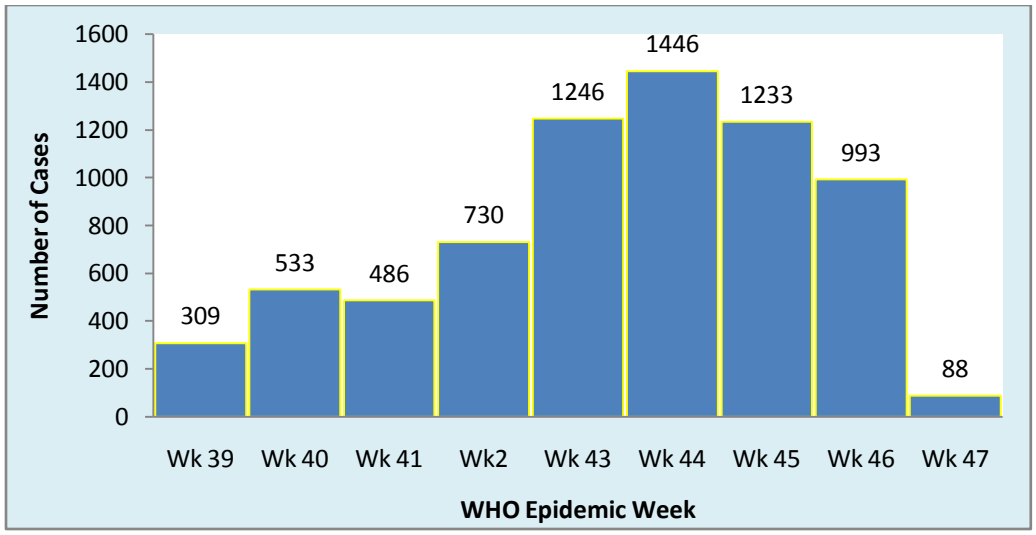

Figure 5.28 Distribution of Malaria Cases by Week in Humera Woreda, Western Tigray, Ethiopia, 2014

Regarding to address, 74.6% of the cases were from Setit Humera and the rest were from other Tigray woredas, Qafta Humera and Amhara Regional state with a percentage of 8.5, 8.1, and 7.1 respectively. Qafta Humera is the neighboring rural woreda located in the same geographic area. There was no death report throughout the outbreak.

The average attack rate during the outbreak period was 84 in 1000. The bulk of the cases were found in the productive age played along in the range of 15-59 with the incidence rate of 172 in 1000 followed by the age group 5 – 14 with the incidence rate of 23/1000. Males are more affected in all age groups than females those results, an average incidence of 12.3% which was three fold than female (4.2%).

Among the total malaria cases whose were treated in the health facilities, 99.6% were confirmed cases and 0.4% was clinically treated. The analytical study of the case-control study showed 83% of the cases were treated for PF. Pv. accounts 14.75% and mixed malaria (PF. and PV.) treated cases were only 1.64%.

Table 5.33Types and Frequency of Malaria Cases in the Cases Study Groups of Humera Town, 2014.

Type of malaria	Frequency	Percent	Cum. Percent	95% CI Lower	95% CI Upper
Mixed	2	1.64%	1.64%	0.20%	5.80%
PF	102	83.61%	85.25%	75.82%	89.69%
PV	18	14.75%	100.00%	8.98%	22.31%

The identified causes of the malaria outbreaks in Humera Town failed into four general categories, which were not mutually exclusive including environmental factor, population factor, vector and host related factors and the prevention and control strategy gap of health service activities.

Table 5.34 Characteristics of Exposure in Case Control Study of Malaria Outbreak in Humera Town, 2014

Exposure	Outcome Rate Exposure	Outcome Rate No Exposure	OR	95% CI	
				Odds Lower	Odds Upper
Presence of thick grass	0.6324	0.4494	2.107	1.186	3.7431
presence of intermittent river crossing the community	0.5417	0.4977	1.1926	0.5122	2.7767
Repellent use	0.3333	0.5063	0.4876	0.0876	2.7128
Un-protective irrigation	0.6712	0.4277	2.7314	1.5389	4.848
presence of breeding sites	0.6346	0.1375	10.894	4.6538	25.505

			7		
broken glass bottle	0.7692	0.4682	3.7864	1.4644	9.7904
Stagnant water	0.7069	0.4362	3.1176	1.628	5.8809

Environmental Factor: The principal classes of environmental elements were the climatic change and man-made breeding sites (OR = 10.9 (95% CI 4.6 – 25.5)) occurred in the township. There was a long lasting continuous heavy rain from July to October 7.2014 followed by interrupting rainfall until October 20, 2014. The last 13 days interrupted rainfall, including the town construction of new houses, roads and a new drainage system were suitable for mosquito breeding sites. There are interrupted rivers (OR = 1.2 (95% CI 0.5 – 2.8)) crossing the town and Tekeze river by itself makes here and there stagnant water (OR 3.1 (95% CI 1.7 – 5.9)) that was clearly seen mosquito larvae while the team were on the site. There were uncontrolled irrigation with thick grasses and water contained well that was suitable for malaria breeding site. Stagnant water and improper use of drainage system were also found in the town. Old tires (OR = 1.7 (95% CI 0.8 – 3.9)), broken glasses, (OR = 3.8. (95% CI 1.5 – 9.9)), flower pots (OR= 4.1 (95% CI 0.5 – 37)), open deep well (OR = 2 (95% CI 0.2 – 22)) and damaged pipes as well as pipes which serve to fill water tracks were risk factors for mosquito bleedings.

Prevention and control strategy gap: Delayed distribution of ILLNs to the region was one factor that was not provided to the residences at the right time. The national malaria prevention and control strategy of continuous provision of malaria prevention method (IRS) fail in Setit Humera. Spraying larvae side chemicals, avoiding and identifying mosquito breeding sites was

not early identified or done timely. Unprotected irrigation and breeding sites in the hospital, school and new constructed houses and roads not early identified or early take measures.

Vector and host related factor: Most of the population was living and staying outside home during the night (OR = 1.3 (95% CI 1.1 – 2.8)) due to high environmental temperature that exposes to mosquito bite. People who used repellents (OR = 0.5 (95% CI 0.1 – 2.7)) and clothes to prevent mosquito bites are minimal. Exposing to mosquito bite is high during staying outside home and late to sleep under their bed nets during the time of increased mosquito capacity.

Population factor: An increasing number of people at risk whose were unplanned and non-immune (agricultural laborers) during the season was one of the factors to increase the number of cases and also may destabilize the immunity of the residences; because all activities by the laborers who worked in agriculture were during the night without any method of mosquito bite prevention.

Discussion

There was malaria outbreak in Humera. Even though there was no prior public study about malaria epidemic in the town, malaria outbreak was occurred occasionally in this woreda like the malaria endemic woredas of the country. But there were no malaria outbreak in the prior year. The existent of the outbreak characterizes by the magnitude of the malaria reported cases that was more than two times the prior year and the type of treated malaria cases, which was more than 80% P. falciparum. Malaria outbreaks are returning associated with high rise in Plasmodium falciparum and its related death cases (13). The risk factors for the outbreak were characterized in to four categories.

Environmental factor was one of the major risk factor for the malaria outbreak. Living in the area of mosquito breeding sites or nearer to the vector breeding sites (OR = 10.9 (95% CI 4.6 – 25.5)) that had significantly risk compared to the study done in South Ethiopia (4.93 (95% CI: 2.59–9.35) (9). The main vector risk factors includes, the Tekeze river (while decreasing its volume), intermittent small rivers crossing the town which made small water bodies, vector breeding areas caused by the construction of houses, roads and drainage system as well as unmanaged stagnant water, old tires, broken glasses, flower pots, open deep wells and damaged water pipes. The increment of mosquito density after the heavy long rain fall which is above the average, in the town was also a risk factor to the outbreak (14, 15). After the heavy rain season when water is widely available such that vegetation increases, there is a greater likelihood for there to be available water for mosquito breeding. When the mosquito population increases, the likelihood of being bitten increases, as does the transmission of malaria Vegetations like thick grasses and maize with breeding sites may help to hide the larvae from their predators which leads to increase the mosquito density (6, 14).

Ethiopia has had made a remarkable progress in scaling up intervention of ITN distribution and IRIS (16). But the national malaria prevention and control strategy of continuous provision of malaria prevention method (IRS) fail in Setit Humera, due to the reason to prevent chemical spoiling to international marketing of agricultural products. Delayed distribution of ILLNs to the region was one factor that was not provided to the residences at the right time. Spraying larvae side chemicals, avoiding and identifying mosquito breeding sites was not early identified or done timely. Unprotected irrigation and breeding sites in the hospital, school and new constructed houses and roads not early identified and not early take measures. Due to the

local high temperature the residents stay outside home during night or they sleep outside their home (OR = 1.3 (95% CI 0.6 – 2.8)). In their staying outside their home they didn't use repellents ((OR = 0.5 (95% CI 0.1 – 2.7)) or other mosquito bite protective methods.

According to the health center and private clinic reports 25.4% of the cases were from other woredas may be endemic or non endemic high lands. The majority of these people were deployed in agricultural products that completely done at night. There were no malaria or mosquito bite prevention methods during their stay.

An active intervention response by the woreda and the team to control the outbreak such as establishing RRT and mobilizing the population in environmental sanitation campaign and budgeting to control the outbreak, spraying chemicals for risk areas of mosquito breeding sites, early treatment of cases continuous surveillance had been made to prevent further devastating and control the outbreak.

Conclusion:

We confirmed the existence of malaria outbreak in Humera Town from WHO epidemic week 42 – 46, 2014. Seasonal instability, which was clearly observed by the long lasting rain fall staying until October, was one risk factor for the outbreak. In addition to the rain fall the environmental, the vector and host, the population and the gaps in the prevention strategy were the main causes of malaria outbreak in the town/woreda.

Recommendation:

Federal and Regional MOH should revise the decision for not using routine IRS activity in the Western Zone of Tigray and the town, or looking for any other mosquito control strategy as there is a fear from the region that it is agro investment areas in which IRS is difficult to apply. The region is better to give stress to strengthening the surveillance system in capacity and manpower of the woreda. The woreda's responsible sectors including investment and health bureau should work in making awareness for construction contractors to protect mosquito breeding stagnant water and able to aware about the impact of malaria while they construct. Special attention may be needed for the new comers from high lands in prevention of malaria. Investors should consider implementing the malaria prevention methods such as avoiding stagnant water, spraying chemicals in larvae breeding sites and providing buzz off repellent to their workers. Introducing mosquito repellents to the residences and highly moveable people with cheap cost or free should able in consideration by the region and responsible sectors.

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Chapter VI – Abstracts for Scientific Presentation

4.1 Five Year Malaria Surveillance Data Analysis Report of Ethiopia from 2009 to 2013

Malaria is the major public health problem in Sub-Saharan Africa, including Ethiopia. It is important to analyze the magnitude of the disease to strengthen the control mechanisms and/or to fill intervention gaps. The goal of this study is to describe the epidemiologic presentation of malaria in Ethiopia in 2009 – 2013. We conducted a retrospective secondary data analysis using Microsoft Excel 2007 and EpiInfo 7.1.3.3. A total of 13 million clinical and confirmed malaria cases were reported nation-wide from 2009 – 2013 in Ethiopia. The overall five year average of nationally reported malaria incidence was 31.8 per 1000. The highest incidence was occurred in 2012 (46.827/1000) followed by 2013 (38.640/1000) and 2011 (34.391/1000). Among the regions, Gambela and Benshangul had the greatest malaria incidence in the five year study periods, at141 and 92 per 1000 population, respectively. The mean number of malaria death per year was 282. The national annual malaria deaths ranges between 275 (17.1%) in 2012 and 319 (22.6%) deaths in 2009. Nationwide average five year malaria fatality rate and mortality rate was 1.087 and 0.386 per 100,000 populations respectively. According to EPHI report, the report completeness had shown significant improvement that was from the list of about 18.9% in 2009 to the peak of 89.1% in 2013. So the substantial increase of clinical and confirmed malaria cases from 2009 – 2012 was due to the data report completeness improvement. Generally the strategy for control and preventive of malaria had been on the right track that results significant decline of mortality, admission rate, and confirmed malaria cases including decreasing the burden of malaria case in health facilities. As malaria declines, it is imperative to strengthen surveillance and scale-up data collection using modern technology.

4.2 Malaria Outbreak Investigation in Humera Town, Western Tigray Zone, Tigray Regional State, Ethiopia 2014

Background: Malaria is a major public health problem in Humera. The purpose of this study was to identify the risk factors for the outbreak in the town.

Method: Unmatched case – control study was conducted. Data collected on clinical bases, risk factors of the disease and knowledge assessment on mode of transmission and prevention method surveys were managed and analyzed using a statistical computer program Epi info version 7.1.3.3 and Microsoft excel.

Result: The general AR of malaria was 8.4%. The attack rate were high in the age group 15-59 (17.2%) followed by the age group 5 – 14 (2.3%). P.falciparum accounts 71.9% followed by P.vivax (26.9%). The principal classes of environmental elements were the climatic change and man-made breeding sites (OR = 10.9 (95% CI 4.6 – 25.5)), interrupted rivers (OR = 1.2 (95% CI 0.5 – 2.8)) crossing the town, stagnant water (OR 3.1 (95% CI 1.7 – 5.9)) risk factors with mosquito larvae and old tires (OR = 1.7 (95% CI 0.8 – 3.9)) suitable for mosquito breeding. The provision of malaria prevention method of indoor residual spray was not done in the town. Most of the population was living and staying outside home during the night (OR = 2.3 (95% CI 1.1 – 4.8)) that exposes to mosquito bite.

Conclusion: Living near to the man- made and natural vector breeding sites, failure of indoor residual spray, living style of the population and increasing non immune population were the risk factors for the malaria outbreak in the town. Sound prevention and control program designed by the country should able to implement in the town to reduce the prevalence of malaria.

Chapter VII – Narrative Summery of Disaster Situation Visited

Health Belg Report of South and South East Tigray, Ethiopia, 2014

Introduction

Ethiopia is one of the resource poor countries that were affected by drought and poverty for decades. Outbreaks/epidemics were the challenges of the country. Disaster early identifying is one of the crucial activities to prevent the consequences of public health emergencies and food shortages. In the current situation the Government of Ethiopia invested resources to response Public Health Emergencies to prevent epidemics, to decrease the widespread of communicable disease and to eradicate poverty and to decrease the vulnerability of malnutrition. Floods and droughts were potential natural disasters resulting population migration and displacement as well as health related problems like social problems, epidemics and malnutrition.

Belg and Meher assessment are the biyearly activities of the country conducting based on human health and nutrition emergency needs. These two seasonal assessments give attention mainly to food security and leaded by Disaster Risk Management and Food Security. Governmental (Ministry of Agriculture, Disaster Risk Management and Food Security Sector, Ministry of Health, Ministry of Water and Energy, Ministry of Education, National Metrology Agency and respective regional bureaus) nongovernmental organizations (WHO, UNICEF, OCHA, MSF, Plan International, IRC and etc) have been participating during the assessment. Food and health related risks were expected to identify during the assessment. Possible potential risks for the next season was also identified by the assessment group. Gaps, weakness and strengths are also able to identify during the assessment to minimize public nutritional and health consequences. Five woredas of Southern Zone and one woreda from South East Zone was selected in the assessment due to their utilization of Belg season.

Communicable disease like water related disease, diarrhea, Trachoma and skin disease have been the commonest causes of morbidity and mortality in these woredas. It is clear that harmonious and integrated universal efforts have been made national wide, especially regionally to prevent and control communicable diseases. The purpose of this assessment to

determine health effects like disease risk factors, type and magnitude of disease and problems faced in the region during the season, and vulnerable groups related to the big season and find gaps in the control and prevention of communicable diseases in order to able make sound recommendations to further strengthen.

Objective of the assessment

- To evaluate the outcome of Belg season and its impact on health
- To assess the impact of a particular disaster, if any, and evaluate the extent to which households can cope
- To identify areas where relief assistance is needed in the current year due to acute problems and to estimate the size of population needs and duration of assistance required
- To evaluate emergency agricultural, health and water intervention, including seeds, livestock vaccine, medicines, and support as well as health and water requirements including type, size and duration of intervention.

Methodology

Study design:- A cross sectional study design was used to assess the effect of Belg season and identify human health and nutrition, emergency needs in the last five months of from January to May 2014.

Study Area:-

Tigray Regional State is one of the nine regions of the Federal Republic of Ethiopia. It is located in the northern part of Ethiopia. It has seven administrative zones, one special city administrative zone and 52 administrative words. The capital city of the region was Mekele located 770 Km. south of Addis Ababa. The study was conducted in South zone in five woredas and South East Zone in one woreda of Tigray regional state. Southern Zone is one of the belg utilized zone otherwise the south east zone was non belg utilized zone except

seven kebeles of Hintalo Wajrat woreda. These visited woredas was prioritizing by the region based on their natural belg seasonal utilization, man-made disasters and disease trends.

Selection of Assessment Area:- The belg utilization woredas of the Southern Tigray Zone and one woreda from South East was prioritized to conduct the assessment by the regional DRMFS. Both natural disasters and disease trends issued on drought, influence of rainfall, internal displacement, outbreak occurrence and ongoing outbreaks, water supply and sanitation etc. were into consideration during the assessment.

- **Assessment Team:-** The assessment team was composed of experts from federal DRMFSS, EPHI, NMA, Tigray region DRMFSS, Tigray region regional health bureau UNISEF, WFP, WASH and Plan International. Before deployment the teams were briefed for about half day by federal/regional DRMFSS/DPPB officials before visiting selected regions as well as zones and woredas. The team was classified in food and noon food section based on their working organization and collect data from respective sectors. The teams conducted 3 days of analysis and reporting writing, then conducted debriefing in regional level.
- **Assessment Tools: -** Semi structured interviews, briefings and debriefing were held with regional, zonal and woreda officials to discuss the food security situations and health information for the current season. A semi structured interview was conducted based in each health, food, water, education and other related data at regional/zonal and district level. Socio-demographic profile, health profile, status of disease/epidemic prevention and control, the availability of emergency drugs and challenges faced during emergency response. We used excel to analyze data.

Source of Data:- Primary and secondary data was collected from regional PHEM and woreda health office. Woreda health heads, Surveillance officers and MCH focal persons were involved in the interview.

Key Assessment Findings

A) Socio Demographic Profile

Table 7,35 Socio - Demographic of Belg Assessed Woredas of Southern and South Eastern Tigray, Ethiopia, 2014

Zone	Woreda	Total Popula	Male	Female	under 5
South Tigray	Ofla	144,220	70668	73552	21056
	Alamata	104002	50961	53041	15184
	Enda Mohoni	96347	47981	48366	14067
	Mohoni	157764	77620	80144	23034
	Emba Alaje	128323	62878	65445	18705
South East Tigray	Hintalo Wajrat	180942	87213	93729	26418

All rural woredas of Southern Tigray Zone; Ofla, Alamata, Raya Azebo, Enda Mohoni, and Enba Alje woredas were assessed during the belg assessment and Hintalo Wajrat woreda from South East Zone was also assessed about the belg effect in health and nutrition.

In all woredas, there was no special population like pastoralist, refugees, IDP or migrant workers. Ofla woreda has a total population of 144,220 of which 70668 (49%) were male and 73552 (51%) were female. Out of the total population of the woreda 21056 (14.6%) were under five years of age. The total population of Alamata woreda was 104002, of which 50961 (49 %) were male and 53041 (51 %) were female. The less than five year age population was 15184, which is 14.6 % of the total population. Enda Mohoni's total population was 96,347, of which 47,981 (49.8 %) were male and 48366 (50.2 %) were female. There were about 14067 (14.6 %) under five year population. Mehoni woreda was the second populated woreda between the assessed woredas. Its total population was 157,764, of which 49.2 % were female and the rest 50.8 % was female. Out of the total population under five aged population accounts 14.6 % of the total population. Emba Alage has about 128323 people, of these total population male accounts 62878 (49 %) and female accounts 65445 (51 %). About 18,705 (14.6 %) of the population were aged under five.

b) Public Health Emergency Coordination and Response

Multi sectoral PHEM coordination forum had been established in all visited wordas. All except Emba Alaje woreda has written preparedness and response plan. None of the woredas had been allocated budget for preparedness and response activities.

c) Public Health Burden

1) Top five leading causes of morbidity

Pneumonia was the first top causes of disease in pediatrics of below five year age in Ofla, Enda Mohoni, and Enba Alaje, and diarrhea was the top in morbidity in Alamata and Raya Azebo. URTI was the top disease in adults and above five years old population in Raya Azebo, Endamehoni and Emba Alaje. Malaria and Arthritis where the top disease in above five year old age in Alamata and Ofla respectively. Water related disease like diarrhea with or without blood, diarrhea with dehydrations; skin disease and eye related disease where the disease in the top five in Raya Azebo, Hintalo Wajrat and Ofla Woredas. In these three woredas, safe water coverage was lower than the other woredas.

Table 7. 36 Top 5 list of Morbidity in Southern Tigray Woredas, Jan. to may 2014

Top 5 list of Morbidity in year 2014 (Jan. to may 2014)			
Zone	**Woreda**	**Morbidity below 5 year age**	**Morbidity above 5 year age**
South	Ofla	Pneumonia	Arthritis
		Diarrhea	Trachoma
		Eye disease	Gastritis
		AFI	PUD
		Intestinal parasite	Water born disease
	Alamata	Diarrhea	Malaria Pf.
		Pneumonia	Malaria vivax
		Malaria vivax	AFI
		AURTI	AURTI
		AFI	Diarrhea
	Raya Azebo	Diarrhea	AURTI
		AURTI	AFI

		AFI	Unspecified infection
		Pneumonia	Trauma
		Moderate Acute Malnutrition	Skin disease
	Enda Mehoni	Pneumonia	AURTI
		Diarrhea non-bloody	Other unspecified disease
		Diarrhea with dehydration	Trauma
		Other unspecified	Muscular skeletal disease
		URTI	Dyspepsia
	Enba Alage	Pneumonia	Acute bronchitis
		Diarrhea non-bloody	Dyspepsia
		AURTI	AURTI
		Diarrhea with blood	Muscular skeletal disease
		Diarrhea with dehydration	Trauma
South East	Hintalo Wajrat	Pneumonia	AURTI
		Diarrhea non-bloody	Trachoma
		AURTI	Other unspecified disease
		Diarrhea with blood	AFI
		Skin infection	Muscular skeletal disease

All woredas have a water related disease like diarrhea, skin disease and eye disease.

2) Trends of weekly reportable disease

There were no records or reports of AWD, Meningitis and meningitis in all visited woredas in the last five months.

Table 7. 37 Trends of some weekly reportable disease in Belg season of South and South East Zone of Tigray, Ethiopia 2014

Zone/Woreda	Sum of Malaria cases	Sum of Malaria Deaths	Sum of Measles Cases	Sum of Measles Deaths
South	**2267**	**0**	**120**	**1**
Alamata	1461	0	27	0

Emba Alage	140	0	7	1
Endamohoni	52	0	2	0
Mehoni	519	0	33	0
Ofla	95	0	51	0
South East	**241**	**0**	**0**	**0**
Hintalo Wajrat	241	0	0	0
Grand Total	**2508**	**0**	**120**	**1**

Malaria

Malaria was stable in the Belg assessment session. The total malaria reported cases during the belg season were 2508. Malaria cases consecutively show a decrement in each month of the belg season, which were 674 cases in January then declining to 402 cases in May. Generally malaria showed a decrement in all woredas compared to previous Belg seasons.

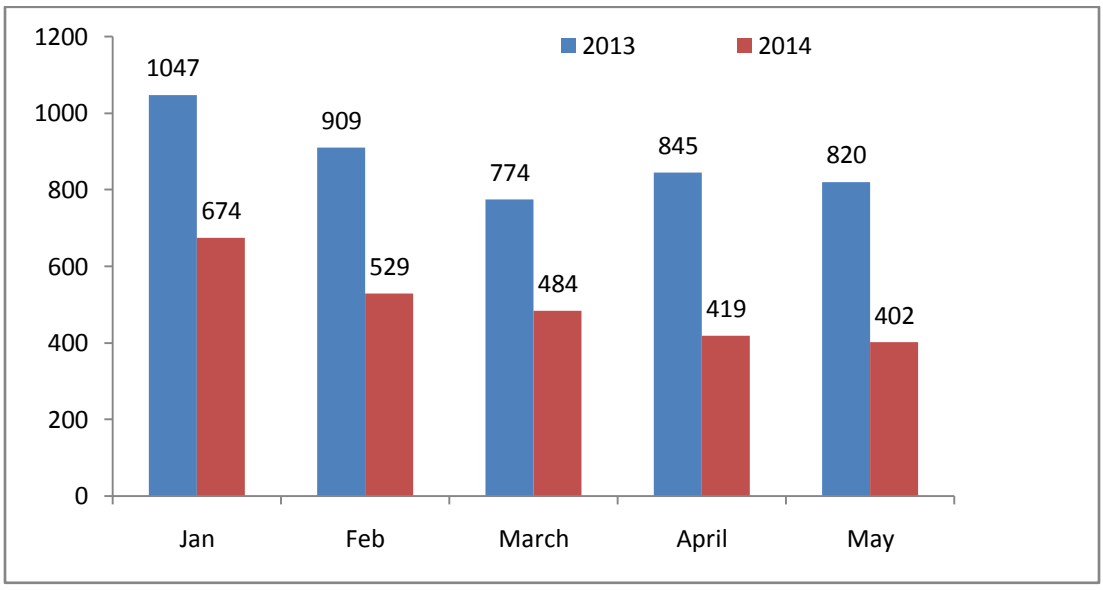

Figure 7.1 Malaria Trends of Belg Season in South and South East Zone of Tigray Region, Ethiopia, 2014

Table 7.38 Malaria Trends of Belg Season in South and South East Zone of Tigray Region, Ethiopia, 2014.

Woreda	Jan	Feb	March	April	May	Grand	Incidence

						Total	rate per 1000
Alamata	423	320	268	220	230	1461	14.0
Emba Alage	26	41	26	27	20	140	1.1
Enda Mehoni	7	7	6	32		52	0.5
Hintalo Wajrat(South East Zone)	63	50	49	43	36	241	1.3
Mehoni	127	95	119	83	95	519	3.3
Ofla	28	16	16	14	21	95	0.7
Grand Total	**674**	**529**	**484**	**419**	**402**	**2508**	**3.1**

Malaria incidence was higher in Alamata woreda, 14 per 1000 populations followed by Raya Azebo/Mehoni 3.3 per 1000 and Hintalo Wajrat 1.3 per 1000 population. The average incidences of malaria in these assessed woredas were 3.1 per 1000 population. Enda Mehoni has the least malaria incidence (0.5/1000) from the visited woredas in the belg season.

All Alamata kebeles are malaria endemic areas.

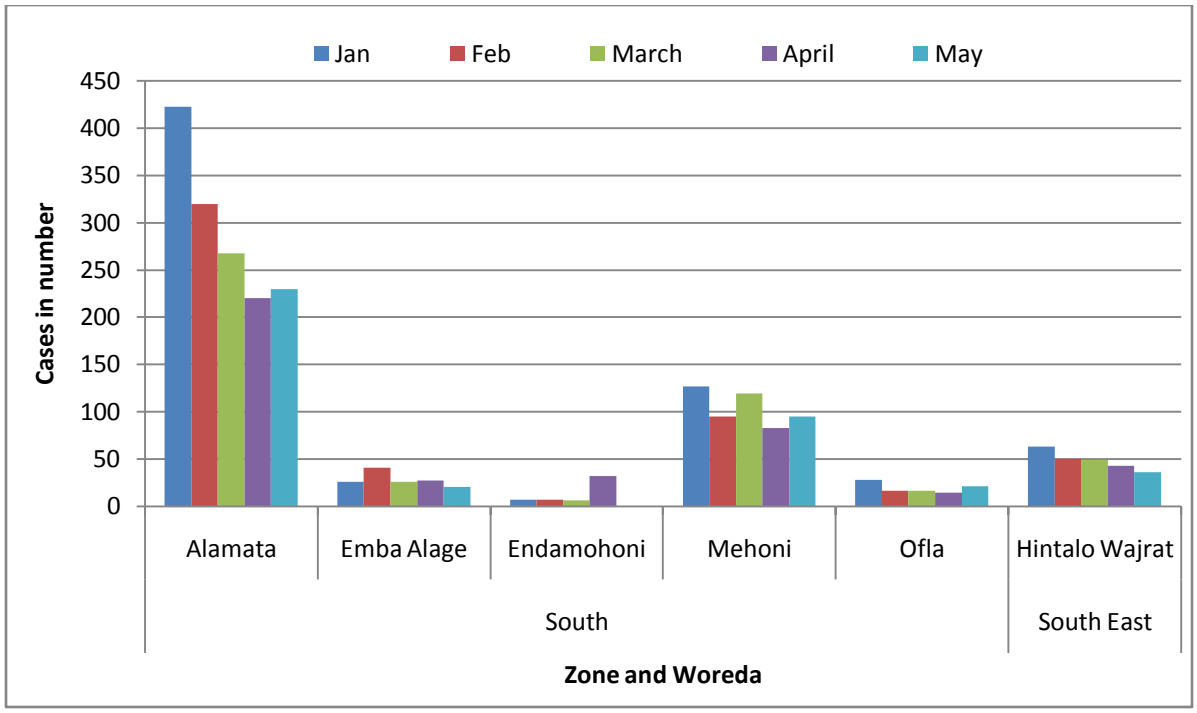

Figure 7.229 Trends of Malaria in Belg Season of South and South East Zone of Tigray Region, Ethiopia, 2014

Measles

There were measles outbreaks in all visited woredas of Southern Zone of Tigray except Hintalo Wajrat woreda in the beginning of this year. There was one death due to measles disease in Enba Alaje woreda.

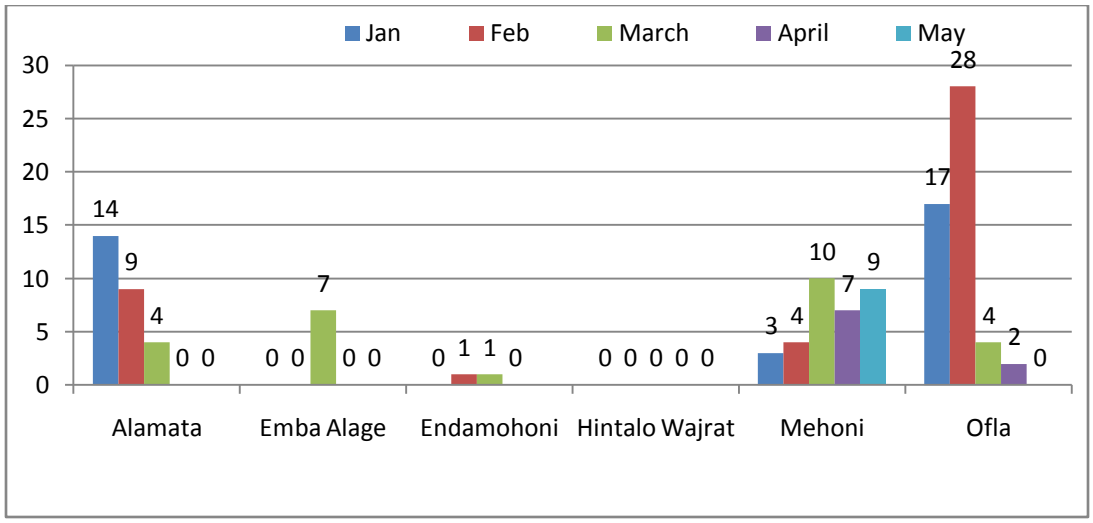

Figure 7.3 Measles Jan.-May 2014 Trends in South and South East Zone, Tigray, Ethiopia, 2014

Hintalo Wajrat woreda had a zero measles report throughout the belg season. Ofla woreda (51), Raya Azebo (33) and Alamata (27) have measles case report from the highest to the lowest respectively. Measles outbreak was higher from the previous year. All woredas have no any measles outbreak in May 2014. There was no any outgoing outbreak of measles in the assessment period.

There were no immunization supplementary activities in 2014. The immunization coverage for less than one year age of the woreda ranges from 85 % in Emba Alaje and Hintalo Wajrat of the highest 105% in Raya Azebo woreda followed by Ofla, Enda Mehoni and Alamata 96%, 94%, and 91% respectively.

3) Emergency Drug Preparedness

Preparedness is the vital issue to strengthen capacity in recognizing and responding to public health emergencies by risk identification, establishing partnership and collaboration, enhancing community participation and implemented a community based intervention during pre-emergency condition. The public health emergency preparedness includes putting drugs, logistics and funding, building of essential system to prevent and control emergency disease or conditions, equipped with the necessary knowledge and tools to public health personnel and community health education.

Table 7. 39 Emergency prepardness of South add South East Zone Woredas of Tigray Region in Belg 2014, Ethiopia.

Woredas						
Drugs and Medical Supplies	Oflas (Yes/No)	Alamata (Yes/No)	Enda Mehoni (yes/No)	Raya Azebo (Yes/No)	Enba Alaje (Yes/No)	Hintalo Wajrat (Yes /No)
Ringer Lactate (to treat AWD cases)	Yes	No	No	Yes	Yes	Yes
ORS (to treat AWD cases):	Yes	Yes	No	Yes	Yes	Yes
Doxycycline *(to treat AWD cases)*:	Yes	Yes	Yes	Yes	Yes	Yes
Consumables : Syringes, Gloves *(for AWD management):*	Yes	Yes	Yes	Yes	Yes	Yes
Amoxil susp (measles)	Yes	Yes	Yes	Yes	Yes	Yes
Tetracycline ointment (measles)	Yes	Yes	Yes	Yes	Yes	No
Vit A (measles)	Yes	Yes	Yes	Yes	Yes	Yes
Coartem for Malaria	Yes	Yes	Yes	Yes	Yes	Yes
Lab supply: RDT for Malaria	Yes	Yes	Yes	Yes	Yes	Yes
Lab supply: RDT (pastorex) for Meningitis	No	No	No	No	No	No
LP set	No	No	No	No	No	No

All the visited woredas were putting the necessary drugs in available areas. Majority drugs were available in woredas and health centers. They have an emergency preparedness board at the level of the health center. Most of the necessary logistics and funds were available in the health center. All woredas have no RDT for meningitis and LP set due to unavailability of a hospital set up in these woredas. There was no ringer lactate in Alamata and Mehoni. ORS and tetracycline eye ointment for measles was not

available in Mehoni and Hintalo Wajrat respectively. CTC, which is used during AWD outbreak occurrence was not available in all words.

4) Public Health Threats

The major potential risk for outbreaks in these visited woreda was water related disease, especially in Raya Azebo and Hintalo Wajrat and the death of 4-5 million fishes in Ofla woreda (Hashenge Lake) where the potential risk of communicable disease. Malaria also needs special surveillance in most of these woredas.

Malaria:- A total of 394,120 population lives in malaria endemic areas of the Southern Tigray Region of the assessed five woredas. Mehoni woreda is total malaria endemic woreda and Emba Alaje and Alamata woreda have 13 and 10 malaria endemic kebeles respectively. Indoor residual coverage in Raya Azebo/Mehoni and Hintalo Wajrat was 88 and 98 percent respectively. The other malaria endemic kebeles have no Indoor residual spray. There were unspecified new households whose didn't cover with indoor residual spray in Alamata woreda. There was potential malaria spreading sites, interrupted river, and unprotected irrigation in limited kebeles and also interrupted rain in the assessed malaria endemic woredas. Malaria prevention activities were strongly and continuously performed in theses woredas and kebeles. There were no an epidemic or an outbreak occurrences of malaria in these woredas. There were some kebeles who have below 80% coverage of LLINs in Ofla and Enda Mehoni Woreda as well as Enba Alaje Woreda.

Table 7.40 Malaria Risk Kebeles and population in South and South East Zone Tigray, Ethiopia in Jan. - May 2014, Ethiopia

Row Labels	The sum of NUM. Popu	Sum of Malarious Kebele
South	**394120**	**54**
Alamata	78002	10
Emba Alaje	43953	13
Endamohoni	96347	6
Mehoni	157764	21

Ofla	18054	4
South East	**55806**	**16**
Hintalo Wajrat	55806	16
Grand Total	**449926**	**70**

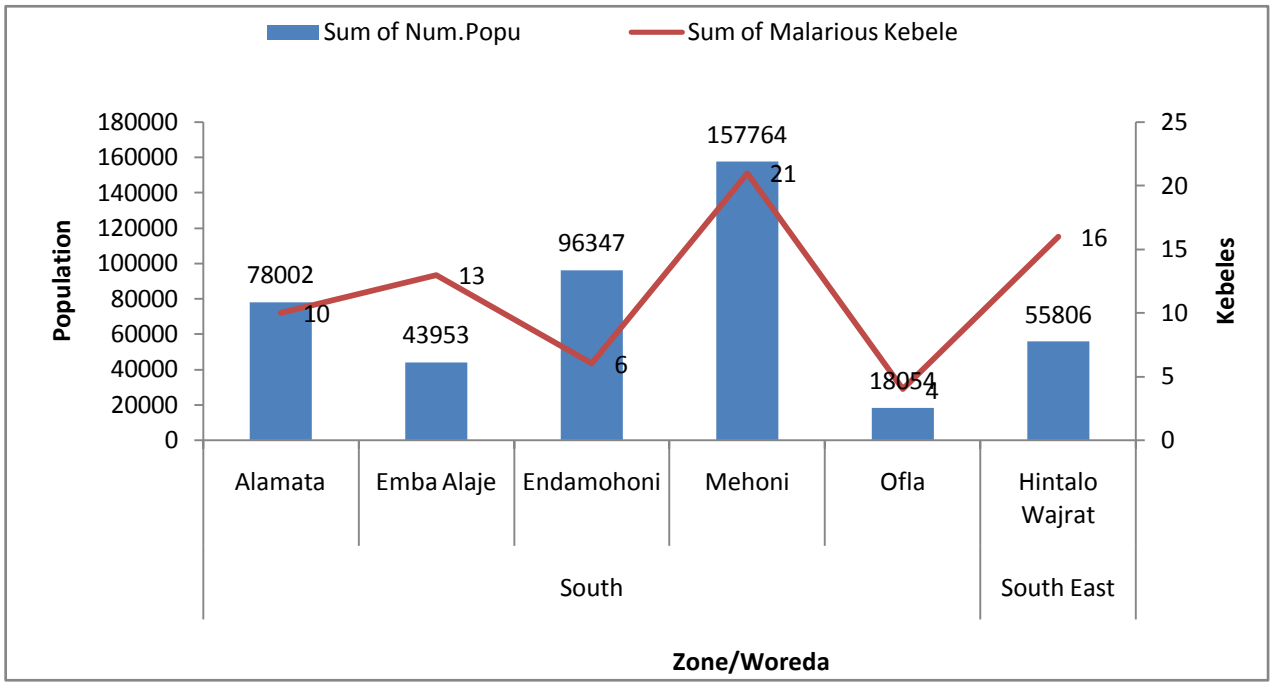

Figure7. 30 Malaria Risk Kebeles and population in South and South East Zone Tigray Ethiopia in Jan. - May 2014, Ethiopia

Meningitis:-Even though there was dry and cold season occurrence which is suitable for the meningitis epidemic in the visited woredas, no meningitis outbreak was reported in the last three years. There were no conducted meningitis vaccinations in the past three years.

AWD:-All visited woreda had achieved above 80 % regarding of latrine coverage except Alamata that achieves 60%. Latrine utilization coverage was above 80 % in all visited woredas. Safe water coverage in general achieves above 60% in all woredas. But there were significant kebeles and communities which were suffering with shortage of water supply, especially in Mehoni/Raya Azebo woredas. Mechare, Hawelti, Ebo etc. Kebeles was used unprotected pond and river water. Even though there were no AWD outbreaks in the last three years in these woredas, they are highly potent for AWD outbreak and water born disease like diarrhea, typhoid fever and skin disease.

Table 7.41 Latrine Coverage and Utilization and Safe Water Coverage of South and South East Zone of Tigray Region, in Jan. - May 2014, Ethiopa

Woreda	Latrine **coverage**	Latrine Utilization	Safe water coverage
Alamata	60	97	75
Emba Alaje	95	88	77
Endamohoni	94	82	75
Hintalo Wajrat	81	93	61
Mehoni	88	89	65
Ofla	97	96	61

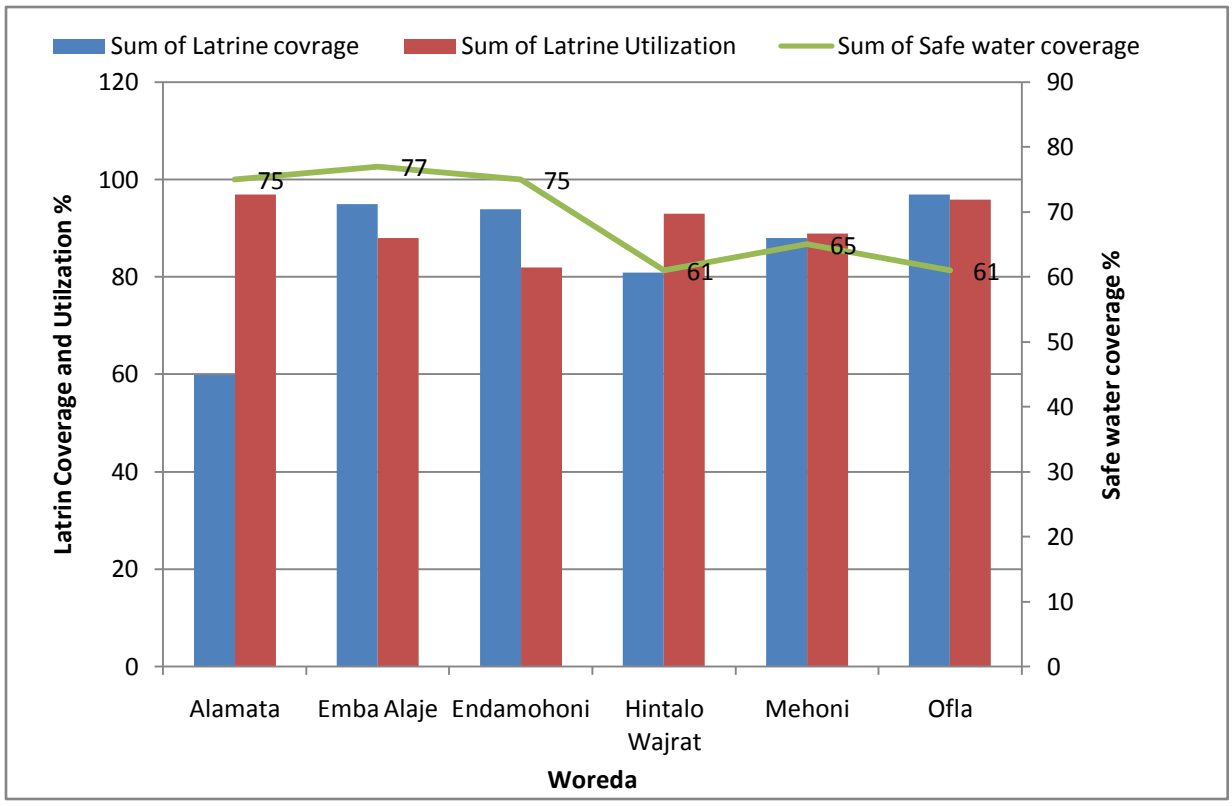

Figure 7.5 Latrine Coverage and Utilization and Safe Water Coverage of South and South East Zone of Tigray Region, in Jan. - May 2014, Ethiopia

The current average water coverage of the region was 73%, but Hintalo Wajrat, Raya Azebo/Mehoni and Ofla were below the average coverage of the region.

Measles:- There were no measles ongoing outbreaks in May 2014. Measles vaccination coverage for less than one year old children was above 85% in all assessed woredas in the period of the belg season. There was no supportive immunization activities campaign in the 2014 belg season.

Woreda	Measles Vaccination Coverage
Alamata	91
Emba Alaje	85
Endamohoni	94
Hintalo Wajrat	85
Mehoni	105
Ofla	96

Table 7.42 Measles Vaccination coverage of six woredas of South and South East Zone of Tigray, (Jan-May 2014), Ethiopia,2014

5) Nutrition

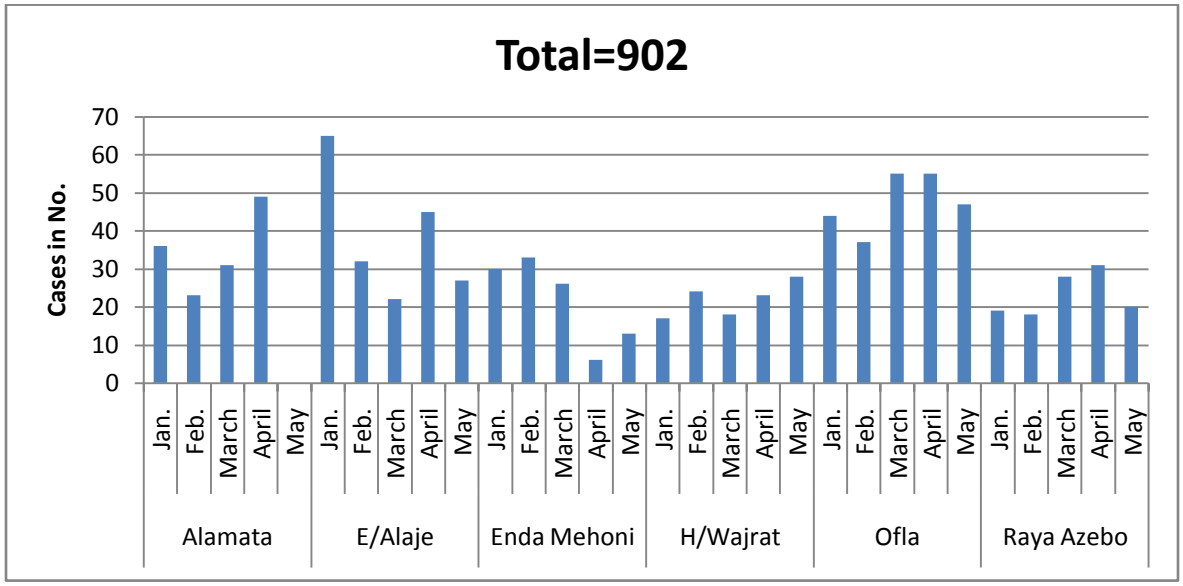

Figure 7.6 Trends of SAM cases in South and South East Zone of Tigray (Jan. - May 2014), Ethiopia 2014

A total of 902 sever acute malnutrition cases were managed in the last five months (Jan. To May 2014) from all visited words.

Table 7.43 Trends of SAM cases by year and woreda in South and South East Zone of Tigray (Jan. - May 2014), Ethiopia 2014

Total SAM cases	**Year**			
	2012	**2013**	**2014**	**Grand Total**
Alamata	157	144	139	440
Emba Alaje	131	147	191	469
Enda Mehoni	158	49	108	315
Hintalo Wajrat	126	149	17	292
Mehoni	190	142	116	448
Ofla	268	264	238	770
Grand Total	**1030**	**895**	**809**	**2734**

Out of the total SAM cases January and April accounts 23.4% and 23.2% respectively, and the list reported month was May, that was 15%. Generals reported SAM cases were declining for the last years. And improvement had been shown in diagnosing and screening of the cases.

Alamata woreda has no F100 and F75 nutritional supplement in their storage and Raya Azebo and Hintalo Wajrat has no F100 supplement.

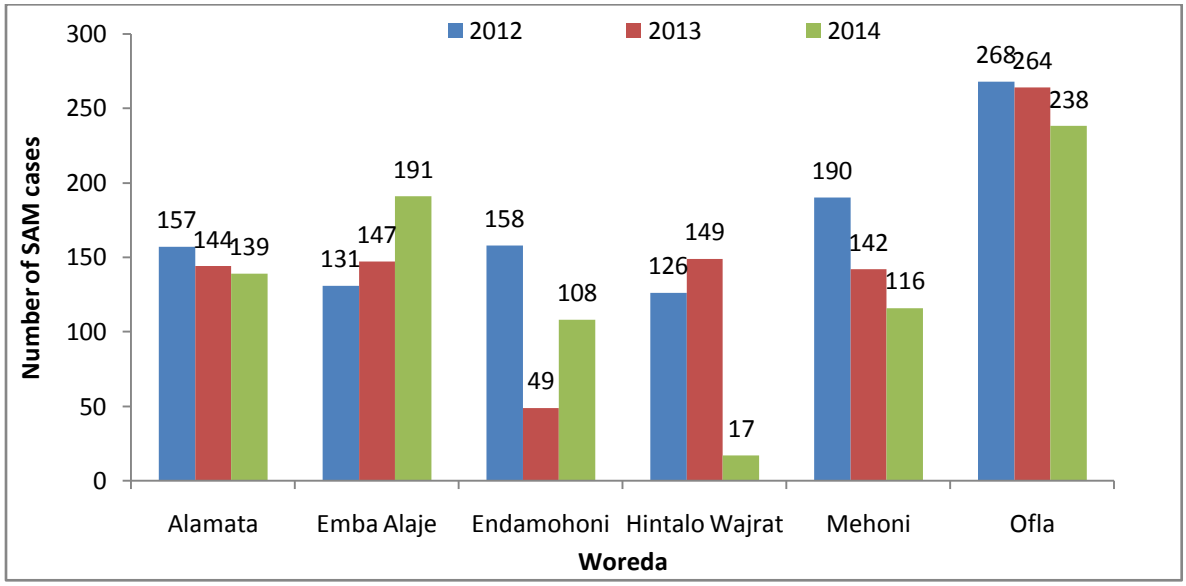

Figure 7.7 The 2012-2013 Trends of SAM in South and South East Zone, in Tigray Region, Ethiopia, 2014

Trends of SAM cases in the last three years show an increment in Emba Alaje throughout the consecutive years and in Enda Mehoni show increment from the previous year. But in the remaining visited woredas reveals decrement from year to year in the last three reporting years consecutively.

WATER, SANITATION and HYGIEN (WaSH)

The major sources of safe water supply in the visited woredas were ground water (Borholes, Shallow wells, Hand dug wells and Springs). However, in the affected kebeles due to recurrent drought aggravated by the poor rainfall of this year's Belg season the existing water supply schemes are either dried up or decreased their water level; this also has an effect on the surface water sources: rivers and streams have decreased their water flow.

During the assessment in Raya-azebo & Hintalo-wajerat woredas about 47,338 people were found to be seriously affected and about 22,172 were at risk of water supply problems mainly due to

drought. In these two woredas there had been recurrent drought for more than 5 years as a result a number of water supply schemes were dried and decrease their yield**.** As a result **community** were forced to use unprotected water sources, and traveling long distances (3-6km) in search of alternative water sources; to fetch water by shifting; served by water trucking. Water borne diseases were common in these areas in which mostly women and children are vulnerable to the situation. Burden on women and girls increased; most of their time is consumed through searching water from long distances because as a culture fetching water is the business of women and children mostly girls.

In addition to these there is a chronic water supply problem in the rest four wordas namely:

- Raya-Alamata (7 kebeles: Laelay-Dayu, Gerjele (gote Adimengesha), Limat (Sifra-amara), Timuga (vitimo & Kbikerensa), Kulgizeselam (Bora).
- Ofla (Dinka, Gualmenqeryious, Guara)
- Alage (Sesat kebele)

Mainly due to poor potential of groundwater (topography, geology) in their surroundings, access problem and spare part problem. Even though this is not considered as emergency related to this belg season the consequence was similar to the areas affected by emergencies. Communities were forced to use unprotected water sources, and traveling long distances (3-6km) in search of alternative water sources.

Out of the 180 schemes found in the 12 affected kebeles in 2 woredas 69 schemes (38%) are non-functional mainly due to drought i.e. many of them are dried and some reduce their yield.

The household latrine coverage of the visited woredas is much better than the water supply coverage. The latrine coverage for each woreda was 97%, 82%, 95%, 82%, 88% & 98.5% for Ofla, H/wajerat, E/Alaje, Raya-Alamata, Raya-Azebo and E/mekoni woredas respectively; and the utilization ranges from 89% in Endamehone to 97% in Ray-Azebo woreda. However, proper latrine utilization and hand washing practices were limited in all the six woredas

Most of the health facilities have a chronic water supply problem. Out of the total 141 health facilities 6 health centers (3 Endamekon, 1 E/Alaje & 2 H/Wajerat) were seriously affected by the water supply problem. Regarding latrine coverage all health facilities in the assessed woredas has a latrine.

Discussion

Among the visited six woredas the current belg season was better in rainfall in Alamata woreda and Ofla woreda. There were interrupted trends of rainfall in both woredas. Endamehone, Raya Azebo, Enba Alaje and Hintalo Wajrat were less than normal. There was no new disease outbreak in theses woredas except measles. Malaria was declining in all months and woredas significantly from the previous years. Malaria shows decrement in all five months consecutively and three to four times less than from 2009 of the same period.

Measles outbreak seems higher than this year compared to the previous year, but child of less than one year age, immunization coverage was greater than 85%, that was 100% in the previous year. There were no SIA in this year, which was an activity of 2013.

Meningitis and AWD were not reported in the last five months. Strong prevention activities and control with continuous surveillance was on the ground in each woredas and health centers by mobilizing the communities.

Safe water coverage was lower than the average coverage of the region (73 %) in three woredas of Raya Azebo, Ofla and Hintalo Wajrat and in these woredas water related diseases like diarrhea (with blood, without blood and dehydration), skin disease and eye disease was the majority of top disease morbidity. The dry belg season aggravates the chronic shortage of water supply in the specified Raya Azebo, and Hintalo Wajrat woreda kebeles. Ofla woreda has non functional water sources, which can able maintain incorporating with the community.

There were about 4 to 5 million fish's deaths in Ofla woreda (Lake Hashenge) in this season. The area was polluted with the death of the fishes. Outbreaks may occur if measures should not take an intervention to clean the area.

Sever acute malnutrition increase in Emba Alaje and Enda Mehoni from the previous year of the belg season. Hintalo Wajrat woreda showed significant decrements from the previous year. The rest woredas showed step wise decrements.

Recommendation

- All woredas should have a budget for PHEM, assumption to be funded during an emergency may lead to delay to react the emergency situation

- An emergency and rapid response should be mandatory to solve shortage of water supply in Raya Azebo specified kebeles as well as Enda Mehoni. The non functional water sources of Ofla woreda need maintenance as soon as possible
- An effective intervention should be taken in decreasing the top ten leading causes of morbidity by improving safe water supply, giving health education and continuous surveillance.
- The woreda rapid response team should strengthen by providing training to able continuous and effective surveillance
- LLITN and the IRS should be available in all malaria endemic areas
- Scaling-up of malaria control interventions, including case diagnosis and treatment, distribution of long-lasting insecticidal nets (LLIN), and indoor residual spraying of households with insecticides (IRS) targeted to malaria endemic woredas and kebeles.
- An active surveillance should be conducted in areas where clinically suspected measles cases occurred
- A supplementary food should be distributed in areas showed an increment of SAM
- Scale up community mobilization activities and active case finding by the DHB and respective woreda sectors
- Fish deaths in Lake Hashenge needs further study and investigation to prevent disease outbreaks through one health way study by cooperation of different sectors, universalities and NGOs.
- Strengthening EPRP/Contingency planning and continuous surveillance should give attention in order to prevent AWD.

Chapter VIII – Protocol/Proposal for Epidemiologic Research Project

8.1 Rapid Assessment about the Ebola Virus Disease (EVD) Awareness in Health Professionals in Ethiopia, 2015.

Excusive Summery

Ebola virus disease is the disease with a high fatality rate and currently lacks proven safety and efficacy treatment or vaccine that makes the anxiety in health professionals and the community. More than 17, 942 suspected or confirmed cases and 6,388 deaths are reported in the West Africa EVD outbreak till December 10, 2014. The average fatality rate is 50%. Multiple weaknesses are observed in the health delivery system in the EVD countries that made difficult to control and prevent the outbreak. Health personnel, including clinical doctors and nurses, epidemiologists and social mobilization experts, are the Frontline deployed to control EVD outbreaks and to diagnose of the disease. The current EVD outbreak is unique from the previous outbreak that indicates any country cannot relax from strengthening readiness and response scheme to prevent the outbreak. Awareness about EVD is the crucial and vital issue for health professionals and the community to prevent and control of the disease. A cross sectional survey assessment will be conducted to assess the awareness of the health professionals in EVD. The purpose of this work is to identify the cracks in health professional awareness in EVD and policy makers should able to take necessary steps to avoid unnecessary anxiety, concern, and excessive reaction that is linked to EVD.

Introduction

Ebola is a viral disease that is one of the Viral hemorrhagic fevers (VHFs) group illnesses that are caused by viruses of diverse families, including Lassa fever, Rift Valley Fever and Marburg viruses [1]. Ebola Virus Diseases (EVD) is a sever, often fatal disease caused by the family of RNA virus called the Filoviridae with a case fatality rate of up to 90% [2-4]. Ebola virus first detected in 1976 in Zaire and Sudan causing simultaneous epidemics of sever hemorrhagic cases (550 human cases) associated with 90 and 50 % of mortality rate in two epidemics respectively [3, 5] [6]. Originating in animals, EVD is spread to humans and among humans through contact with the blood, secretions, organs, or other bodily fluids of those infected [2].

Unlike previous outbreaks in east and central Africa that was controlled in short time fairly swiftly, the current outbreak occurred in West Africa is unique which broke the pattern of previous outbreaks and has become the worst in history [7]. According to WHO EBOLA RESPONSE ROADMAP SITUATION REPORT, the number of suspected or confirmed cases was peaking in 17,942 and 6,388 deaths between March, 2014, and December 10, 2014. The current EVD outbreak in West Africa has persisted and amplified in the last almost one year due to lack of early detected or not suspected which allowed the outbreak to spread to other countries; inadequate medical system; the site of the outbreak bordered three countries and spread to the capital cities rather than rural in previous outbreaks and the physical contact in traditional funerals accelerates the outbreak [7].

An infection in a health care worker might represent transmission from an Ebola patient in a health care facility, but might as well be a signal for transmission to and from health care workers in the community, and for facility-based transmission from patient to patient and from health care workers to patients or to other health care workers that makes to stay in the circle of outbreak [8]. Health personnel, including clinical doctors and nurses, epidemiologists and social mobilization experts, are the Frontline deployed to control EVD outbreaks. Therefore, health workers in the front line are at increased risk for infection for EVD outbreaks [8] and to contract Ebola by coming into contact with the body fluids of infected Ebola patients. Multiple problems and weakness had been faced in the public health delivery system of the 2014 EVD outbreak, including limited awareness, minimal isolation of wards, delayed initial response, poor health professional-population ratio, human resource shortage, logistics constraints like PPE and inability to involve members of the community [9]. A study conducted in Sierra Leone shows that health system gaps, including shortage or absence of trained health care staffs, PPE, safe patient transport and standardized infection prevention control protocols identified [10]. To have the knowledge and practice of use of adequate PPE and clothing while giving care directly or indirectly to EVD cases or deceased, through cleaning, and effective waste disposal, can substantially reduce the risk of infection to health personnel themselves and to other community. Otherwise providing care to EVD suspects without reasonable and adequate infection control process can cause filed to control the outbreak or exacerbation of the

transmission (outbreak) that results extreme anxiety [1]. EVD has a wide and dramatic media coverage that provokes wide national and international interest that issued very aware about the professional fatalities in previous EVD outbreaks [1].

The unaffected countries should not relax by declared as Ebola- free of the two countries, Senegal and Nigeria after claiming of thousands of people including health professionals [9]. New transmission can occur at any time in any country or nation, even if there is a single lapse in the detection of an infectious case, or isolation of symptomatic contact, or a failure in infectious control or burial of disease [9]. The WHO proposed Regional Ebola Emergency Preparedness and Response Plan should adopted countries where no suspect or confirmed cases of Ebola has been detected till now [9]. This plan is a composed of provisions for mobilization of sufficient human resources, implement Ebola response measures; measures to ensure community participation; ascertaining laboratories for work related with diagnosis of Ebola; logistics support; infection prevention and control measures; travel and trade related recommendations; awareness campaigns for the community regarding different preventive measures; establishment of a data collection system; mechanism for surveillance and follow up; establishment of Ebola treatment centers; and guidelines to ensure coordination and crisis management at different levels [9]. This all made the health professionals (doctors, Nurse Staffs, Laboratory personals, etc) are critical to countries' efforts to protect their people from EVD.

Ethiopia establishes the prevention strategies EVD. One of the strategies is making surveillance and screening all imported people in Air Ports and Land Ports. Creation awareness in the population, health education and training are also part of the prevention strategies. The aim of this study is to identify the gaps in health professional awareness in EVD and policy makers should able to take necessary measures to avoid unnecessary anxiety, fear, and excessive reaction that is linked to EVD.

Objective

General Objective:-

To identify EVD awareness of health professionals in the country

Specific Objective:-

- To gauge health professional perception of the capabilities of health facilities in managing cases of Ebola
- To strengthen EVD prevention and preparedness in the country
- To assess the confidence of health professionals on the ability of the Ministry of Health, Health Facilities and its authorities in prevention and preparedness EVD.
- To recommend necessary measures to full fill the gaps in EVD awareness in health professionals

Methodology and Materials

Study area

The study will conduct in Ethiopia, where health professionals working places, including hospitals, Health Centers and Clinics as well as other health related organizations and sectors. Ethiopia is located in East Africa. The capital city of Ethiopia is Addis Ababa that is also the AU center. In that location are nine administrative regions and two administrative towns. The health service in Ethiopia is structured in three tiers, with service delivery at primary, secondary and third level. Primary level is the most peripheral and basic facility staffed by two female health extension workers.

Study Design

Cross sectional design will be conducted to assess the EVD awareness in health professionals in nine regions and two administrative towns. Health professionals (medical doctors, nurses, laboratory personals and other supportive staffs) whose work in governmental, private and NGO health facilities will interview used the structured self administrative questionnaire for distribution, risk factors, cause, mode of transmission and prevention and preparedness of EVD. The Federal Ministry of Health and WHO will participate in the study, which are the main

responsibility to protect EVD. The study will conduct within five months since the EVD is seriously affected Africa, which makes the possible to spread to the country.

Study Population

The study population will be health professionals working in governmental and private health facilities as well as health related sectors and systems. For professionals whose work out of health facilities will exclude from the study due to the professional detail questions may be included in the questionnaire.

Sample Size

Epi info sample size determination formula for population study is utilized to set the sample size. Evidence for sample size calculation was used the US unpublished study.

Sampling Procedures

A multi-stage cluster sampling design with primary sampling units (PSUs) selected with probability relative to their size using stratified random sampling method will be used to hold the national wide study in the convenient (health professional) study population which may include hospitals, health centers as well as health posts. Regions and zones, those who have land ports and international air ports may consider as priority candidates for the study. All governmental and private hospitals and governmental health centers and health posts will be the target studies. Proportional numbers of health professionals will take from the selected health facilities.

Data Collection Procedures (Instrument, personnel, Data Quality control)

We will accept two cases of data collecting processes. The foremost one is collecting data through applying the health association through email and the second type through data collectors that is the health professionals who can't address through their affiliation and email. Health professionals who are in health facilities will interview randomly in structures self

questionnaire. Training will give to supervisors and data collectors. The training will focus on the importance and methods of filling and collecting the data as well as clear image of the variables.

Operational Definition

Health professional: - Health professional is an individual who provide preventive, curative, promotional or rehabilitation health care services in a systemic way to people or communities.

EVD: - a disease of humans and primates caused by Ebola viruses that causes an acute, serious illness which is often fatal if untreated.

Awareness: - the state or ability to perceive, to feel, or to be conscious of events, objects, thoughts, emotions, or sensory patterns.

Infection control: - a discipline aim to insure the prevention of who might have be vulnerable to acquiring an infection with the general community and while receiving care due to health problems, in a range of settings.

Management: - the function that coordinates the efforts of people to accomplish goals and objectives using available resources efficiently and effectively.

Data Processing and Analyzing

Data will enter, clean and analyzing using Epi info version 7.3.3.1 and Microsoft Excel program. Frequency tabulation will be identified, and then compared with each other.

Ethical Consideration

Permit will be obtained from EPHI/FMOH before interviewed of the participants. Addis Ababa University (AAU), Medical Faculty Institutional Review Board (IRB-MF) will provide ethical clearance and approval for the study. Written and oral consent will be explained to the study participants.

Dissemination of results

After completion of the study the document will submit to AAU, School of Public Health and EPHI/FMOH. The finding of the study will present to the school community, EPHI/FMOH and responsible sectors and organizations. The report will disseminate to journals for publication.

Reference

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Work Plan

Phase	**Activities**	**May 2015**			**July 2015**				**August 2015**				**Sept. 2015**	**October 2015**			
		Wk	Wk	Wk	Wk	Wk	Wk	Wk	Wk	Wk	Wk	Wk		Wk	Wk	Wk	Wk

		1-2	3	4	1	2	3	4	1	2	3	4		1	2	3	4
Phase I	**Proposal Writing**																
	Draft preparation and Revision																
	Finalizing the Proposal																
	Ethical Clearance																
	preparing Data Collection Instruments																
	Supplies and assessment materials																
	Data Collectors																
	Recruiting Data collectors																
	Training																
	Pretesting data collectors tool																

	Selecting individuals																
	Prepare interview tips																
Phase II	**Conduct the Assessment**																
Phase III	**Data Analysis**																
Phase IV	**Writing Report**																
	Preliminary report writing																
	Submission of the preliminary repot																
	Writing the final report																
	Present & disseminate																

Cost of the Project

Item/Activity		Number/quantity	Rate /Day	Duration Work Day	Total

A. Personnel Cost					Birr	Cent
1. Training						
Supervisors		11	400	2	880	
Data Collectors		50	400	2	40,000	
Breakfast/Tea/coffee		71	50	2	7,100	
2. . Data Collectors						
Data Collectors		50	400	10	200,000	
Supervisors		11	500	10	55,000	
Investigator		1	500	500X130	65,000	
B. Equipment and supplies						
Paper	Desta	10		10X200	2000	
Photo Copy		2000X1.50			3000	
Printing the proposal		20X2.5			50	
Printing the Draft		200X2.5			500	
Printing the final		200X2.5			500	
Pencil		200X3			600	
Pen		200X5			1000	
Markers	pack	2X50			100	
Clip Board		1			500	
Chart Paper		4X500			2000	
Eraser		100X2			200	
Sharpener		100X5			500	
Note book		100X20			2000	
Mobile card		100X100			10,000	
Soft Paper		100X10			1000	
Soaps		100X10			1000	
GPS		11X500			5,500	
Cars		15X2500X10			375,000	

Tag, Badge for data collectors	20X71			1420	
Total				774,850	

8.2 Malaria Transmission and Associated Factors in Huge Agricultural Investment Areas of Kafta Humera District of Western Tigray, Ethiopia During Sesame Harvesting Period, 2015

Background

Malaria is a vector born disease caused by protozoan parasites (Plasmodium falciparum, P. vivax, P. malariae, P. ovale, or P. knowlesi) that affects humans [1, 2]. Of these P.falciparum and P.vivax are the most important. Malaria due to P.falciparum is the most deadly form that predominates in Africa. P. vivax has a wider distribution than P. falciparum because it is able to develop in the Anopheles mosquito vector at lower temperatures, and to survive at higher altitudes and in cooler climates [3]. Malaria completes the complex cycle of development in an alternating way between human hosts and Anopheles mosquitoes. Malaria is one of the important diseases prioritized to eliminate by WHO by 2015 [4]. Rather than the 100 million peoples who are at risk for malaria outbreak, the global malaria cases, accounts 207 million, 80% occur in Sub-Saharan Africa, and 627,000 deaths, 90% from Sub-Saharan Africa, that occurs among the one third of the population whose are living in a malaria risk area [3, 5, 6].

Malaria is significantly decreasing over time in Sub-Saharan Africa that overloads significantly with an approximate 90 % of the global malaria disease [2]. Even though the situation is fragile, it is an encouraging that the status report of reducing malaria deaths [2]. The global malaria cases decrease from 222 million to 207 million between 2009 and 2012, whereas the estimated deaths in during the same period were decreased from 691,000 to the 627,000 respectively, which was 91% from Africa and 86% were among the children of under five year age [1, 4, 5]. The pace of decrease in estimated malaria mortality rates accelerated from 2005, but slowed between 2011 and 2012 [3].

Almost 110 million of Africa people live in areas at high risk for seasonal malaria outbreak brought by spatial and temporal alterations, changes in the environment caused in great function made by regional climate changes [7, 8]. The approximate Ethiopian population living in a malaria risk area was about 68% (two-third) of the entire 94 million people of the country [6, 8, 9]. Malaria was the leading cause of outpatient visits in Ethiopia in 2010/2011. Approximately 75% of the geographic regions of the country have significant malaria transmission risk. Among the leading communicable disease in Ethiopia, malaria accounts for about 30% of the overall Disability Adjusted Life Years lost [10].

Western Tigray including Kafta Humera is located in high risk malarious areas. Malaria is the major problem in the woreda. Malaria in the area is considered endemic and seasonal, which means that a majority of the transmission occurs during September to November, when continued rainfalls support the breeding of the anopheles mosquito larvae. The woreda consists abundant fertile farm lands that attract investors. Large mechanized agricultural activities including investors and the local farmers is increasing in large extended areas to produce high value crops such as sesame, cotton, sorghum, wheat, barley, teff, linseed, noug, vegetables and other horticultural crops. Crop production exclusively depends on the current (June to September) rainfall. Sesame production is labor intensive, especially during the weeding and harvesting period of September to October. It attracts an average of 500,000 to 600,000 workers from the highlands of Tigray and northern Amhara, and also from Sudan each year. The influx of migrant workers creates concern about the public health of the major risk factors for malaria. The interaction of agriculture activity and malaria is well studied and documented[11] but the primary consideration on this topic that the risk factors of malaria

transmission for people living around huge agricultural investment areas during harvesting sesame needs further study. Majority of the collection of the agricultural production activities is during the night due to the environmental high temperature and to protect the loss of sesame product. Therefore, this survey tried to assess the risk factors of malaria transmission for people living around huge agricultural investment areas during harvesting sesame in a rural district of Kafta Humera and to prepare recommendations for consideration during future formulation of specific malaria prevention policy.

Objective

General Objective:-

To determine the magnitude, severity and associated factors for malaria transmission during harvesting time in Kafta Humera

Specific Objectives:-

1. To describe malaria transmission among population deployed in agricultural investment during harvesting time
2. To determine the associated factors for malaria transmission during harvesting agricultural products

Methods and Materials

Study Area

The study will conduct in the Kafta Humera woreda of the western Tigray Zone, Ethiopia, that is located 1000 km of North West of Addis Ababa. Kafta Humera borders Eritrea to the north, Sudan to the west, Amhara region of south, and Tselemti, Asegede Tsimbla and Tahtay Adiabo woredas in the east. The administrative town of the woreda is Setit Humera Town. Kafta Humera is predominately laid in a lowland attitude (kola) with topography of wide open plains covered in bush scrub and acacia trees. It is plotted in 6,643 $Km^{2.}$ The district has a total

population of 122, 268. It is divided in to 21 administrative kebeles and 81 villages. Health facilities in Kafta humera include only nine health centers and 13 health posts which are all governmental. The environmental temperature falls to between 25 and 35 degree Celsius during the moderate months from June to February and rise to an average 42 degrees Celsius between April and June. The average rainfall is 460 – 650 mm per year, mainly in kiremt (June to September). The population is sparsely spread. Most of the people live in rural areas who are engaged in farming activities. According to the regional report to the national PHEM the average annual incidence of malaria in the western zone in 2010 to 2013 was 20.5%. Kafta humera district is selected because of an access of large agricultural investment attracted for influx of farming workers during the harvesting season. During the harvesting time, the farmers and the worker influx from other parts of the country stay in a temporary huts and working in the movement over the night till sesame production is finalized (last of September). It is estimated that malaria transmission is intense in the farming areas and the temporary huts are poorly constructed to protect mosquito vectors. Annual ITN distributes to the community residences and environmental vector control management is primary activities to protect malaria by the halls. Indoor residual spraying has not been adopted in the western zone.

Study population

The study population compromised of the selected villages, growing areas and individuals acted upon in the malaria risk areas (farming areas) and professionals worked in health, environment, agriculture and NGOs. All households of the selected villages and influx farming workers will include in the study survey. Purposefully interview will conduct among health professionals operating in health and health

related activities in the work and agricultural countries and other sectors whose activates and polices can impact on malaria control..

Inclusion and exclusion criteria

Farmers and workers living in the agricultural area, health professionals working in district and health facilities will include in the study. Investors, agricultural workers or professionals those who are not staying in the farm lands during night or living outside the woreda will exclude from the study.

Sample Size and Sampling Technique

The sample size for this study is estimated using the formula for estimating single proportion at 95% confidence interval (CI), level (Z (1-ά/2) = 1.96), an expected prevalence of 20% calculated from the previous four years malaria surveillance analysis in Western Zone, 2.0% margin of error, and 5% level of significance. A sample of 561 individuals is estimated as the minimum number required for malaria prevalence in the district.

$$n = DEFF \times 1.96^2 \times (P)(1-P)/ d^2$$

Where

n= total sample size

DEFF = Design effect, 1.96 = Z value for p = 0.05 or 95% confidence limits, P = Estimated prevalence, d = Desired precision (for example, 0.05 for ± 5%)

The Total sample size could be 540.

Study Procedure

Participant selection will select through two stage cluster probability sample stratified by the size of farming games. The first stage cluster will be the kebeles and the second cluster will be the farming sites. Focus Group Discussion (FGD), Semi-structured interview and observation methods will conduct in order to strengthen the study and effective results. Open and closed questionnaire will prepare targeted on general knowledge of malaria, mosquito ecology, malaria epidemiology and socioeconomic determinants of malaria, knowledge of malaria vector control and their opinion, and ranking of the various methods of prevention of malaria.

Study Design

Community based cross sectional study will conduct in Kafta Humera during harvesting of Sesame (September to October).

Data analysis and management

Data will collect based on respondents' demographic and socioeconomic characteristics, cause, signs and symptoms of malaria and malaria prevention methods. The FGD data will record in audio – tapes and transcribe from audio-tapes will be subjected to content analysis based on responses category. A data quality check will be conducted both on spots and after entering to computer. The questionnaire will sort, cleaned, coded manually and entered into a computer. The data will analyze using EPI-Info statistical software and Microsoft Excel. Semi structure questionnaire, both open and closed, develop in English will modify to local condition. The questionnaire will translate and print to the local language, Tigrigna and Amharic. Pre-test will conduct to validate the pre-coded answers. Data collectors and supervisors will be trained on the tool.

Operational Definitions

Confirmed malaria case: A suspected case confirmed by microscope or RDT for Plasmodium parasite

Malaria suspected case: - A person with a fever or fever with headache, chills, rigor, back pain, sweats, myalgia, nausea and vomiting diagnosed clinically as malaria

Malaria outbreaks: - Crossing the norm line OR doubling the number of malaria cases compared to the prior year of reported WHO epidemic week

Clinically and confirmed case: - malaria suspected cases plus confirmed malaria cases

Controls: any person who doesn't have signs and symptoms of malaria or no history of malaria in the previous three weeks.

Variables:

Independent variables: Socio demographic characteristics such as sex, age, occupation, educational status, incidence of anti-malarial spraying in the past 12 months, use of mosquito nets and total number of nets, using of repellents, frequent of chemical spraying, presence of mosquito breeding sites, working time, and knowledge of malaria prevention methods.

Dependent Variables: The response variable is binary whether the malaria illness or wellness during the stay in the study area and malaria prevention (practices used to prevent during the stayed at the area)

Data Quality:

As indicated in the annex the questionnaire is prepared in English, but will be translated in to Amharic and partially to Tigrigna in order to search reliable information. Both Amharic and Tigrigna languages are important since majority of the workers are from the two regions. Training to data collectors and supervisors will be given in addition to providing data collecting guideline and conducting pre-test of questionnaire. The principal investigator will review the completeness of questionnaires at every day of the field work.

Ethical consideration:-

Ethical permission will assured from AAU, school of public health. All the study instruments will contain an informed consent note related to the voluntary nature of the study and the steps taken to ensure the confidentiality of responses. Informed consent will obtain at community level in order to brief about the

nature and the objective of the of the study and potential benefit associated with it, and to assure the information collected from them will not use against their interest.. Individual informed consent will obtain from interviewees and FGD discussants. Confidentiality of information will maintained throughout the study period.

Result Dissemination

At the end of the study the result will disseminate to the district, zone and regional administrative and respected sectors as well as to FMOH. It may also share to the media in order to able to transmit widely to communities about the important findings, AFENET and TEPHINET may also the back bones for the publication and inviting to the scientific conferences.

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Work Plan

Phase	Activities	May 2015			September 2015				October 2015			November 2015				December 2015				
		Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk1	Wk2	Wk3	Wk4	Wk1	Wk2	Wk3	Wk4	Wk 1	Wk 2	Wk 3	Wk 4
Phase I	**Proposal Writing**																			
	Draft preparation and Revision																			
	Finalizing the Proposal																			
	Ethical Clearance																			
	Preparing Data Collection Instruments																			
	Supplies and assessment materials																			
	Data Collectors																			
	Recruiting Data collectors																			
	Training																			
	Pretesting data collectors tool																			
	Selecting enumerates																			
Phase II	**Conduct field Assessment**																			

Phase III	**Data Analysis**																		
Phase IV	**Writing Report**																		
	Preliminary report writing																		
	Submission of the preliminary repot																		
	Writing the final report																		
	Present & disseminate																		

Budget Break Down

Item/Activity		Number/quantity	Rate /Day	Duration Work Day	Total	
					Birr	Cent
A. Personnel Cost						
1. Training						
Supervisors		1	400	1	400	
Data Collectors		5	300	1	1,500	
Breakfast/Tea/coffee		15	50	1	750	
Sub total					2,650	
2. . Data Collectors						
Data Collectors		5	300	20	3,000	
Supervisors		1	400	20	8,000	
Principal Investigator		1	500	40	20,000	
Sub total					31,000	
B. Equipment and supplies						
Paper	Pack	10		10X200	2000	
Photo Copy	Page	200X1.50			300	
Printing the proposal page		20X2.5			50	
Printing the Draft	Page	60X2.5			150	
Printing the final	Page	120X2.5			300	
Pencil	Each	10X3			30	
Pen	Each	10X5			50	
Markers	Pack	2X50			100	
Clip Board	Each	1			500	
Chart Paper	Pad	4X500			2000	
Eraser	Each	10X2			20	

Sharpener	Each	10X5			50	
Note book	Each	10X20			200	
Mobile card	Each	100X20			2,000	
Soft Paper	Each	10X10			100	
Soaps	Each	10X10			100	
GPS	Each	2X500			1,000	
Cars	Each	1	2500	20	50,000	
Contingents	10%				9,000	
Tag, Badge for data collectors		7X71			491	
Sub Total					68,441	
Grand Total					102,091	

Chapter IX- Other Additional Output Reports

9.1 Ebola Virus Disease (EVD) Screening and Preparedness Report in Pagak Land Port Gambella, ETHIOPIA, 2014

Introduction

Ebola Virus Diseases (EVD) is a sever, often fatal disease caused by the family of RNA virus called the Filoviridae with a case fatality rate of up to 90% [1-3]. Ebola virus first detected in 1976 in Zaire and Sudan causing simultaneous epidemics of sever hemorrhagic cases (550 human cases) associated with 90 and 50 % of mortality rate in two epidemics respectively [2, 4] [5]. Originating in animals, EVD is spread to humans and among humans through contact with the blood, secretions, organs, or other bodily fluids of those infected [1].

Ebola is found in several African countries. Since 1976, Ebola outbreaks have occurred in countries of Democratic Republic of the Congo (DRC), Gabon, South Sudan, Ivory Coast, Uganda, Republic of the Congo (ROC), South Africa (imported), Guinea, Liberia, Sierra Leone, Senegal and Nigeria [2] [6].

The EVD circulating in West African countries and DR Congo unique from the previous outbreaks due to the factors (1) it is the first EVD outbreak to occur outside of East and Central Africa, (2) cases are spreading across borders simultaneously, (3) people are contracting the virus in urban areas, and (4) it has infected and killed more people than any other single EVD outbreak [1]. The disease is spreading quickly, however, because the health systems in the affected countries are ill-equipped to implement requisite containment and disease surveillance measures [3].

The IHR requires countries to develop national preparedness capacities, including the duty to report internationally significant events, conduct surveillance, and exercise public health powers, while balancing human rights and international trade [1]. Any case compatible with Ebola virus infection or an unusual event associated with an Ebola virus infection should be reported through the channels established under the International Health Regulations (IHR) [3]. Surveillance and screening in ports are vital strategies to identify the imported Ebola cases

and to prevent the country from the fatal disease. Ethiopia establishes the prevention strategies EVD. One of the strategies is making surveillance and screening all imported people in Air Ports and Land Ports. The aim of this paper is to report the preparedness and screening of the Pagak EVD Screening Team Gambela Regional State, Lare Woreda of Pagak Land Port.

Objective:

General objective

- To prevent the spread of Ebola virus disease (EVD) in Ethiopia by early detection and
- Isolation of persons entering Ethiopia who are at risk of having EVD at major land ports of entry.

Specific Objective

1. Formulation of Ebola(EVD) surveillance and preparedness committee with all stakeholders
2. Initiate and conduct EVD screening
3. Awareness development on EVD among Health professionals and community
4. Assess the preparedness and response plan of Ebola disease in this region
5. Regular follow up on Ebola screening and action taken
6. Final report with the way forward

Methods and Materials

Gambella region is one of the nine regions and two administrative cities of Ethiopia. It is located in the western part of Ethiopia. It is about 776 kilometer from Addis Ababa. Administratively there are three zones, (Agnua-zone, Neur-zone and Majaing-zone), 12-woredas, one special woreda and one administrative town.. In the region there are two known and three temporary land-port entries. Lare district is found in Neur zone of Gambella region, which is 75 kilometer from the Gambella region. The woreda has a population of 44,465. Administratively there are 26 rural Kebeles, and 02 urban Kebeles. Regarding to health facility distribution in the district, there are 2-health centers, 10-health posts, 3-private clinics, and 1-rural drug vender. There are 75 health extension workers in the district. Pagak land-port entry site is found in Lare

woreda,17-Kilometer far away from the center of the woreda. It is served for refugee registration and reception camp. The security forces are controlling the land-port entry site of Pagak. It is 867 kilometer from Addis Ababa.

Ebola surveillance teams have got a highlight orientation from Ethiopia Public Health institution (EPHI) prior to start journey in Addis Ababa. We planned to start a journey on 27 August 2014. We travelled a total of two days journey from Addis Ababa to Jimma and Jimma to Gambella. Immediately arriving at Gambella region, we communicated with Gambella RHB PHEM core processes owner. Introduction and briefings have given by regional PHEM core process owner. The teams have identified the local partners in Gambella region in collaboration with regional health bureau and meeting has conducted to identify known Land Ports entry sites in Gambella region. Ebola task force committee has established on time to facilitate Ebola prevention and control at regional level. Action plan has designed by the team members. Resources have mapped with partners. Health professionals from nearby Land Port entry site health facilities, health professionals from each health facility, a total of 14 have trained on Ebola surveillance and screening by RHB. Visiting to Land Port entry sites has conducted by surveillance team in collaboration with partners. Briefings and introduction have conducted at woreda level. Woreda task force committee has established and sensitized at the same time. Selection of screening and isolation sites has conducted. Construction of screening and isolation shelters took about a week. Until to start of construction of screening shelter, we discussed with local security forces to start screening in security force shelter and we used the security force shelter as temporarily and later we built the screening shelter and we continued screening. While local health professionals are screening, we were giving health education for local communities. At the end debriefings has given for woreda health office and regional health bureau. Handover of the Pagak Land Port entry site for the coming EFETP resident team has held on.

Non contact method of screening and measuring body temperature using sublingual thermometer, laboratory conformation for differential diagnosis in MSF clinic,

All people crossed to Ethiopia through the Pagak Land-Port were screened for EVD according to the Screening Algorithm guideline.

1. Observation of any person looks sick
2. Ask anyone who has fever
3. History of travel to affected countries in the last three weeks (Nigeria, Liberia, S.Leon, Guinea and DR Congo)

- If one of the above is positive
    - Measuring temperature using sublingual thermo meter, and the temperature is above 38^{o}C, we fill the administrative questionnaire and took the case to MSF clinic for final diagnosis
    - If there is travel history or contact with a person from affected countries fill administrative questionnaire
    - Assessment of level of risk and public health action
- Information about mass death of people and mass death of primates were trying to collect from imported people.

Preparing an action plan

Oral and written plan was prepared from the beginning of the mission. The plan was based on the following main issues. (see annex 1)

a. Travel plan
b. Training and health education
c. Initiation of Screening
d. Identifying and establishing of Screening and Isolation Center

Initiate and conduct EVD screening

Formulation of Ebola (EVD) surveillance and preparedness committee with all stakeholders

EVD Task force and Technical Committee was established in the region while we arrived in the region, then we established EVD technical committee in the woreda that includes

the woreda resource as a head, the woreda health officer as secretary, and the woreda educational head as a member and from secretary as a member. The mandate of the technical committee was finding resources; follow up the health education and screening activities in the woreda and in the Pagagk.

Initiate screening

Preparation for screening

i. Visiting the screening area was conducted by the national EVD screening team and WHO and selecting of the screening center and isolation center was conducted
ii. Discussing for screening with the responsible authorities, especially security to use the shelter that they use for check point. The security found in the place where from the Federal Police and they permitted us to use the checkpoint temporarily for screening.
iii. Communicating with different sectors, woreda administrative, woreda health office, NGOs

It was a big opportunity to conduct meeting by the Regional PHEM including the EVD team and the following organization and sectors

- The regional bureau health sectors
- WHO
- UNHCR
- UNICEF
- ARRA Adninistrative for Refugees
- MSF
- IOM
- ACF 9 Action Center Fair)
- OXFAM
- HAPCO
- EPHI EVOLA screening team

In this meeting the following information was shared by the regional PHEM

- Establishing of EBOLA Preventive Task Force
- Sensitization of the outbreak to leaders
- Isolation site was selected and prepared around Gambela Town

- One team was sent to oversee conditions in one entry site (PAGAK)
- The PPE materials at hand was only two goggle, 200 pair gloves and 50 face masks
- Action plan: - training, visiting Land Ports, finding resources

The EVD Screening Team was able to take part in Joint Multi-Sector weekly meeting, which were the articulation of different sectors including WHO, MSF, RHB, UNCR, UNICEF, ARRA, WASH, ACE and OXFAM.

Conducting Screening

Pagak Land Port Screening was official opened on September 5, 2014 with the presenting of the security officials, the screening team, and the local community with limited materials but full commitment and enterprise. The team was equipped with one eye goggle, one auxiliary thermo meter, facial mask and 50 pair of surgical gloves. There were four local screeners trained by the region, who took practical training on the site.

Figure 9.1.1. EVD Screening in Security Check point, Pagag/ Gambela Regional State, Ethiopia, Sept. 2014

The team was equipped with one goggle, 50 pair of surgical gloves, one auxiliary thermo meter, 25 masks and four gowns for the local screeners. The screening was initiated with the possibility of risks to acquire the disease. But there was no other alternative rather than to start as early as possible then the remaining PPE, screening center and isolation center may full fill in a process. Plastic chairs and table was temporarily allowed from OXFAM.

Practical on job training was conducted to the four local screeners. The local trained screeners were also important in solving the language gap. They also serve to the team as translators. Daily allowance to the local screeners was allowed to pay by the regional PHEM discussing with UNICEF.

Constructing of the screening center

To tone up and maintain the screening it was mandatory to have screening shelter. The team designs the 6X4m room to help for the precaution of the disease. It was projected to construct by the local resources. The team decides to use the materials (wood and plastic) from the previous shelters destroyed by flood. The screening center has two rooms of 3 X 4 M. That is one room for the health professionals and the other one for screening people that is also divided into two, to have one meter of distance between the screener and the screened people. It was constructed with limited resources and man power with the total price of 800 birr that was refund at the last by Gambela RHB.

Figure 9.1.2 EVD Screening Center Constructed by the Team, Pagak Land Port, Gambela/Ethiopia, Sept. 2014.

Continuing and maintaining Screening

Even though challenges like lack of PPE materials, hand washing materials and transport were faced to the team the screening was continued with the support of some organizations. UNICEF was supported transport for the local screeners and provides five box boxes (100 pair pieces each) of disposable gloves.

Isolation center and quarantine center are also identified, which may need simple repairing to cover plastics and make portioning. The isolation center is around the MSF clinic, which may also have the advantage to follow for the identified cases by the MSF stuffs. The quarantine center is around the screening site.

There were a total of 4145 people screened in the site. Out of these screened people there were nine sick looking cases but two of them were febrile. The febrile cases were confirmed as malaria in the MSF clinic.

Table 9.1.44Pagak Land Port total number Screened for Ebola Virus from Sept. 5 to Sept. 30, Ethiopia, 2014

Total Screened	Cases	Febrile cases	Confirmed dx

4145	9	2	Malaria

Proposal preparation

Pagagk was the refugee center for registration and screening of EVD. Establishing screening by itself was not only important, but establishing isolation center and quarantine center was important as well. If suspected cases were identified, it is mandatory to confirm the diagnosis. Until confirmation isolation of the suspected case is mandatory in EVD. The people who come with the suspected case needs to stay in quarantine center. Even though the coordination of these activities was the mandate of regional PHEM, we prepare the following proposal to construct

a. Screening center
b. Isolation center
c. Quarantine center

Quarantine center and Isolation center was identified, which can need simple maintenance of covering plastics, establishing simple fences and portioning.

Searching new Land Port, Jekawo

It was important to see other entry areas during our stay in Pagak. We try to collect information from the woreda officials and the community. We find another Land Port called Jekawo that was the entry site of migrants from South Sudan. About 60 – 120 (two to three Bus) population enters per day through it. It is located in the Eastern part of Lare Woreda that is 17 Km far away from Lare and 92 Km from Gambela town. People crossed Baro River by traditional boats (see photos).There were no security or shelter at the site.

Figure 9.1.3 Jekawo Port Land in Lare Woreda of Gambela Regional State, Ethiopia, 2014

Health Education and awareness

We planned with the woreda to give health education and training to all health professionals and to the woreda people. Sensitization for the community was conducted successfully using the opportunity of celebration of cultural Yegnwak traditional religious holiday. It was conducted in two sites based on their culture and praying with them. The traditional leaders permitted us to give the health education about Ebola. At the last they made prey for their God to prevent the disease. (See site one and two figures)

Table 9.1.45 EVD Health Education in Lare Woreda, Gambela Regional State, Ethiopia, September 2014

No,	Participants	No. of Participants		Total
		M	F	
1	Defense unit	31	0	31
2	Federal Security Unit	18	0	18
3	OXFAM staff	5	20	25
4	Security (Federal police) in Pagak	26	0	26
5	Lare town community	1434	1066	2500

6	Lare woreda community			2300
7	Woreda Finance staff	25	1	26
8	Refuge staffs workers	20	31	51
9	Federal Police	86	6	92
	Total			5069

Figure 9.1.4 Figure 1 Ebola Health Education in Yegnwak Religious Cultural Holiday in Lare Woreda, Gambella Regional State, Ethiopia, 2014 (Site 1)

B.

C. Figure 9.1.5 Ebola Health Education in Yegnwak Religious Cultural Holiday in Lare Woreda, Gambella Regional State, Ethiopia, 2014 (Site 2)

True Cross celebration was the other opportunity to give health education in Lare town. Health education in the True Cross celebration was conducted after permitted to the Religious leaders and Security sectors. There were many people not only the Christian but also other peoples whose watch the celebration. The religious leaders make preying about the disease too.

Figure 9.1.6 Health Education about EVD in True Cross Religious Holiday in Lare Woreda, and to Federal Police in Gambela Regional State, Ethiopia, Sept. 2014

Training

Training was conducted in Lare Woreda to the woreda health center professionals, concern worldwide

Table 9.1.46 EVD Training in Lare Woreda of Gambela Regional State, Ethiopia, September 2014

No.	Participants	No. of Participants		Total
		M	F	
1	MSF	9	2	11
2	Lare HC professionals	12	11	23
3	Concern worldwide stuff	6	3	9
4	Defense Health professional	9	0	9
	Total	36	16	52

stuffs and in Pagak refugee center to MSF staffs as well as in Gambela town for Defense HC professionals. Training to Concern Worldwide stuffs was important. Because they have the probability to meet the HEW in the woreda and can give wide health education to the woreda people.

Figure 9.1.7 EVD Training to Concern Worldwide Stuffs in their compound in Lare Woreda and to Defense HC Stuffs in Gambela Regional State Ethiopia, Sept. 2014

D. Take Handover of the Ebola Screening to Lare Woreda and to the new group.

In Lare Woreda there are four clinical nurses who trained about Ebola by the Regional PHEM. We gave them additional screening practice and identifying suspected case. We also show them how to fill formats and the method of verifying febrile case by linking with MSF clinic. Reporting system was also able to link with Woreda PHEM and also with hotline number 8335.

Figure 9.1.8 Screening of Ebola in Pagak Land Port, Gambela Regional State by Professional trained Health Professional, Ethiopia, Sept. 2014

Transport to the local screeners was arranged to use UNICEF vehicle coordinated with vaccination team. We discuss about the total screening work on the site and show the sites as well as introducing to the local administrative and woreda health office workers with the new EVD screening team. Written documents, materials and address contacts were shared with the new group. At the last dinner program was prepared by the two groups and also invited the Gambela Regional PHEM officer.

Table 9.1.47 The Gambela EVD Screening Teams with Gambela PHEM Head, Ethiopia, 2014

Challenges

a. Transportation for the team and the local screeners was a challenge for the team to work flexibly and the use time properly as willing as the team. The rental driver was not voluntary to have accommodation in Lare town. At the last he terminated the mission because of "social problem".
b. Lack of initiative in local health officials to coordinate and to work cooperatively in health education and training.
c. Lack of response from responsible organizations and authorities.
d. Lack of materials and resources

Recommendations:-

- Every responsible organization should able to participate actively in the screening of EVD as the proposal is required. In Gambella region there are many NGOs, which may need coordination to participate in the EVD prevention activities.
- Every Step of EBOLA TASK Force should able to identify the gaps, the strength and weakness of the EBOLA screening activities done until now.
- Training to health professionals should able to continue to address about the disease in every step of the health facilities.
- Transport for screeners' isolation staffs should identify who the responsible for them is.

- New sites, especially Jekawo, Dima and Metar should able to consider to open for screening of EVD
- Strengthening the human and resource capacity as well as PPE may be mandatory.
- Isolation center may need in Lare town

Reference

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Eighteenth Edition, ed. H.s.P.O.I. MEDICINE. 2012.

5. gateway, P.p. *Information on Ebola: Outbreak in West Africa*. June 2014.
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9.2 Public Health Emergency Management Weekly Bulletin

Tigray weekly surveillance feedback (week 8, 2014)

Highlights of the week

- **Percentage of completeness met the minimum expected (98.4%)**
- **Malaria cases show decrement in the region when compared to week 7**

1. Surveillance data completeness

Surveillance report completeness: The overall completeness of Tigray region in week 8 is 98.4%. The reporting rate of health post is 97.9% and of health center and hospital is 100%.

Table 1: Reporting rate of HP, HC and hosp. of Tigray region in wk 8, 2014

	Heath post	Health center	Hospital
Reported	611	225	14
Expected	624	225	14
Completeness (%)	97.9	100	100

When we analyze completeness by zones, all of them have achieved completeness above the minimum requirement. We would like to express our appreciation and gratitude to those zones that have achieved 100% Completeness.

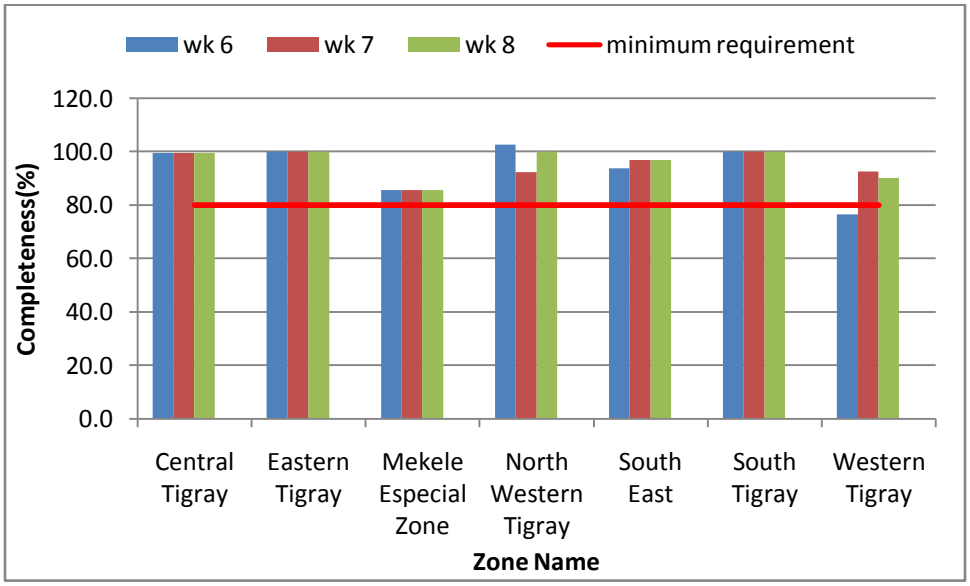


Fig 31: Weekly surveillance report completeness of Tigray region by zone, Week 6-8, 2014

2. Disease trend

2.1. Malaria

In week 8, a total of 3572 malaria cases were reported from Tigray region. When we see the trend, the number of cases is decreased over the previous weeks.

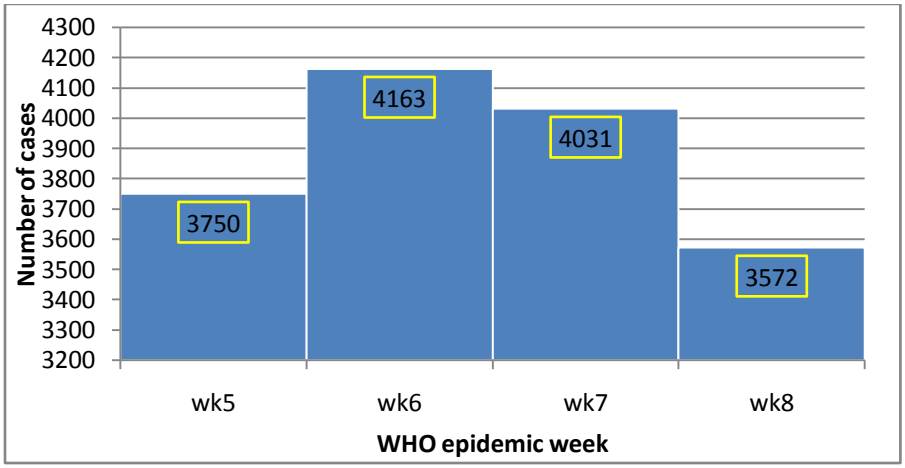


Fig 32: Trends of malaria cases in Tigray region, week 5-8, 2014.

Table 48 positivity rate of malaria per suspected febrile examined cases in Tigray region, week 4-8, 2014

Week	Total Malaria suspected febrile cases	Total positive /confirmed/	SPR %
4	14424	4366	30.3
5	13427	3708	27.6
6	15013	4167	27.8
7	15203	4008	26.4
8	13197	3547	26.9

Cascaded malaria trend by zone

Of the 3572 malaria cases reported from the region, Zonal contribution is as follows: Northwestern Tigray 1163(32.6%), Central Tigray 1099(30.8%), Western Tigray 986(27.6%), South Tigray 153(4.3%), Southeast Tigray 86(2.4%), Eastern Tigray 63(1.8%), and Mekelle 22(0.6%). (See fig 3 below)

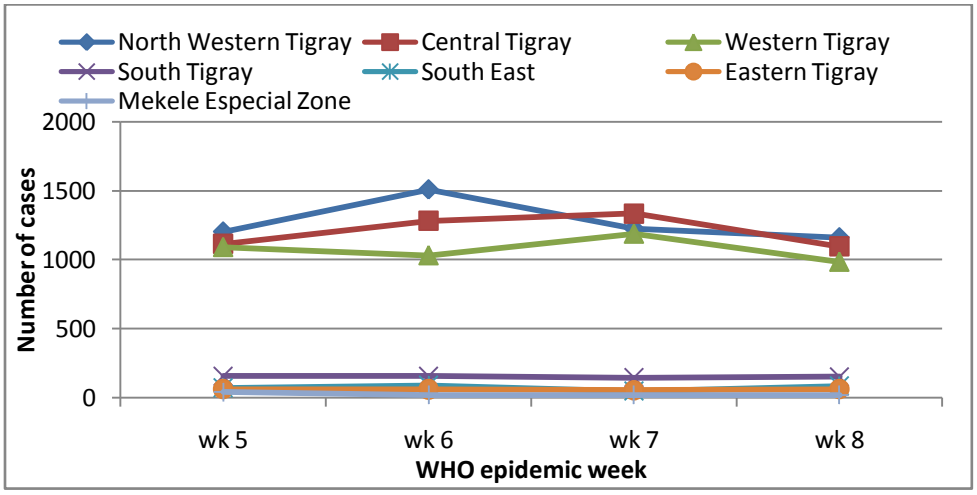


Fig 33: Trend of malaria case by zone, Tigray region, week 5-8, 2014

Cascaded malaria trend by woreda

North western Tigray:

Of the 1163 malaria cases reported from Northwestern Tigray zone in wk 8, majority of cases were from Asegede Tsimbila 295(25.4%), Tahitay Adiyabo 207(17.8), Tselemt 191(16.4%), Laelay Adiabo 148(12.7%) and Tahtay Qoraro 130(11.2%).The number of cases is decreased when compared to the previous week.(See fig 4 below)

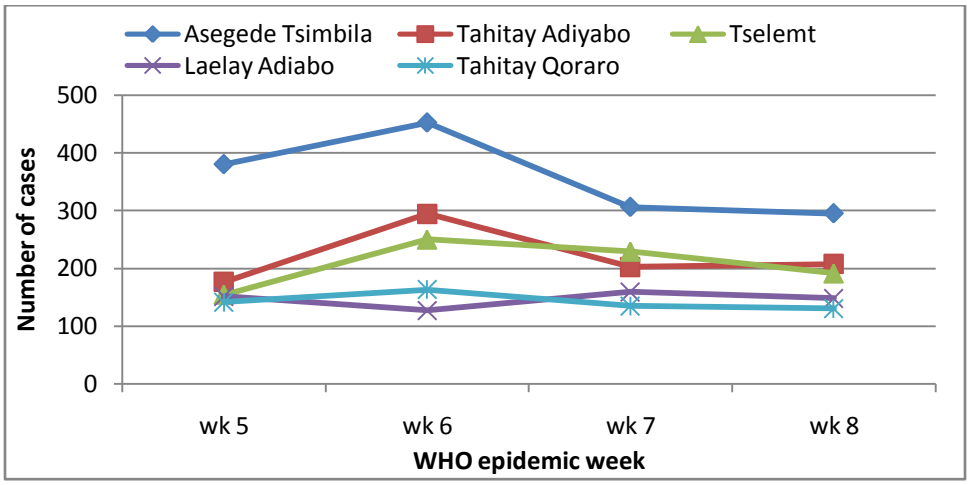


Fig 4: Malaria cases trend by woreda of Northwestern Tigray, week 5-8, 2014

Central Tigray:

Of the 1099 malaria cases reported from Central Tigray zone in wk 8, majority of cases were from were from Mereb Leha 302(27.5%), Tankua Abergele 209(19%), Wereilehi 122(11.1%), and Nader Adet 111(10.1%). When we see the trend, the number of cases is decreased in the zone when compared to the previous week. (See fig 5 below)

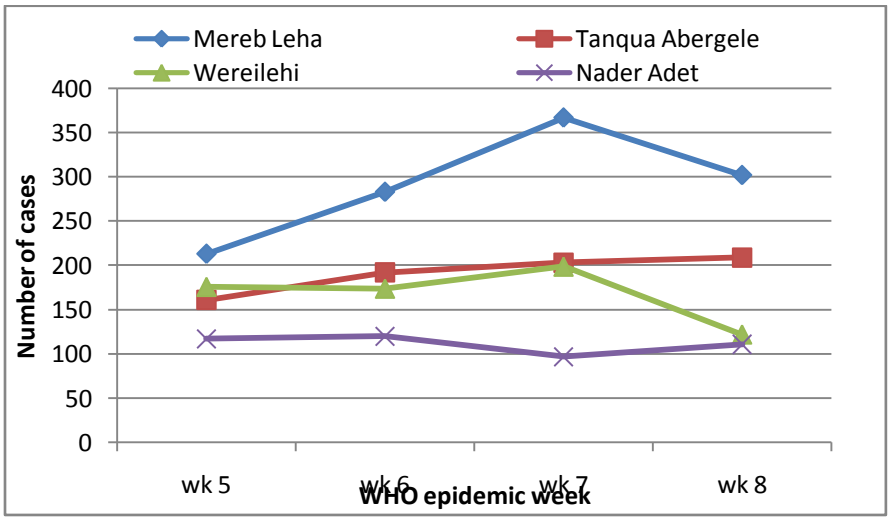


Fig 5: Malaria cases trend by woreda of Central Tigray, week 5-8, 2014

Western Tigray:

Of the 986 malaria cases reported from Western Tigray zone in wk 8, woredas contribution is as follows: Qafta Humera 377(38.2%), Welqayet 289(29.3%), Tsegede 181(18.4%), and Humera Town 139(14.1%).When we see the trend, the number of cases is decreased in Qafta Humera and Tsegede and slightly increased in Welqayet and Humera Town. (See fig 6 below)

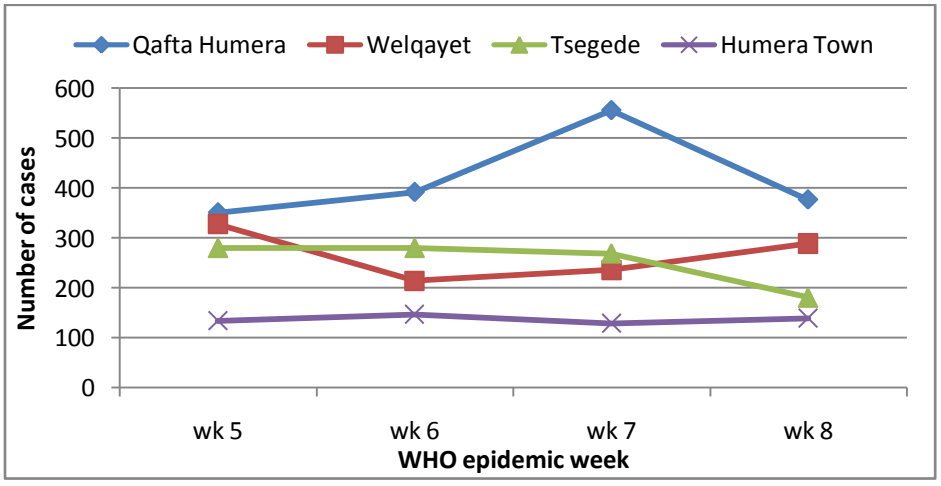


Fig 6: Malaria cases rend by woreda of Western Tigray, wk 5-8, 2014

2.3. Measles

In week 8, a total of four measles cases were reported from Mekelle and it should be reported using a case based format on daily basis.

2.2. Rabies

In week 8, 32 rabies cases were reported from Tigray region which accounts for 68% of nationally reported cases. These cases were reported from Central Tigray 18(56.3%), Northwestern Tigray 8(25%), Mekelle five (15.6%), and Eastern Tigray One (3.1%)

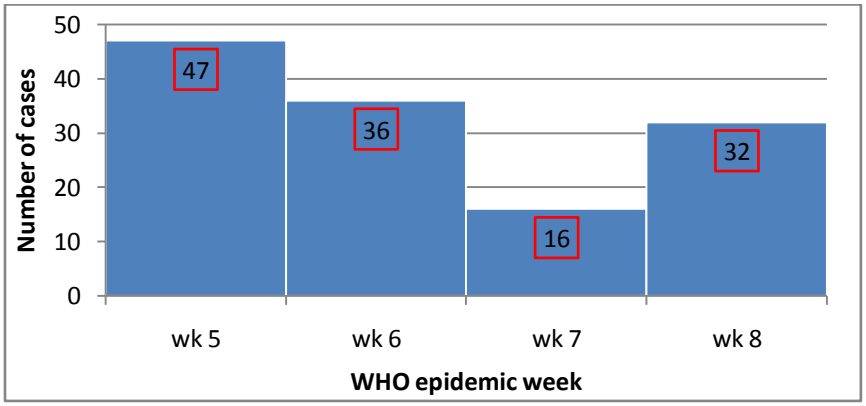


Fig 34: Trends of human rabies exposure in Tigray region, week 5-8, 2014.

Moreover, Rabies is an immediately reportable disease and it should be reported using a linelist or case based format on daily basis. Thus, there is a need to at least notify the national PHEM immediately when encounterd.

2.4. Anthrax

In week 8, four Anthrax cases were reported from Northwestern Tigray. From these cases, two were from Laelay Adiabo and the remaining two cases were from Shire Endesilase town.

Moreover, Anthrax is also an immediately reportable disease and it should be reported using a linelist or case based format on daily basis.

2.5 Malnutrition

This week, a total of 132 malnutrition cases (108 outpatients and 24 inpatients) were reported with one death which is reported from Abiyi Adi Town, Central Tigray.

Tigray weekly surveillance feedback (week 10, 2014)

Highlights of the week

- **Percentage of completeness met the minimum expected (94.7%)**
- **Malaria cases show decrement in the region when compared to week 9**

3. Surveillance data completeness

Surveillance report completeness: The overall completeness of Tigray region in week 10 is 94.7%. The reporting rate of health post, health center and hospital is 94.2%, 95.5% and 100% respectively.

Table 1: Reporting rate of HP, HC and hosp. of Tigray region in wk 10, 2014

	Heath post	Health center	Hospital
Reported	590	214	14
Expected	626	224	14
Completeness (%)	94.2	95.5	100

When we analyze completeness by zones, most of them have achieved completeness above the minimum requirement except Western Tigray zone which achieved 76.5%. We would like to express our appreciation and gratitude to those zones that have achieved 100% Completeness.

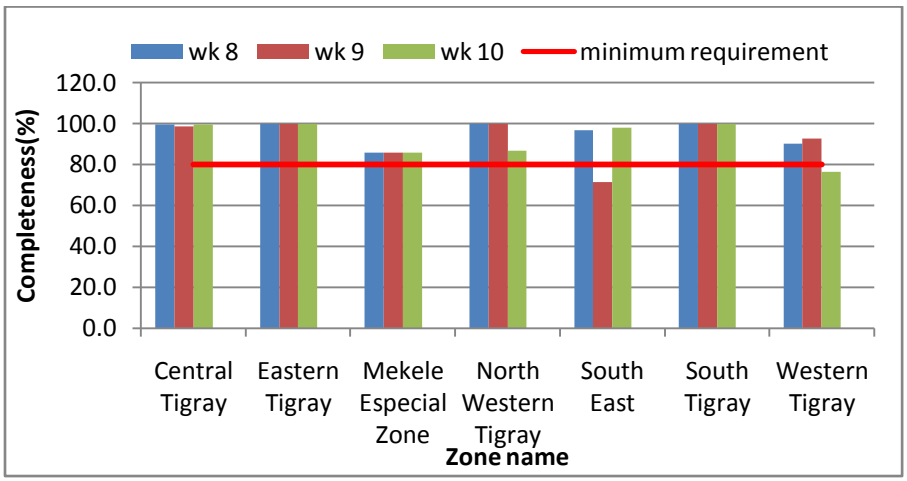


Fig 35: Weekly surveillance report completeness of Tigray region by zone, Week 8-10, 2014

4. Disease trend

4.1. Malaria

In week 10, a total of 3454 malaria cases were reported from Tigray region. When we see the trend, the number of cases is decreased over the previous weeks.

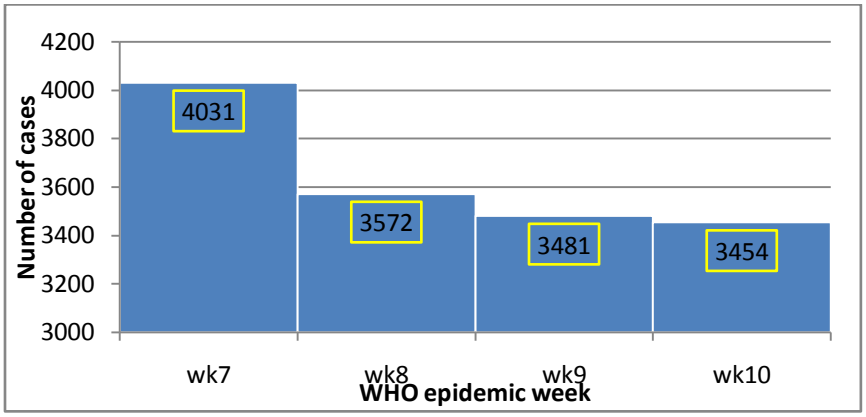


Fig 36: Trends of malaria cases in Tigray region, week 7-10, 2014.

Cascaded malaria trend by zone

Of the 3454 malaria cases reported from the region, Zonal contribution is as follows: Central Tigray 1320(38.2%), Northwestern Tigray 990(28.7%), Western Tigray 857(24.8%), South Tigray 129(3.7%), Eastern Tigray 68(2%), Southeast Tigray 60(1.7%), and Mekelle 30(0.9%). When we see the trend, the number of cases is increased in Central Tigray zone. (See fig 3 below)

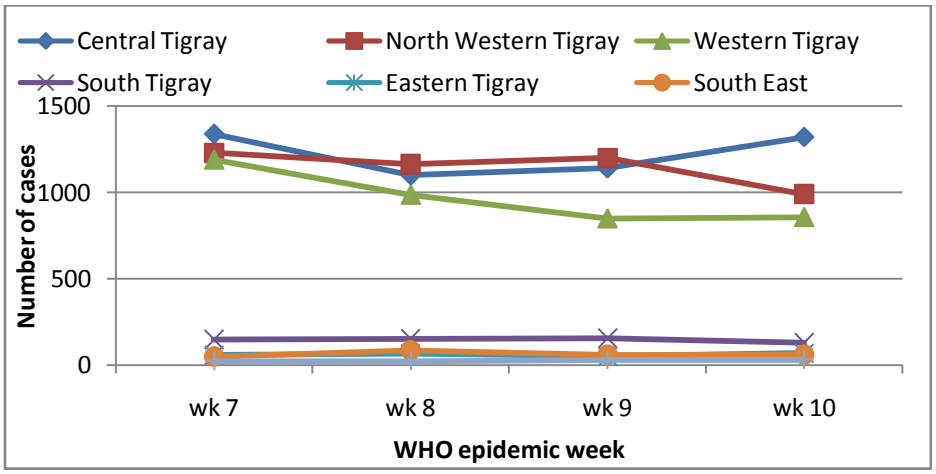


Fig 37: Trend of malaria case by zone, Tigray region, week 7-10, 2014

Cascaded malaria trend by woreda

Central Tigray:

Of the 1320 malaria cases reported from Central Tigray zone in wk 10, majority of cases were from were from Tahtay Maychew 383(29%), Mereb Leha 241(18.3%), Tankua Abergele 160(12.1%), and Wereilehi 157(11.9%).But, the number of cases is increased from 55(week 9) to 383(week 10) in Tahtay Maychew woreda within one week. So, please check it whether it is the exact number of cases or if it is due to data entry error. (See fig 4 below)

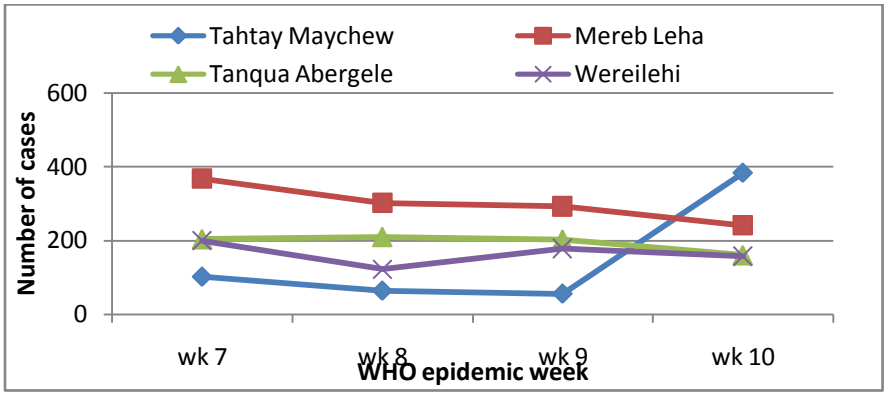


Fig 4: Malaria cases trend by woreda of Central Tigray, week 7-10, 2014

North western Tigray:

Of the 990 malaria cases reported from Northwestern Tigray zone in wk 10, majority of cases were from Asegede Tsimbila 276(27.9%), Tahitay Adiyabo 201(20.3%), Tahtay Qoraro 144(14.5%), Laelay Adiabo 132(13.3%) and Tselemt 124(12.5%).When we see the trend, zero number of cases had been reported in week 9 and 144 cases are reported in week 10 in Tahtay Qoraro woreda. How this significant increase in the number of cases occurred within one weeks period should be checked. (See fig 5 below)

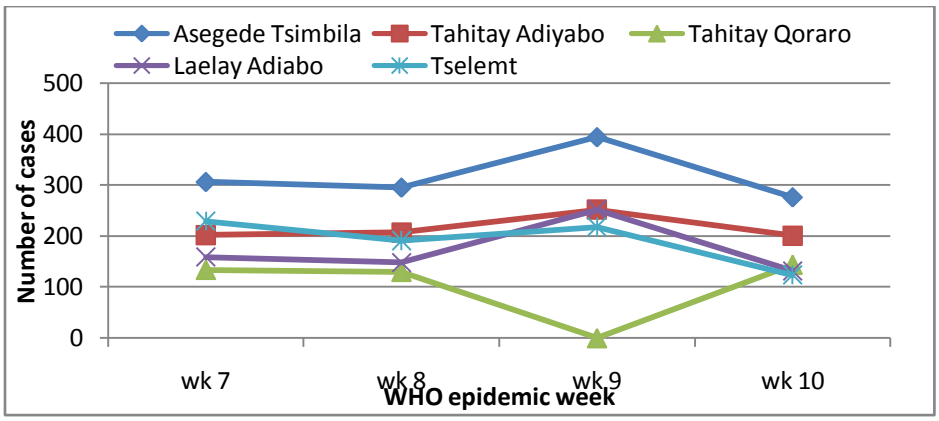


Fig 5: Malaria cases trend by woreda of Northwestern Tigray, week 7-10, 2014

Western Tigray:

Of the 857 malaria cases reported from Western Tigray zone in wk 10, woredas contribution is as follows: Qafta Humera 368(42.9%), Welqayet 191(22.3%), Tsegede 161(18.8%), and Humera Town 137(16%). (See fig 6 below)

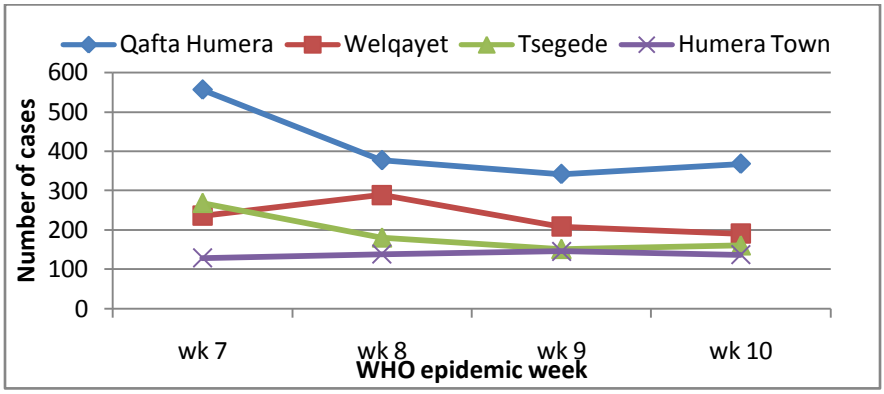


Fig 6: Malaria cases rend by woreda of Western Tigray, wk 7-10, 2014

2.2. Rabies

In week 10, 39 rabies cases were reported from Tigray region. These cases were reported from Central Tigray 21(53.8%), Eastern Tigray 11(28.2%) and Northwestern Tigray 7(17.9%).

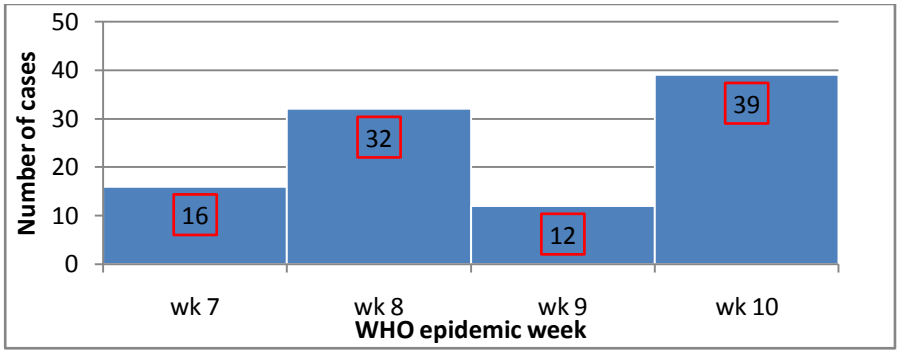


Fig 7: Trends of human rabies exposure in Tigray region, week 7-10, 2014.

2.3. Measles

In week 10, a total of 12 measles cases were reported from Tigray region. From these cases, seven were from Western Tigray and Five were from South Tigray.

2.4. AFP

In week 10, one suspected AFP case was reported from Tselemti woreda of Northwestern Tigray. To confirm the case, sample should be sent to our National lab.

2.5. Anthrax:

From Tigray region, a total of 18 cases were reported in week 10.From cases, thirteen were reported from Northwestern Tigray and five were reported from Central Tigray.

2.6. Malnutrition:

In week 10, total of 112 Malnutrition cases were reported from Tigray region (95 outpatients and 17 inpatients) with one death from Korem town of South Tigray.

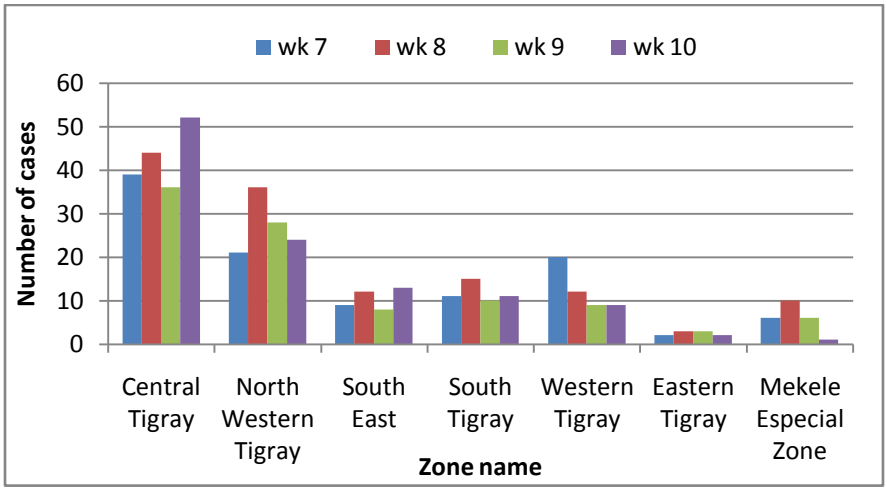


Fig 8: Trends of malnutrition case in Tigray region, week 7-10, 2014.

Tigray weekly surveillance feedback (week 11, 2014)

Highlights of the week

- **Percentage of completeness met the minimum expected (99.1%)**
- **Malaria cases show decrement in the region when compared to week 10**
- **The number of Rabies case increased over the previous weeks**

5. Surveillance data completeness

Surveillance report completeness: The overall completeness of Tigray region in week 11 is 99.1%. The reporting rate of health post, health center and hospital is 98.9%, 99.6% and 100% respectively.

Table 1: Reporting rate of HP, HC and Hosp. of Tigray region in wk 11, 2014

	Heath post	Health center	Hospital
Reported	619	223	14
Expected	626	224	14
Completeness (%)	98.9	99.6	100

When we analyze completeness by zones, all of them have achieved completeness above the minimum requirement .We would like to express our appreciation and gratitude to those zones that have achieved 100% Completeness.

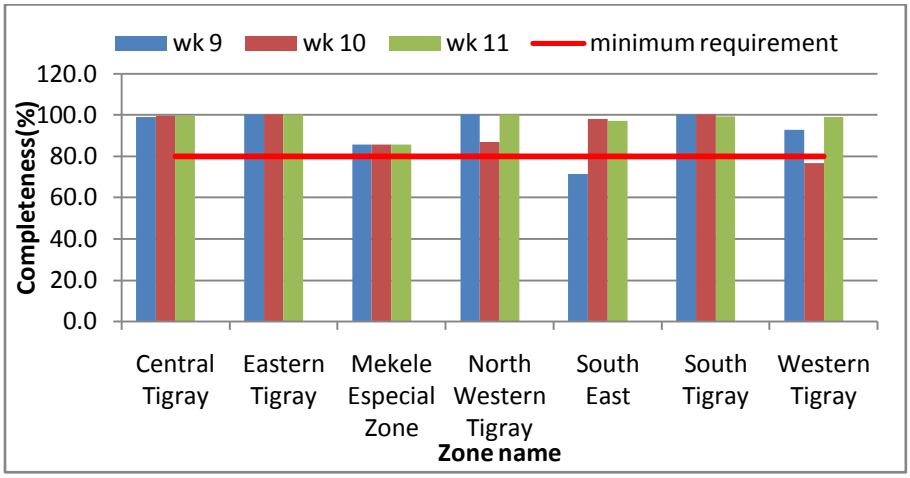


Fig 38: Weekly surveillance report completeness of Tigray region by zone, Week 9-11, 2014

6. Disease trend

6.1. Malaria

In week 11, a total of 2847 malaria cases were reported from Tigray region. When we see the trend, the number of cases is decreased over the previous weeks.

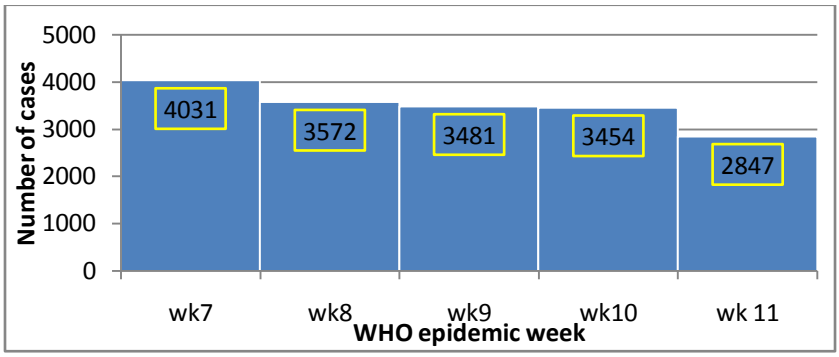


Fig 39: Trends of malaria cases in Tigray region, week 7-11, 2014.

Table 49 positivity rate of malaria per suspected febrile examined cases in Tigray region, week 8-11, 2014

Week	Total Malaria suspected febrile cases	Total positive /confirmed/	SPR %
8	13197	3572	27.1
9	14302	3481	24.3
10	12992	3454	26.6
11	10548	2847	27

Cascaded malaria trend by zone

Of the 2847 malaria cases reported from the region, Zonal contribution is as follows: Central Tigray 1057(37.1%), Northwestern Tigray 1051(36.9%), Western Tigray 413(14.5%), South Tigray 146(5.1%), Eastern Tigray 81(2.8%), Southeast Tigray 78(2.7%), and Mekelle 21(0.7%). (See fig 3 below)

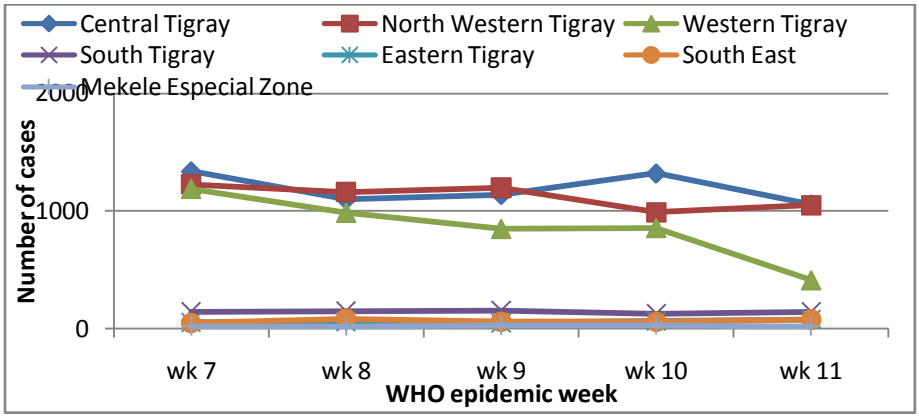


Fig 40: Trend of malaria case by zone, Tigray region, week 7-11, 2014

Cascaded malaria trend by woreda

Central Tigray:

Of the 1057 malaria cases reported from Central Tigray zone in wk 11, majority of cases were from were from Mereb Leha 332(31.4%), Tankua Abergele 167(15.8%), Wereilehi 133(12.6%) and Nader Adet 89(8.4%).The number of malaria cases is increased in Mereb Leha Woreda. (See fig 4 below)

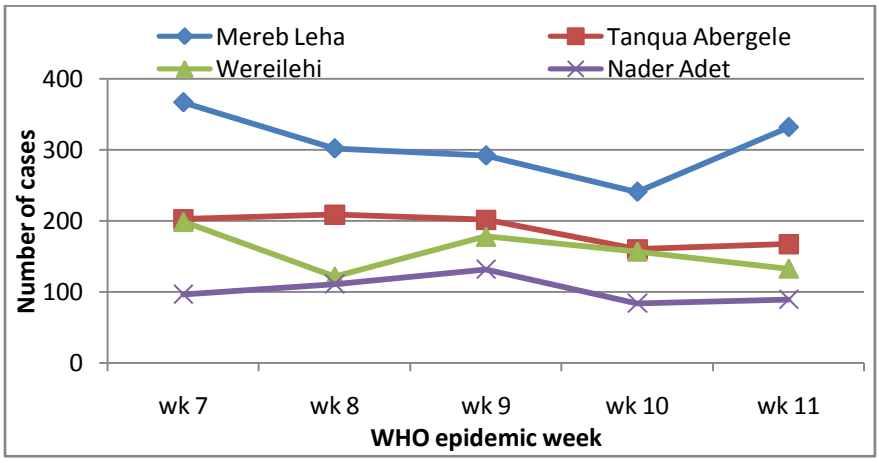


Fig 4: Malaria cases trend by woreda of Central Tigray, week 7-11, 2014

North western Tigray:

Of the 1051 malaria cases reported from Northwestern Tigray zone in wk 11, majority of cases were from Asegede Tsimbila 310(29.5%), Tahitay Adiyabo 227(21.6%), Tselemt 134(12.7%) and Tahtay Qoraro 131(12.5%). (See fig 5 below)

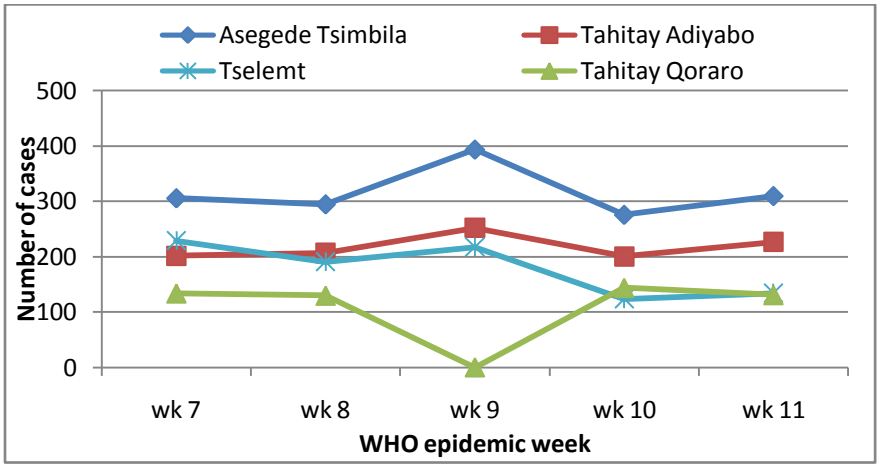


Fig 5: Malaria cases trend by woreda of Northwestern Tigray, week 7-11, 2014

Western Tigray:

In week 11, only 413 malaria cases were reported from Western Tigray. From these cases, 279 were reported from Welqayet and 134 were from Tsegede. The report from Qafta Humera and Humera town is not sent. (See fig 6 below)

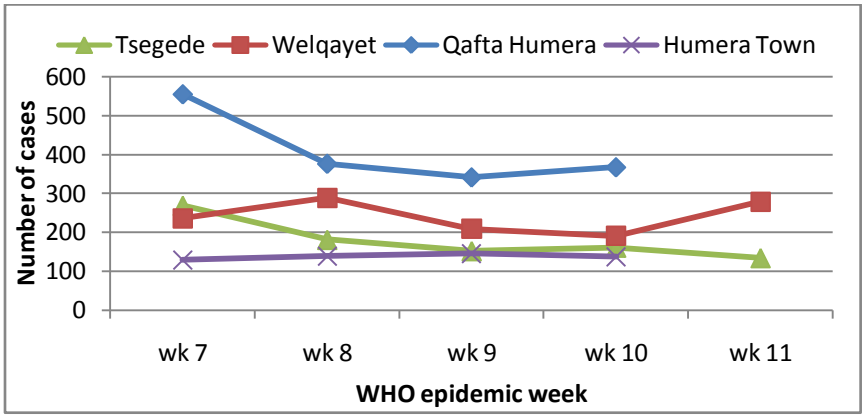


Fig 6: Malaria cases rend by woreda of Western Tigray, wk 7-11, 2014

2.2. Rabies

In week 11, 41 rabies cases were reported from Tigray region. These cases were reported from Eastern Tigray 22(53.7%), Central Tigray 17(41.5%) and Northwestern Tigray and South Tigray reported one case each (2.4%).

Moreover rabies is an immediately reportable disease and it should be reported using a line list or case based format on daily basis. Thus there is a need to at least notify the national PHEM immediately when encountered.

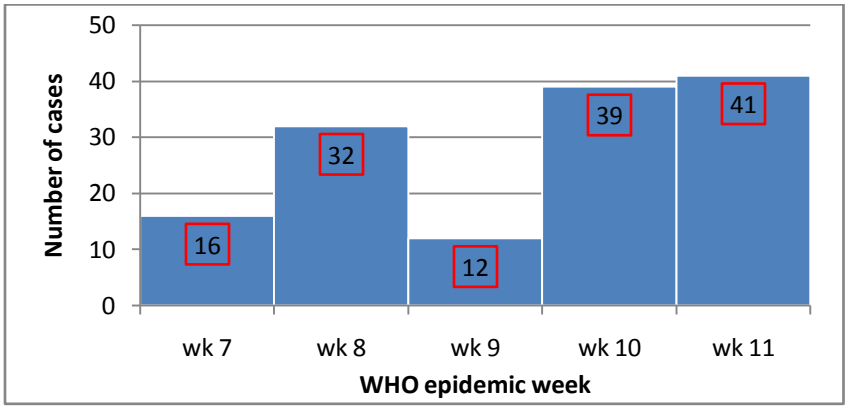


Fig 7: Trends of human rabies exposure in Tigray region, week 7-11, 2014.

2.3. AFP

In week 11, one suspected AFP case was reported from Shirer ende silase woreda of Northwestern Tigray. To confirm the case, sample should be sent to our National lab.

2.4. Anthrax

From Tigray region, a total of two Anthrax cases were reported in week 11.Shiraro town of Northwestern Tigray zone and Abiyi Adi town of Central Tigray reported one case each.

2.4. Measles:

In week 11, a total of 16 measles cases were reported from Tigray region. The cases were from Eastern Tigray 9(56.3%), South Tigray 5(31.3%) and Northwestern Tigray 2(12.5%)

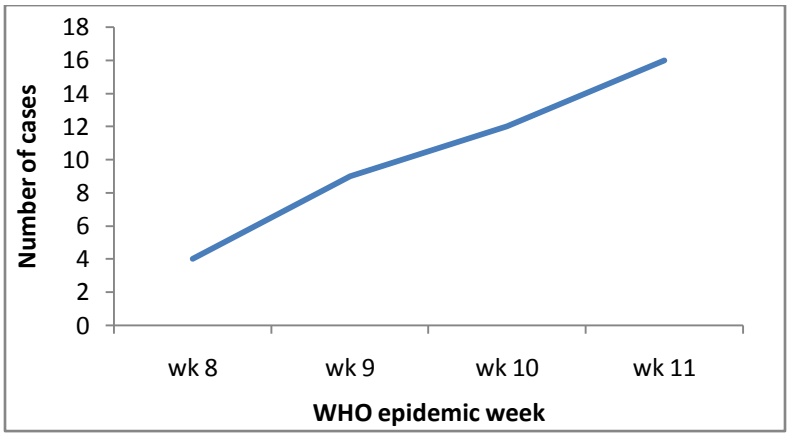


Fig 8: Trends of measles cases in Tigray region, week 8-11, 2014

2.5. Meningitis:

In week 11, four meningitis cases (Three outpatients and one inpatient) cases were reported. The inpatient case was reported from Tahitay Qoraro woreda.

9.3 MDSR and Ebola Training for Tigray Region Woreda Public Health Emergency Management Officers Report

Introduction

On 27 - 28 December 2014, the Ethiopian Public Health Institute (EPHI) facilitated training in Tigray Regional State "MDSR and Ebola". This training was as a result of collaboration between the EPHI through Tigray Regional PHEM.

The collaboration aimed to support capacity building and institutional strengthening of the Tigray and partially Afar in surveillance activities in MDSR and Ebola. It also has an objective to roll out the surveillance system program that empowers the surveillance officers on the gaps in their daily activities.

This report provides information about how the training was conducted, and highlights lessons learnt and the way forward for improving the gaps in the surveillance and reporting system.

The aim of the two-day training was to strengthen the knowledge, skills and training capacities of participants on MDSR and Ebola. The specific objectives were as follows

- Strengthen capacity in recognizing and responding to public health emergencies
- To build a capacity that effectively guides immediate as well as longer term actions to reduce maternal mortality; and to count every maternal death, permitting an assessment of the true magnitude of maternal mortality and the impact of actions to reduce it.
- To update the current situation of EVD enable to show the political and economical impact as well as to strengthen the preparedness and prevention of EVD in the region.
- Public Health Emergency

Methodology for the Implementation of the Training

Organizers

The training was facilitated by EPHI and Tigray Regional PHEM. EPHI provides technical and financial support. The training was held in a conference hall of Mekele Axum Hotel. An official program of activities with six modules was used as the tool for the delivery of the training to benefit participants.

Methods

- A mix of methods was used for the Training. They are as follows:
- Participant observation
- Brainstorming
- group work and group presentation
- Question and answers

- Practical Experiences
- Power point presentation
- Energizers

Opening Ceremony

Mr. Yohannis Gebrehawariya, the Tigray Regional PHEM Coordinator, welcomed the organizers, participants and government officials and he appealed the objective of the training. He urged participants to take advantage of the opportunity to enhance their knowledge and skills so they can also become trainers for others to benefit.

Topics of the Training

- PHEM
  - Public Health Emergency Early Warning System
  - Weekly Reporting format (Format for HEW and Health Workers)
  - Outbreak Investigation and Response
- Ebola
  - Epidemiology of Ebola
  - Ebola Surveillance and Outbreak Investigation
- MDSR
  - Introduction to National MDSR system
  - MD identification and reporting system with practical exercise
  - MDSR Data flow within the IDSR system
  - Extracting data from the system with practical exercise
  - Maternal death review at facility with practical exercise
  - Current status of MDSR
- Way forward and Closing remarks

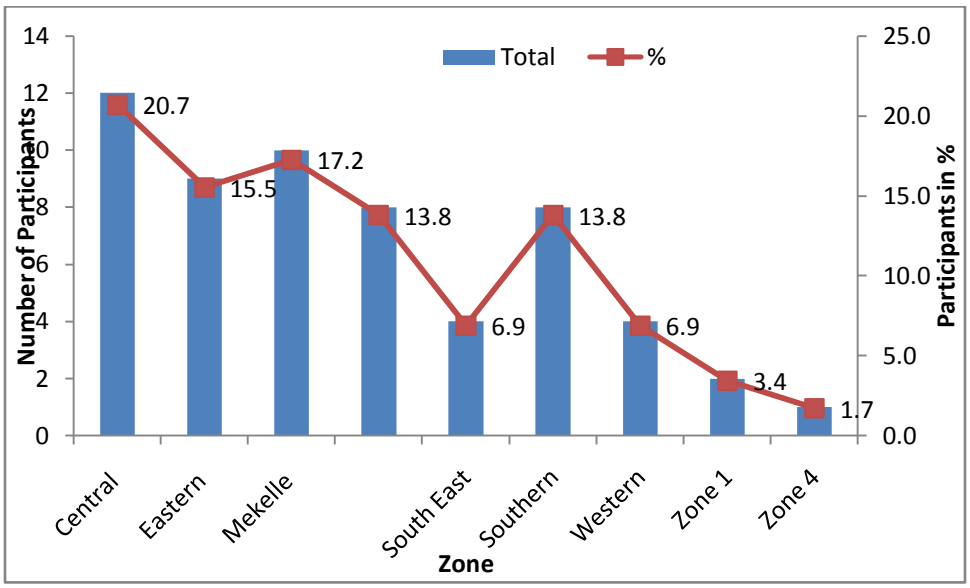


Figure 9.3.41 Distribution of MDSR and Ebola Training of Participants by Zone, Mekele, Tigray, December 2014.

The participants were from all zones of Tigray and two zones of Afar. Central zone had the highest number of participants (20.7%) followed Mekele and Eastern zone with 17% and 15.5% respectively. South East and Western Zone had the least number of participants each 13.8%. Afar regional state had 3 (5.1%) participants.

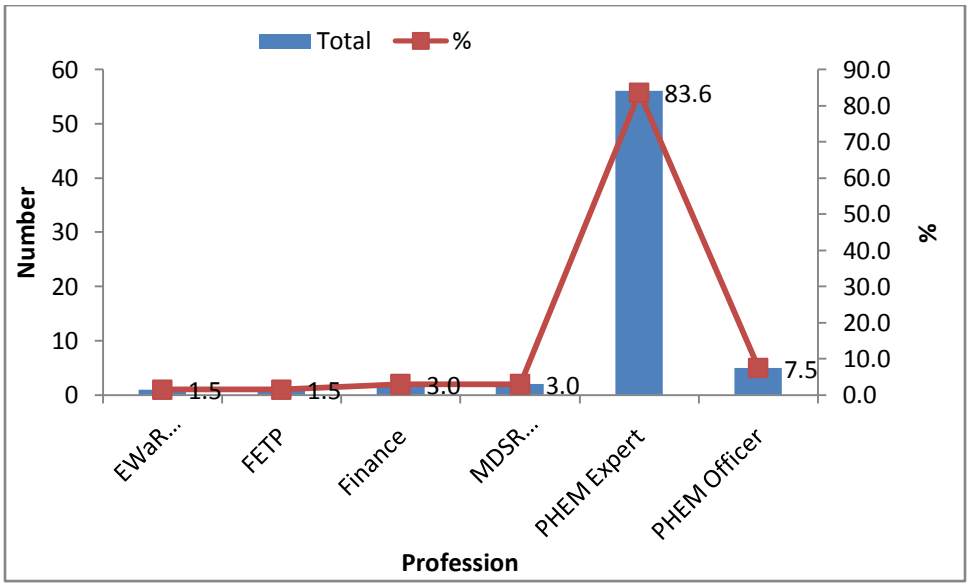


Figure 9.3.42 Distribution of MDSR and Ebola Training of Participants by Profession, Mekele, Tigray, December 2014

Majority of the participants (56 = 83.6 %%) were PHEM experts, others were from national and regional PHEM stuffs.

Gaps of the Training

- The time given for each topic were short, which was trying to expense by extending the trailing until the evening
- Lack of pre and post test, to evaluate about how far they were and what copes from the training.

9.4 Surveillance Report for Influenza SARI Site In Amhara And Tigray Region

Summary

Surveillance for Influenza Sever Acute Respiratory Illness (SARI) had been conducted from March 9 – 15/ 2013 in Amhara and Tigray. The surveillance team had three members. All are from Ethiopian Public Health Institute.

General meeting regarding to the human resources, sample transport and coordination system and challenges which are faced to the system have been conducted with the regional PHEM coordinators and the focal persons including Medical director.

The objective of the surveillance was to assess the SARI surveillance in coordination, human resources, health system support, sample collection and transport system, records and data management system, logistics supplies, supervision and feedback system and challenges faced to the system.

This report includes the strength, the weakness or gaps and challenges faced to the SARI surveillance system in both regions.

Introduction

Influenza viruses have focused attention worldwide due to its rapid biological mutation strain. Epidemiologic data surveillance is important for early detecting and controlling of the virus. A sentinel surveillance system could enhance and motivate in order to have quality in laboratory investigations and continuous assessments by strengthening the capacity the country seasonal, novel, and pandemic influenza detection and prevention system.

Running the SARI sentinel program through capacity building, training, supporting by providing fund by collaborating stakeholders is mandatory to monitor and control the pandemic disaster of the disease. Supportive supervision is one of the tools to make future planning by searching gaps or weakness and strengths.

Methods and Materials

A group was established by EPHI, having three members. Supportive supervision was conducted from March 9 – 15/2013. The supervision was conducted in Amhara region in Amhara region from March 9 – 12/2013. Meeting was conducted initially with regional PHEM coordinator and regional SARI focal person. Meeting was also conducted with Amhara region Felege Hiwot Medical Director and the hospital focal persons.

The same system and process was followed in Tigray region, except regional laboratory was not participated in the meetings conducted in regional and hospital coordinators and focal persons.

Supervision had been done with prior prepared supervisory SARI checklist. The checklist includes information such as human resources, health system support, sample collection, record assessment, data management, logistics and supplies, supervision and feedback and challenges.

Guidelines and brochures had been distributed for both regions [1].

Result

1. Amhara region

Human Resource

- At Felege Hiwot hospital: there are assigned trained two heath workers as influenza sentinel surveillance focal person
- At regional health bureau: There is delegated one focal person at regional health bureau

Health system support

- Room is not assigned for surveillance activities
- They do not have their own refrigerator however they used hospital or regional laboratory refrigerator , the refrigerator is functional and its deep freezer
- Sample kept according to required temperature
- There is no shortage of required supplies like clean water and Infection prevention materials
- Infection prevention materials not purchased

Sample collection

- We did not seen any sample collection due to annual health workers shifting
- Patient meets the clinical case definition of SARI according to the observed case based report
- Patients were chosen for sampling among patients who are admitted with a diagnose of sever pneumonia and samples were taken by trained health workers

Records

- Individuals samples are filled properly including date of onset, age , sex, occupation, woreda etc…. even though individual samples and Epid number records filled properly, there is no weekly aggregated formats records .
- Though the weekly aggregated formats was not filled, we observed HMIS registration book and we get a total of 18 sever pneumonia cases from 35 total under five OPD visit per week in addition we get a total of 24 sever pneumonia cases from the total 138 pediatrics OPD visit .

Data management

- Because of unavailability of computer; no storage, analysis or interpretation of data

Logistic and supplies

- There are enough tongue depressed, VTM materials, IP materials except shortage of reporting forms
- Telephone card is provided to influenza focal persons
- Specimen transported in leak proof specimen bags
- Health care workers collect specimen using /wearing PPE

Supervision and feedback

- Feedback received from EPHI and RHB weekly or monthly
- laboratory result did not obtained from regional health bureau and EPHI
- Monthly supervision by regional health bureau conducted
- After filling case based reporting format they recheck routinely

Challenges

- lack of materials like refrigerator, computer and furniture's
- lack of room
- shifting manpower
- ownership problem and lack of commitment in every step
- complain about reporting forms which increase work load

2. Tigray Region

Human Resource

- At Mekele hospital: there are two trained health workers assigned as influenza sentinel surveillance focal person, whose have working full time for SARI sentinel site. Both are trained on specimen and data management in March 2005 EFY.
- There is delegated one focal person at regional health bureau.

Health system support

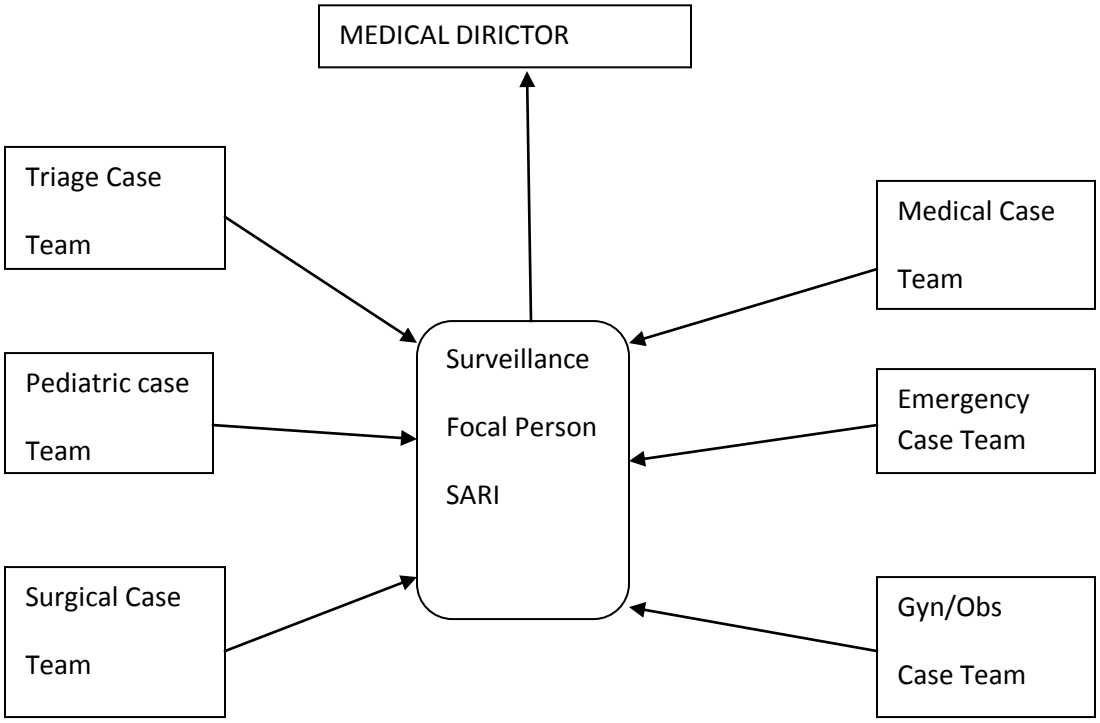
Mekele Hospital SARI sentinel service has assigned room for surveillance activities. The room has enough spaces and available to take samples and it is equipped with furniture, shelve, computer and functional refrigerator. The refrigerator has monitoring chart, which kept samples according to the required temperature that is below 4 degree Celsius. All required supplies are available. No shortage of clean water and infection prevention materials.

Sample collection

- Even though there was no case during the supervision period we observe that collected samples and materials like gloves, plastic aprons and also collected samples. According to our observation of the properly filled logbook recording, patients meet the clinical case definition of

SARI. Samples have taken by trained persons. Patients were chosen for sampling among patients who are admitted with a diagnose of sever pneumonia and samples were taken by trained health workers

Figure 9.4.43 Mekele Hospital SARI Surveillance Information System 2013 - 2014



Records

- Individuals samples are filled properly including date of onset, age , sex, occupation, weredas etc…. even though individual samples and Epid number records filled properly, there weekly aggregated formats records fill incorrectly.

Data management

- They have computer but they only use for data and document storage. They haven't used for data analysis and interpretation due to lack of training.

Logistic and supplies

- There are enough tongue depressed, VTM materials, IP materials.
- Telephone card is provided to influenza focal persons
- Specimen transported in leak proof specimen bags
- Health care workers collect specimen using /wearing PPE

Supervision and feedback

- Supervision was done by the RHB every 3 -4 months and gave oral feedbacks accordingly. Laboratory result did not obtain from regional health bureau and EPHI.
- Filled data base reporting had been rechecked routinely.

Challenges

- Shortage of VTM
- Lack of training on computer skill and data management system in analyzing and interpreting.
- Lack of planned supervision by the RHB and RGH PHEM focal person.

Discussion

Sentinel Surveillance system of SARI had been established in both Amhara region and Tigray region. Training was given to focal person and to responsible person in the RHB. Both are trying to run the system as much as possible. Tigray region is continuing the sentinel surveillance system in Mekele hospital properly. Both regions have focal persons in RHB and in their hospitals. But the difference is Mekele hospital have committed staffs and motivated focal persons. Every staff is awarded to do what is expected from him. They took the system as their duty, but there was no enough support and programmed supervision from RGB.

The Sentinel surveillance system of SARI was not functional since January 2014, which is because of rotation of trained staffs to another department. There was no prior preparedness for the continuation of the system. Even though Amhara RHB has focal person and the focal person have been done routinely weekly supervisions, there was no solution for the interruption of the system. There is no isolated room, no equipments like furniture, computers and refrigerator. The management system in the hospital was not able to buy these items due to unidentified bureaucratic system. The focal person from RGH lacks power to do so. RHB also have not been given attention to the system.

Sample taking method training was trying to give for staffs but there was no preparedness in preparing teaching materials and hall by the hospital. Mekele hospital was not the computer properly. They only use for document storage. They can't use even email, with having internet access. But it was easy to solve the problem by RGH staffs and focal person. We open email account for focal persons.

Limitation

- Lack of commitment especially Amhara RGH, focal persons and Felege Hiwot hospital Management
- Lack of training in computer skills to focal persons for data management, analyzing and interpreting.
- Delaying of supportive supervisions from National PHEM
- Complicated of data formats to fill in every step of the sentinel surveillance system.

Conclusion

Felege Hiwot hospital is not currently functional. They didn't use their budget properly. Solution is expected from the RHB and the hospital management soon. Strict follow up and support is mandatory from the respected departments.

Mekele hospital is working the sentinel surveillance system of SARI properly. They have committed and motivated focal persons, hospitals staffs and medical managements.

Recommendation

- Standardized data management system training to both hospitals focal persons and RGH PHEM focal person with providing standardize software
- Routine and programmed supportive supervision
- Revising of the data managements forms
- Continuous updating by orientation and training to staffs and focal persons.

Annex 1 Malaria Outbreak Investigation Questionnaire of Humera Town Western Tigray, Ethiopia, 2014.

I. Socio-demographic information:

1. ID number of respondent_____
2. Age in years_____
3. Sex: M☐ F ☐
4. Address: Region _____Zone_____ Woreda_____ kebele _____village_____
5. Occupation: Employed ☐ unemployed ☐ Student☐ Pastoralist ☐ farmer
6. Total family members _____
7. Ethnicity: _____
8. Religious: Orthodox, ☐ Protestant, ☐ Muslim ☐ other ☐
9. Marital status : Married, ☐ single ☐ Widowed ☐ Divorced☐
10. Education status: Illiterate ☐ Primary, ☐ Secondary ☐ tertiary ☐, non-formal ☐
11. Case status
    a) Case Yes ☐ ,
    b) Control yes☐

II. Clinical presentations:

<u>*(For case only)</u>

12. What was the first symptom? _____
13. When was the 1st symptom started(date of onset of symptoms) DD/MM/YY_____
14. What were others symptoms?
    a) Fever: Yes ☐ No☐, if yes duration of fever____ Was it constant fever?: Yes ☐ No☐ or every other days fever? Yes ☐ No☐
    b) Vomiting : Yes ☐ No☐
    c) Diarrhea : Yes ☐ No☐,
    d) Anorexia (appetite loss): : Yes ☐ No☐,
    e) Headache: Yes ☐ No☐
    f) sweating,: Yes ☐ No☐,
    g) Chilling and shivering : Yes ☐ No☐,
    h) Weakness : Yes ☐ No☐,
    i) Caught: : Yes ☐ No☐,
    j) back pain : Yes ☐ No☐,

k) muscle pain : Yes ☐ No☐,

l) rigor: Yes ☐ No☐,

➧ ***Ask the following signs (M to Y) for complicated malaria only***

m) Altered consciousness (e.g. confusion, sleepy, drowsy, comma) Yes ☐ No☐,

n) Not able to drink or feed Yes ☐ No☐,

o) Severe dehydration, Yes ☐ No☐,

p) Persistent fever, Yes ☐ No☐,

q) Frequent vomiting Yes ☐ No☐,

r) Convulsion or recent history of convulsion Yes ☐ No☐,

s) Unable to sit or stand up Yes ☐ No☐,

t) pallor (Anemia) Yes ☐ No☐,

u) No urine output in the last 24 hours Yes ☐ No☐,

v) Bleeding Yes ☐ No☐,

w) Jaundice (yellowish coloration) Yes ☐ No☐,

x) Difficult breathing Yes ☐ No☐,

y) Other conditions that cannot be managed at this leve_____

15. Did you visit health facilities? Yes☐ No☐, if yes, when did you visit health facilities? DD/MM/YY_____

16. Blood samples taken: Yes-☐ No ☐

17. If yes Q18, what was the result : Positive ☐ negative ☐

18. Did you get any treatment 1.Yes ☐ No☐, If yes, what treatment did you get?

(a) Coartem Yes ☐ No☐, was it for PF Yes ☐ No☐,

(b) Chloroquine? Yes ☐ No☐, was it for PV Yes ☐ No☐,

(c) Quinine tablets Yes ☐ No☐, was it for pregnant and <5 Kg? Yes ☐ No☐,

(d) Quinine injection Yes ☐ No☐, was it for sever malaria Yes ☐ No☐,

(e) Other treatment given

_____

_____

19. Did you recover completely after the treatment: Yes-☐ No ☐

20. Place of residence during 2 weeks before onset of illness;_____

III. Risk Factors:

(For both cases and controls)

21. Specific living areas _____

22. Sleeping areas in side home _____outside home_____

23. Do you stay outside over night? Yes-☐ No☐

24. Is there anybody in your home with similar sign and symptoms? Yes-☐ No☐

25. Did you travel outside your village in the past 2-3 wks Yes-☐ No ☐

26. If yes Q 24, indicate

(a) date of travel DD/MM/Y_____

(b) the place of travel

(c) date when you returned back DDMMYY_____

27. If Q 24 is yes, Is there sick patients (same symptoms) in the place where you have been Yes-☐ No☐

28. is there a similar sick patient in your house hold Yes-☐ No☐

29. Do you have bed net in your household Yes-☐ No☐, If is yes, how often do you use Always☐ Sometimes ☐Never ☐

30. Do mothers and children given priority of using bed nets? Yes-☐ No☐

31. If yes Q 28 the number of bed nets _____

32. Was deltamethrine sprayed this year? Yes-☐ No☐

33. If yes Q31 when?_____

34. If yesQ31 how many? Once ☐ twice ☐

IV. Environmental investigation

35. Place of stay during night? _____

36. Is there any artificial water -holding containers close to your home? such as :

a. old tires: Yes-☐ No☐,

b. Plant in the containers /flower –pots Yes-☐ No☐,

c. plant with temporary water pools Yes-☐ No☐,

d. Open deep well: Yes-☐ No☐,

e. Broken glass bottles Yes-☐ No ☐,

f. Cans Yes-☐ No☐,

g. Plastic container Yes-☐ No☐,

h. Gutter to collect rainwater: Yes-☐ No☐,

i. Uncovered water storage/ septic tank Yes-☐ No☐,

j. Stagnant water Yes-☐ No☐,

37. Presence of mosquito vectors/ mosquitoes breeding sites around the home or vicinity? Yes-☐ No☐,

38. If Q36 yes, presence of larvae in breeding sites Yes-☐ No☐,

39. Types of house screened Yes-☐ No ☐, unscreened Yes-☐ No ☐,

40. Do you use repellents Yes-☐ No☐,

41. Protective clothing Yes-☐ No☐,

42. Waste collection: Yes-☐ No☐,

43. Unprotected irrigation Yes-☐ No☐,

44. Presence of Intermittent rivers cloths to the community Yes-☐ No☐,

45. Presence of tick grass Yes-☐ No☐,

V. Awareness assessment

46. Do know malaria? Sign and symptoms ----------

---

47. How it transmitted?----------

How it can be prevented?----------

Annex 2 Measles Outbreak Investigation Questionnaire for Kola Tembien District, Central Tigray Zone, Ethiopia February 2015

Instructions: italics don't read out loud.

1. *Data collector information:* Name:_____ Phone number*:* _____
2. *Date of Data collection:*_____

*Region*_____ *Zone*_____ *District*_____ *Kebele* _____ *Village* _____

House: Longitude:_____ *Latitude:*_____

3. *Who is answering the questionnaire?:*

☐ Parent/ guardian of sick person ☐ Sick person ☐ Other (please specify) _____

4. *Respondent category*: ☐ case ☐ control Active case: Yes☐ No ☐

I. **Socio-demographic information**

1. Patient Name_____
2. Patient phone number: _____ (whose phone#?) _____
3. How old are you? **: Years**_____ Months
4. Sex**:** ☐ Male ☐ Female
5. What is your occupation?**:**
   ☐ Farmer ☐ Merchant ☐ Housewife ☐ Unemployed ☐ Government
   ☐ Pastoralist ☐ Student ☐ Not applicable ☐ Other _____
6. What is your ethnicity? _____
7. What is your religion?**:** ☐ Orthodox ☐ Protestant ☐ Muslim ☐ Catholic ☐ other_____
8. What is your marital status ?: ☐ Single ☐ Married ☐Widowed ☐ Divorced ☐ Not applicable
9. Have you ever attended school?: ☐ yes (go to question 10) ☐ No (go to question 11)
10. What is the highest level of education you have completed? (read answers): ☐ KG ☐ Primary ☐ Secondary ☐ Tertiary ☐ Not applicable
11. Father's occupation : ☐ Farmer ☐ Merchant ☐ Unemployed ☐ Government ☐ Student ☐ Pastoralist ☐ Other _____
12. Parents' of case/control's education : Mother: ☐ Illiterate ☐ Primary ☐ Secondary ☐ Tertiary Father: ☐ Illiterate ☐ Primary ☐ Secondary ☐ Tertiary

13. What is the main material of the roof. RECORD OBSERVATION

(Natural roofing) ☐ No roof ☐ thatch/leaf/mud

(Rudimentary roofing)

☐ Rustic mat/plastic sheets ☐ reed/bamboo ☐ wood planks ☐ cardboard

(FINISHED ROOFING) ☐ CORRUGATED IRON /METAL ☐ WOOD ☐ ASBESTOS/CEMENT FIBER ☐ CEMENT/CONCRETE ☐ ROOFING SHINGLES ☐ OTHER (SPECIFY)

14. Does your household have:

Electricity?	☐ Yes ☐ No	A refrigerator?	☐ Yes ☐ No
A watch/clock?	☐ Yes ☐ No	A table?	☐ Yes ☐ No
A radio?	☐ Yes ☐ No	A chair?	☐ Yes ☐ No
A television?	☐ Yes ☐ No	A bed with cotton/sponge/spring mattress?	
A mobile telephone?	☐ Yes ☐ No	☐Yes ☐ No	
A non-mobile telephone?	☐ Yes ☐ No		

I. <u>Knowledge Questions</u>

1. Do know measles? ☐ Yes ☐ No
2. If Q 1 Yes, give clarification----------

Does measles transmitted? ☐ Yes ☐ No

3. If Yes for Q 2, how do you think measles is transmitted,? You can pick more than one response:
   ☐ Through the air ☐ Fecal/oral ☐ Food ☐ Close contact with an ill person ☐ Other _____
4. How do you think measles can be prevented, or do you not know? :
   ☐ Vaccination, ☐ There is no prevention ☐ local healing ☐ Other _____
5. Who do you think can be affected by measles, or are you not sure?

☐ Children less than 5 years old	☐ Any age groups of both male and women
☐ Children between 5-18 years	☐ Don't know
☐ People over 18 years old	☐ Other (specify):_____

6. Why do some people vaccinate their children with measles vaccine?
   ☐ To prevent measles ☐ Other _____
7. What is the routine age for a child to be vaccinated with measles vaccine, or do you not know?
   ☐3 months ☐ 6 months ☐ 9 months ☐Other ☐ Don't know
8. Do you think vaccination can prevent measles? ☐ Yes ☐No ☐ Don't know

VI. Clinical presentations *<u>(for case ONLY)</u>*

9. What were the symptoms?

z) rash: ☐ Yes ☐ No	dd) cough : ☐ yes ☐ No
aa) fever: ☐ yes ☐ No	ee) Tiny white spots or sores inside the mouth
bb) runny nose: ☐ yes ☐ No	☐ yes ☐ No
cc) red eyes: ☐ yes ☐ No	

10. What is the date when you first saw a rash on your body? : ____/_____/_____
11. Were you in your home village when you first noticed you were ill?
    ☐ Yes (skip to question 12) ☐ No (go to next question)
12. Where were you when the illness started? District;_____Kebele; _____
13. How long have you had a rash? _____days
14. Do you still have the rash? ☐ yes ☐ No
15. Did you visit health facility for this illness?

☐ Yes (date went to facility____/____/____) ☐ No (go to RISK FACTORS section)

16. How long were you sick before visiting the health facility? _____ in days/hours

17. Admitted: ☐ Yes ☐ No, If yes, date admitted:___/___ /_____

a. Treatment given? ☐ yes ☐ No, if yes

☐ ORS ☐ Antibiotics ☐ Vitamin A ☐ Supplementary food

☐ TTC ointment ☐ Anti pyretics ☐ other _____

b. Outcome: ☐Alive ☐ death

18. Did you have any of the following complications when you were sick with measles?

a) Pneumonia:☐ yes ☐ No b) Diarrhea: ☐ yes ☐ No

c) Ear infection: ☐ yes ☐ No c) Convulsions ☐ yes ☐ No

d) Change in vision: ☐ yes ☐ No e) Blindness : ☐ yes ☐ No

19. Did you travel four days prior to or four days after rash onset?

☐ Yes (go to question #20) ☐ No (go to question #20)

20. Where did you travel to ?_____

VII. Risk factors (Vaccination status)

21. Can I see your immunization card? ☐ Yes (go to question 22) ☐ No (go to question 21)

22. Were you vaccinated again measles?: ☐ Yes (go to question 22) ☐ No (go to question 25) ☐ Don't know (go to question 25)

23. What is the number of measles vaccine doses received? ☐One ☐Two ☐ More than two

Age of first dose_____

Age of second dose ___

Age of third dose____

24. Were these vaccinations given during routine programming (at the health center during vaccination days) or during a campaign, or both? : ☐ Routine program ☐ Campaign ☐ Both ☐ Don't know

25. Date last measles vaccine dose received? ___/____/_____ (GO TO QUESTION #22)

26. What is the main reason were you not vaccinated against measles?

☐ Clinic was too far ☐ Absent during vaccination campaign ☐Didn't know it was time for vaccination ☐ Think the vaccine will hurt the child ☐ Someone told you not to go ☐ You are scared of vaccines ☐ Other, (specify)_____

EXPOSURE

27. Did you have contact with a person with measles symptoms the 2-3 weeks before onset of illness? ☐ yes ☐ No ☐ Don't know

28. Have you travelled outside of your village the 2-3 weeks before onset of illness?

☐ Yes, ☐ No. If yes, District _____ Kebele_____

29. Is there other person with measles symptoms in your household?: ☐ Yes ☐ No

30. *Does the case have any symptoms of malnutrition? (Malnutrition being…)*: ☐yes, ☐ No.

    a. If yes, on OTP:☐ Yes, ☐ No

31. How long does it take you to walk to the health center from your house?

☐ Less than 10 minutes ☐ 10-30 minutes ☐31 minutes – 1 hour

☐ More than 1 hour ☐ More than 2 hours

32. *How many windows does the house have*

☐ Two or more windows or doors ☐less than two windows or doors

How many sleeping rooms are there in your house? _____

33. How many people slept in your house last night? _____

Annex 3 Surveillance Evaluation Questionnaire for Surveillance Sentinel SARI/ILI Site of Mekele Hospital, Tigrai Regional State, Ethiopia 2014.

BACKGROUND:

Region _____ Zone_____ Wereda _____

Site ☐ SARI ☐ ILI

Name Health facility_____

Total population _____ urban _____ rural _____ Male _____ Female _____

Respondent(s) _____

Address: Office no _____ Cell phone no _____ e-mail _____

PART ONE:

A. Communication and reporting system assessment

1. Which communication material did you have? ☐ E-mail ☐ wired phone ☐ mobile ☐ radio ☐ fax ☐ other----------
2. Did you have address of SARI/ILI regional/national PHEM focal persons? ☐ Yes ☐ No
3. How frequently you communicate with the regional/national PHEM focal persons on emergencies and other daily activities? ☐ daily ☐ weekly ☐ every 2 week ☐ monthly ☐ quarterly ☐ every 6 month ☐ yearly ☐ others----------
4. When are you expected to send weekly report to the regional/national PHEM unit? ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday
5. Did you send summary or short report to the administrative /program leaders or other responsible organs on planning, prevention and control activities addressing Important

issues at community level that have arisen through the surveillance system? ☐ Yes ☐ No

6. If answer for Q5 is yes to whom did you send? ----------

B. <u>Assessment of availability of Surveillance Documentation, Registers, and Forms</u>

1. Did you have National Guide line for SARI/ILI? ☐ Yes ☐ No ☐ Not Applicable
2. Did you have standard case definition for SARI/ILI? ☐ Yes ☐ No ☐ NA
3. Was the case definition posted? ☐ Yes ☐ No
4. Does all professionals aware of it? ☐ Yes ☐ No
5. If answer for Q2 is No, for which disease(s) did you lack the case definition?
6. Did you have case based reporting formats for SARI/ILI? ☐ Yes ☐ No ☐ NA
7. Was there national manual for surveillance? ☐ Yes ☐ No ☐ NA
8. Was there guide line for specimen collection, handling and transportation to the next level? ☐ Yes ☐ No ☐ NA
9. Is a specimen collected from every identified SARI? ☐ Yes ☐ No ☐ NA
10. *If all cases are not enrolled/ sampled, what is the sampling scheme used/how re cases selected for specimen collection and enrollment?*
11. *Is this method random?* ☐ Yes ☐ No ☐ NA
12. Is there a limit to the number of SARI cases that can be sampled on a weekly basis? ☐ Yes ☐ No ☐ NA
13. If yes, what is that number?
14. How are laboratory specimens collected in this hospital (please describe):
    a. Which staffs are responsible for specimen collection?
    b. How frequently are these staff trained in specimen collection and storage methods?
15. How are laboratory specimens packaged in this hospital? (please describe)
16. How are laboratory specimens transported to the confirmatory laboratory? (please describe):

17. How frequently are specimens transported to the confirmatory laboratory (e.g. daily/weekly/monthly):
18. Does the site have standard specimen collection forms printed, available, and in use? ☐ Yes ☐ No ☐ NA
19. Does the site have standard operating procedures for specimen collection, transportation, and storage written, accessible, and in use? ☐ Yes ☐ No ☐ Not
20. Is this a standard form provided by the national surveillance office/coordinator? ☐ Yes ☐ No ☐ Not
21. Please indicate which of the following items are included on the specimen collection form:
    a. Unique identifier ☐ Yes ☐ No ☐ Not Applicable
    b. Hospital name ☐ Yes ☐ No ☐ Not Applicable
    c. Person collecting specimen ☐ Yes ☐ No ☐ Not Applicable
    d. Age or date of birth ☐ Yes ☐ No ☐ Not Applicable
    e. Sex ☐ Yes ☐ No ☐ Not Applicable
    f. Date of symptom onset ☐ Yes ☐ No ☐ Not Applicable
    g. Date of specimen collection ☐ Yes ☐ No ☐ Not Applicable
    h. Type of specimen collected: ☐ Yes ☐ No ☐ Not Applicable
        i. Nasal swab ☐ Yes ☐ No ☐ Not Applicable
        ii. Throat swab ☐ Yes ☐ No ☐ Not Applicable
        iii. Nasopharyngeal swab ☐ Yes ☐ No ☐ Not Applicable
        iv. Nasopharyngeal aspirates or washes ☐ Yes ☐ No ☐ NA
        v. Nasal wash
        vi. Other (please describe)
22. Please indicate which PPE are rountinely used during the collection of specimens
    a. Gloves
    b. Gown/Lab coat
    c. Safety glasses
    d. Respiratory protection type
        i. Mask

ii. Respirator

23. Is hand washing required before & after specimen collection?
24. Are specimen collection materials readily available? ☐ Yes ☐ No ☐ Not Applicable
25. If yes, for how many specimens are materials routinely available?
26. Please indicate which collection materials are available
27. Tongue depressors ☐ Yes ☐ No ☐ Not Applicable
    a. Swabs ☐ Yes ☐ No ☐ Not Applicable
    b. Vials containing VTM at 4°C ☐ Yes ☐ No ☐ Not Applicable
    c. Alcohol/bleach ☐ Yes ☐ No ☐ Not Applicable
    d. Packaging materials for transport ☐ Yes ☐ No ☐ Not Applicable
28. How often are specimens sent to the national laboratory for confirmatory testing?
29. How are specimens stored?
    a. Refrigerated ☐ Yes ☐ No ☐ Not Applicable
    b. Freezer -20 ☐ Yes ☐ No ☐ Not Applicable
    c. Freezer -70 ☐ Yes ☐ No ☐ Not Applicable
    d. Liquid nitrogen ☐ Yes ☐ No ☐ Not Applicable
    e. Cold pack ☐ Yes ☐ No ☐ Not Applicable
    f. Ambient temperature ☐ Yes ☐ No ☐ Not Applicable
    g. Other (please describe)
30. For how long are specimens stored before being sent for testing?
31. Is there a system in place for monitoring the temperature of the samples in storage? (Y/N)
32. If yes, please describe that system
33. Are total numbers of specimens collected and tested ☐ Yes ☐ No ☐ Not Applicable
34. Are laboratory results reported back to clinicians? ☐ Yes ☐ No ☐ Not Applicable
35. If yes, how often are laboratory results received at the site/reported to clinicians?
36. What is the typical lag time between specimen collection & reporting of results to clinicians?
37. Are total numbers of positive and negative specimens reported to a surveillance focal point? ☐ Yes ☐ No ☐ Not Applicable

38. If yes, how often are these results reported (eg weekly/monthly, etc)?

39. Have you faced any outbreaks of SARI/ILI?

40. Did you have line list for reporting outbreaks? ☐ Yes ☐ No ☐ Not Applicable

C. <u>Data analysis, Computer skill and training assessment</u>

1. Had you trained on SARI/ILI surveillance system on
    a. Application of standard case definition & identification of cases? ☐ Yes ☐ No
    b. Case sampling & enrollment procedures (eg random sampling, etc)? ☐ Yes ☐ No
    c. Specimen collection, storage, and shipment? ☐ Yes ☐ No
    d. Completion of specimen collection and clinical/.epidemiologic data forms? ☐ Yes ☐ No
    e. Recording & reporting of aggregate weekly hospital admissions, SARI admissions, patient enrollment, etc? ☐ Yes ☐ No
2. If answer for Q1 is yes a) when----------? b) Topic----------? c) For how long? ----------
3. Was data compiled? ☐ Yes ☐ No
4. Did you have computer? ☐ Yes ☐ No
5. It is functional? ☐ Yes ☐ No
6. How the data entry and compilation is accomplished? ☐ Manual ☐ Computer ☐ other----------
7. Did you have computer skill on ☐ Ms word ☐ Ms excel ☐ MS power point ☐ Epi-info
8. Did you analyze data of the surveillance system? ☐ Yes ☐ No
9. If answer for Q8 is yes, did you describe data by ☐ time ☐ place ☐ person
10. Did you have denominators for data analysis? ☐ total pop ☐ male ☐ female ☐ <5
11. Please indicate the frequency of your data analysis. ☐ weekly ☐ every two week ☐ Monthly ☐ quarterly ☐every 6 month ☐ annually ☐ No regular time
12. Did you notify the results of your analysis to the higher level PHEM? ☐ Yes ☐ No
13. Did you notify the results of your analysis to the lower level PHEM? ☐ Yes ☐ No

D. <u>Outbreak investigation and case confirmation assessment</u>

1. Had you investigated any outbreak in 2005 or 2006 EFY? ☐ Yes ☐ No , list if any
2. Did you have outbreak investigation check list? ☐ Yes ☐ No
3. If answer for Q2 is No, how did you know possible factors for the outbreak?

   ---

4. Where was laboratory confirmation of cases? ☐ regional lab ☐ Hospital ☐ EHNRI ☐ HC ☐ other----------
5. Who was responsible to investigate an outbreak? ☐ RRT ☐ HEWs ☐ staffs of woreda health office ☐ experts organized randomly ☐ health facility staffs ☐ other----------
6. Had you faced any challenge in outbreak investigation in 2004 EFY? ☐ Yes ☐ No
7. If answer for Q7 is yes,

   a) List the challenges ----------

   b) List the alternatives that you took to tackle the challenges ----------

E. <u>Supervision and feedback assessment</u>

1. Were you supervised by higher level officers in 2004 EFY? ☐ Yes ☐ No
2. Had you received feedback from higher level supervisors in 2006 EFY? ☐ Yes ☐ No
3. If answer for Q2 is yes how many feedbacks did you received in 2006 EFY? ----------
4. Had you faced any challenge on supervision and feedback in 2006 EFY? ☐ Yes ☐ No

<u>PART-TWO</u>

Describe Each System Attributes:

I. IS THE SURVEILLANCE SYSTEM HELPFUL?

1. To detect outbreaks early on time to permit accurate diagnosis? ☐ Yes ☐ No
2. To estimate the magnitude of morbidity and mortality? ☐ Yes ☐ No
3. Permit assessment of the effect of prevention and control programs? ☐ Yes ☐ No
4. To estimate research intended to lead to prevention and control? ☐ Yes ☐ No

II. Simplicity:

1. Is the case definition easy for case detection by all level health professionals? ☐ Yes ☐ No
2. Does the surveillance system allow all levels of professionals to fill data? ☐ Yes ☐ No
3. Does the surveillance system help to record and report data on time? ☐ Yes ☐ No
4. Does the surveillance system have necessary information for investigation? ☐ Yes ☐ No
5. Does the surveillance system allow updating data on the cases? ☐ Yes ☐ No
6. How long does it take to fill the format? ☐ <5 min ☐5 to 10 min ☐ 10 to15min ☐ >15 min
7. How long does it take to have laboratory confirmation? ----------

III. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? ☐ Yes ☐ No
2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? ☐ Yes ☐ No , Add your explanation ----------
3. Is the system easy to add new variables? ☐ Yes ☐ No
4. Is the surveillance system easy to integrate with other systems? ☐ Yes ☐ No
5. Is the surveillance system easy to add new disease on report? ☐ Yes ☐ No

IV. Data quality

1. Are all reported forms Complete? ☐ Yes ☐ No
2. If answer for Q1 is No, how many unfilled spaces are in your 2004 EFY report? ----------
3. Percentage of unknown or blank responses to variables from the total reports of 2004 EFY report---
4. Percent of reports which are complete(that is with no blank or unknown responses) from the total reports ----------

5. Is the recorded data clear to read and understand? ☐ Yes ☐ No
6. If answer for Q5 is No, how many records are not clear/are difficult to understand in 2004 EFY report? --------
7. Percent of records which are difficult to read/ understand. ----------

V. Acceptability

1. Did you believe the surveillance is important for public health intervention? ☐ Yes ☐ No

2. Did you accept the influenza surveillance system? ☐ Yes ☐ No

3. Do you think the reporting agents accept and well engaged to influenza surveillance activities? ☐ Yes ☐ No

4. If yes, how many are active participants (of the expected)? ----------

5. 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 for their contribution

C) Reporting formats are difficult to understand

D) Report formats are time consuming

E) Other: ----------

6. Were all participants using the standard case definition to identify cases? ☐ Yes ☐ No

7. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? ☐ Yes ☐ No

8. Were all the health professionals aware about the surveillance system? ☐ Yes ☐ No

9. Was all PHEM officers send report on time? ☐ Yes ☐ No

VI. Representativeness

1. Was the surveillance system enabled to follow the health and health related events in the whole community? ☐ Yes ☐ No
2. If answer for Q1 is no, who do you think is well benefited by the surveillance system? ☐ The urban ☐ the rural ☐ both

3. Are all the Socio demographic variables included in the surveillance reporting format? ☐ Yes ☐ No
4. If the answer for Q3 is No, which a) Sex---- b) age group---C) ethnic group----d) religion---- is less represented?

VII. Timeliness

1. Are all reporting sites reporting on time? ☐ Yes ☐ No
2. Percent of reporting sites that report on time. ----------

VIII. Completeness

1. Are all reporting sites reporting? ☐ Yes ☐ No
2. *Is all surveillance data completed?* ☐ Yes ☐ No
3. Percent of Health facilities that send report of each week in 2004 EFY. ----------

IX. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance? ☐ Yes ☐ No
2. Was there lack of resources that interrupt the surveillance system? ☐ Yes ☐ No
3. Was there any time /condition in which the surveillance is not fully operating? ☐ Yes ☐ No
4. If the answer for Q3 is yes, explain why? ----------

X. Sensitivity

1. Does the SARI/ILI case definition able to pick all cases? ☐ Yes ☐ No
2. What was the total SARI/ILI cases occurred in your wereda/site in 2006 EFY? _____
3. What were the total numbers of suspected SARI/ILI cases examined? ____
4. How many of those cases were laboratory confirmed? Write the number with type_____

Influenza Surveillance Evaluation Questionnaire for Regional PHEM

BACKGROUND:

Region _____ Zone_____ Wereda _____

Total population _____ urban _____ rural _____ Male _____ Female _____

Respondent(s) _____

Address: Office no _____ Cell phone no _____ e-mail _____

No.	Question	Coding Classification		
General Information				
1	What kind of influenza/respiratory disease surveillance systems are currently operating, for how long, and who is responsible for their operation and oversight			
	Type of System	Yes/No		
	a. ILI outpatient sentinel site surveillance			
	b. Non-sentinel ILI outpatient surveillance			
	c. SARI/Pneumonia hospital-based sentinel site surveillance			
	d. Events based /Outbreak surveillance			
	e. Do all of the systems above share their specimens with the national influenza laboratory?			
	f. Do all of the systems above share clinical and/or epidemiologic data with national surveillance staff?			
	g. Are specimens, testing results, and data from all of the above systems kept track of separately? (e.g. Are ILI and SARI tracked/able to be analyzed separately)			
2	How many sentinel SARI/ILI sites have been established, and in what sorts of facilities? _____Hospitals…….HC……..HP			
	Type of facilities	# of sites		
		SAR	ILI	

		I		
	General Hospitals			
	HC			
	Clinics			
	HPs			
3	How were these sites selected? (E.g. what selection criteria were used?	Y/N		
	a. Is participation in the sentinel surveillance program voluntary for each site?			
	b. Are any incentives provided to the facility from the national level for undertaking surveillance activities?			
	c. IF yes, what are the incentives?			
4	Does each site have surveillance focal points/staff assigned to oversee surveillance activities? (Y/N)			
	a. Who are the staff overseeing surveillance/what are their qualifications?			
	b. Please describe the duties and responsibilities of site surveillance staff:			
5	Has a regional protocol for SARI (or influenza) surveillance or a set of standard operating procedures (SOPs) been developed? (Y/N) Comments			
	a. If yes, who developed this protocol?			
	b. Does the protocol includes clearly defined objectives for the surveillance system? (Y/N)			
	c. If yes, what are those objectives?			
	d. Has a copy of the protocol been distributed to each sentinel surveillance site? (Y/N)			
	e. Has the protocol, it's objectives, and the SOPs contained I n it been presented to all participating			

	surveillance staff at all sites?/		
	f. Have staff been trained in implementation of the protocol? (Y/N		
6	How frequently are site-level staff trained in each of the following (eg one time, annually, bi annually, etc):		
	Training	Frequency	
	Application of standard case definition & identification of cases		
	Case sampling & enrollment procedures (eg random sampling, etc)		
	Specimen collection, storage, and shipment		
	Completion of specimen collection and clinical/.epidemiologic data forms		
	Recording & reporting of aggregate weekly hospital admissions, SARI admissions, patient enrollment, etc		
Regional Data Aggregation & Analysis			
7	a. Are data from different surveillance systems maintained in different databases or otherwise distinguishable from one another? (Y/N)		
	b. How frequently are site-level data compiled and analyzed at the regional level (eg weekly/monthly, etc)?		
	c. Who analyzes this data?		
8	**a.** Is a report describing national influenza activity produced at the central office using data received from participating sites?		
	b. If yes, with whom is this report shared?		
	c. How is this report published?		
	Email		
	Paper report by post		
	Telephone		
	d. Which of the following analyses/charts are included in this report?		
	ILI consultations/Total consultation		
	Flu positive ILI specimens/Total tested ILI specimens		

	SARI admissions/Total admission		
	Flu positive SARI specimens/Total tested SARI Specimens		
	Positive flu specimens by type & sub-type		
	e. How frequently is this report prepared (eg weekly/monthly, etc)? (If a report is available, please request a copy)		
	National/Regional Monitoring & Evaluation of ILI Sentinel Sites		
10 **10a**	How frequently does regional/national surveillance staff visit each sentinel site for evaluation, quality control, or assessments? • Regional_____ • National_____ What sorts of activities are performed on these visits? (please describe)		
10b	Are clinic logbooks verified on site visits to verify that all ILI cases are being identified and documented? (Y/N)		
10c	Are feedback and recommendations from these visits documented? (Y/N)		
10d	Are those documents shared with sites? (Y/N)		
11	Does regional/national surveillance staff monitor the quality and completeness of epidemiologic data received from each of the sites? (Y/N)		
	a. How is that quality monitored?		
	b. How frequently is the quality/completeness monitored?		
	c. How frequently are those quality findings/comments reported back to sites?		
	d. Is an indicator checklist used to monitor quality and completeness? (Y/N) (If so, please obtain a copy)		
	e. Are feedback and recommendations from these findings given to sites individually?		
	f. If so, how frequently are such feedback and recommendations provided?		
12	Does regional/national surveillance staff follow up with sites when timely submissions of aggregate data are not received?		

12a	(Y/N) If yes, what is the lag period/when do national staff follow-up?	
12b	What proportion of SARI/ILII sites submits their complete data by the due date on a weekly basis?	

Epidemic response and preparedness assessment

	Activities	Y/N	
1	Did you have plan for epidemic response and preparedness?		
2	Did you have emergency stocks of drugs and supplies?		
3	If answer for Q2 is No, how did you control epidemics?		
4	Was an epidemic management committee built in your office?		
5	Did the epidemic management committee have regularly scheduled meeting time?		
6	Was Rapid response team (RRT) built in your office?		
7	Did the RRT have regularly scheduled meeting time during epidemics?		
8	Did you have case management protocol for epidemic prone diseases?		
9	Did your PHEM have multi sectoral emergency preparedness and response task force?		
10	Were partners working together with your office on emergencies?		
11	If answer for Q10 is yes, what type of supports did they give to your office?		
12	Was there a budget for epidemic response?		
13	Who had the authority to mobilize the emergency finance? ¨wereda head ¨ wereda health department ¨ experts ¨ other----------		
14	Had you a car assigned for emergencies (PHEM)?		
15	If answer for Q14 is NO, how did you address emergencies?		

Influenza Surveillance Evaluation Questionnaire for National Laboratory

BACKGROUND:

National Laboratory Name_____

Date of Interview_____

Respondent(s) _____

Address: Office no _____ Cell phone no _____ e-mail _____

No.	Question	Coding Classification	
General Information			
1	Does the national laboratory receive all specimens from all ILI?SARI sentinel sites? (Yes/No)		
Specimen Processing and Testing			
	Platform	Yes/No	
	RT-PCR		
	Rt Rt-PCR		
	IFA		
	Viral Culture		
	Rapid Test		
2	If multiple testing platforms are used, is a testing algorithm in use for priority testing by different platforms? (Y/N)		
	If yes, what is that algorithm?		
	What type of data is recorded for each specimen?		
	Type		
	Subtype		
	Strain		
	Does the national laboratory routinely test influenza specimens for any other respiratory disease? (Y/N)		
	If yes, please list pathogen(s) and test(s)		

3	What is the weekly maximum sample testing capacity at the national laboratory?		
	How are specimens stored at the national laboratory?		
	What are the typical lag times between receipt of specimens at laboratory and the testing and reporting of results?		
Data Management & Tracking & Analysis			
	Are specimens received from sites marked with a unique ID that enables a linkage to individual cases and to clinical/epidemiologic data? (Y/N)		
	If yes, do those IDs differentiate between sentinel ILI or SARI and specimens from other systems (eg is it possible to record test results from different systems separately?) (Y/N		
	Are all specimens received accompanied by a corresponding data collection form? (Y/N)		
	Are laboratory testing results recorded in a national influenza database/table? (Y/N) Who enters data and manages that database? How frequently is that database updated with testing results?		
	Are ILI and SARI cases identified separately in that database? (Y/N)		
	Is the total number of specimens received for testing recorded? (Y/N) Is the total number of specimens tested recorded? Is the total number of positive specimens recorded? (Y/N)		
	How frequently is this data analyzed to observe patterns in influenza activity? Who does this analysis		
Reporting			
	How frequently are basic testing results shared? With whom is this information shared?		
	How frequently are the analyzed results of testing outcomes shared? With whom are these results shared?		
	How many isolates have been sent from the national laboratory to WHO CC in the past year? In the past three years? With what frequency are samples shared with a WHO CC?		

	Does a protocol exist for sharing specimens with a WHO CC? (Y/N)		
Specimen Quality & Site Monitoring			
	Do national laboratory staff follow up with sentinel sites when specimens are not received by the scheduled date?		
	Does the national lab routinely monitor the quality of specimens submitted by sentinel sites?		
	If yes, how is quality monitored?		
	How frequently is quality reported to the sites?		
	Is this feedback documented?		
	Is there a system to track actions taken as a result of feedback/actions to be taken?		
	If yes, please describe that system		
Find the result of Mekele hospital by type and age and also in season.			

Annex 4 Health profile data description of Kilte Awlaelo Wereda, Easter Zone of Tigray Regional State, Ethiopia April 2014

1. Historical

- Wereda Name
- How and why the name given [1].
- Any other historical aspect about the Wereda
- Administrative towns
- Kebeles
    - Rural
    - Urban
- Council
- Representative for federal parliament [2].
- Sectors and ministry office, where they found
- Main supporting organizations

Geographical coordinate

- Latitude
- Longitude
- Annual Rain Fall (average)
- Climatic zone_____(%)_____ ____(%)_____(%)
- Wereda boundaries
  North_____
  South_____
  East_____West_____ _____
- Map of the zone

- Culture
- Main transport and how they connected each weredas, kebeles and with the capital city of the zone
- Telephone, mobile and internet
- Electric city

3. Demographic Data

- **Population**

S,No	Kebele	Sex		Total	Ser. No	Kebele	Sex		Total
		Male	Female				Male	Female	
1									
2									
3									
4									
5									

6									
7									
8									
9									
10									
Total					Total				

Population distribution

Se.No	Description	Total Population	%	Remark	
1	Male				
2	Female				
3	Urban population				
4	Rural Population				
5	Under 1 year				
6	Under 5 year				
7	5-15 year				
8	15 -49				
9	6-59 month age group				
10	24-59 month age group				
11	Pregnant women				
12	Non pregnant women in reproductive age				

4. Population pyramid

Population data by age and sex

Male	<5	5_9	10_14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	>64	Total
Female	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	>64	

Total															

Characteristics	Frequency	Percentage
Ethnic/language		
Tigri		
Amhara		
Kunama		
Erob		
Others		
Religion		
Orthodox		
Muslim		
Protestant		
Others		
Occupation		
House Wife		
Student		
GOV employment		
Merchant		
Others		
Water Source		
Pipe		
River		
Wale		
Others		

5. Economy (mainstay of the economy, average income levels etc)

Main income sources

- Agriculture
  - Cultivated area_____
  - Grazing area_____
  - Cropping seasons_____
  - Land

density_____

- Livestock
- Tourism
- Trade
- Other business

House hold income source

- Agriculture_____ (#)
- Government Employer_____(#)
- Private Employer_____(#)
- Daily Laborer_____(#)
- Different business_____ (#)
- Jobless _____ (#)
- **Average Income_____**

Characteristics		Frequency	Percentage
Educational institution			
K.G			
Primarily School 1-8			
Secondary 9-10			
Preparatory			
College/ University			
TVET			
School health activities: Number of schools with Water supply			
Schools with functional latrines	Male		
	Female		
Schools with HIV/other Health clubs			

6. Educational Status

School Enrolment	Sex			
	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Illiterate				
KG				
1_8				
9_12				
TVT				
Collage/University				
School Age Children (target)				
School dropout in 6 months or year 2005 EFY				

Literacy status_____

< 15 years_____

>64 years_____

- Education
    - Universities……No of students…
    - High Schools…… No of students
    - Primary schools_____
    - Drop out…….% compare with the previous year …….% and means of drop out
    - Enrolment compare with the previous year

7. Water coverage

Characteristics	**Frequency**	**Percentage**
Total safe water coverage		
Main source of water supply • • • •		
Kebeles getting safe water		
Population getting safe water		
Daily water consumption per day per person		

Other Facilities

Characteristics	**Frequency**	**Percentage**
Transport		
Accessibility (main roads)		
Type of road		
How many kebeles have access to transportation		
Flow of transportation per day		
Telecommunication		
How many people have access to fixed telephone		
How many people have access to mobile phone (coverage)		
Post Office		
Bank		
Power supply		
How many house hold get power supply		

10 Disaster situation in the woreda

- Was there any disaster (natural or manmade) in the woreda in the last one year? _____
- Any recent disease outbreak/other public health emergency_____
- If yes cases_____ and deaths_____

9. Vital Statics and Health Indicators

- Infant Mortality Rate (IMR) _____(total <1 yr deaths this 2005yr_____)
- Child Mortality Rate_____(this year's total <15 yr deaths_____)
- Crude Birth Rate_____
- Crude Death Rate_____ (total deaths 2005yr____)

- Maternal Mortality Rate_____(2005 total maternal deaths_____)
- Contraceptive prevalence rate_____
- Contraceptive acceptance rate _____
- ANC rate (how many of the total expected pregnancies attended 1st ANC) _____
- ANC rate (how many of the total expected pregnancies attended 4th ANC) _____
- Percentage of deliveries attended by skilled birth attendants_____
- Percentage of deliveries attended by HEWs_____
- Percentage of deliveries attended by TBA _____
- Average family size_____

10. Immunization Coverage

Type of Vaccine	Vaccination Status			
	Zero dose	1st dose	2nd dose	3rd dose
BCG				
OPV				
Penta				
Measles				
PCV				
TT2				
Rotarix				

11. Health facilities

Ser.No.	Type of Health facility	Number		HF: Population Ratio	Total Number of beds	Remark
		Governmental	Non-governmental			
1	Hospitals					
2	HC					
3	HP					
4	Dxic laboratory					
5	Clinics					
6	Higher private clinics					
7	Medium private clinics					
8	Small private clinics					
9	Pharmacy					
10	Drug store					
11	Rural drug vendor					

Human resource distributions

Se.No	Profession	Number		Total	HP:population Ratio	Remark
		Male	Female			
1	Specialist					
2	GP					
3	HO					
4	Nurse BSC					
5	Clinical nurses					
6	Ophthalmic nurse					
7	Public nurse					
8	Ophthalmic nurse					
9	Midwife BSC					
1o	Midwife diploma					
11	Lab.Technology					
12	Lab. Technician					
13	Pharmacist					
14	Pharmacy technician					
15	Environmental HO					
16	X-ray technician					
17	Anesthetist					

18	Health assistance				
19	HEW				
	Total				
	Supportive staff				

12. Top causes of morbidity and mortality

Top ten leading causes of OPD visit (morbidity)

	Adult	Pediatrics/ < 5 years
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Top ten causes of admissions (Morbidity)

	Adult	Pediatrics/ <5 year
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Top ten causes of deaths (mortality)

Adult	Pediatrics/ <5 year

1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

13. Health budget allocation

Government

- Total budget allocated for the woreda _____
- Total budget allocated for health _____(____%)

Funds from NGO

- Total _____ (purpose/programs)_____

14. Community Health Services

Status of services provided by community health workers namely:

- No. of TBAs/TTBA_____ and their responsibility
- No. of CHWs/CHPs_____ and their responsibility
- Number of HEWs_____Responsibilities_____
- Others_____

15. Status of Primary Health Care Components – with focus on the eight PHC elements and MDG

- (Immunization, MCH, Essential drugs, Food and Nutrition, Education, Illness and injury, Water and Sanitation, Vector and reservoir)

- MCH (Delivery, ANC, PNC)

Serial No.	Indicator	Total Number
1	Number of ANC Cases Registered	

2	Number of pregnant provided TT2 Immunization	
3	PNC cases visited	
4	Number of children <1year receiving DPT immunization	
5	Number of children <5 year treated for diarrhea at public HF	
6	Number of children <5 year treated for pneumonia at public health facilities	
7	Number of facilities reporting stock out of contraceptive commodities	
8	Total deliveries conducted by skilled attendants	
	Number of live births	
	Number of still births	
	Total obstetrics/Maternal/deaths	
	Total Newborn deaths	

Family Planning Methods

Methods	Frequency	Percentage
Oral Contraceptive		
IUD		
Implant		
Injection		
Condom		

Is their EPI (outreach service?)

- Yes
- No

Conduct cold chain or vaccine management supportive supervision

- Yes
- No

If yes, do you have checklist?

- Yes
- No

Environmental Health and Sanitation

- Latrine coverage_____ & utilization rate_____

Type of Latrine

Type of Latrine	**Frequency**	Percentage
Open field		
Pit Latrine		
Ventilated Pit Latrine		
Others		

Solid waste management

Is their solid waste container?

- Yes
- No

Is their solid waste container loader?

- Yes
- No

If yes, frequency of solid waste collection_____

- Liquid waste management _____
- others_____

- Health Education (what, when, where, how and who conducted health education)_____

16. Endemic diseases

Malaria:

- Total malarious kebeles_____& Pop at risk_____
- ITNs coverage (including current dist)_____
- Is there IRS this year(No of kebeles)_____
- Total cases/yr_____ deaths/yr_____,<5yr cases_____ deaths_____
- Malaria supplies (Coartem, RDT, etc) shortage _____
- Other issues_____

TB/Leprosy:

- Total TB cases_____
- PTB negative_____
- PTB positive_____
- ExtraPTB _____
- TB detection rate _____
- TB Rx completion rate _____
- TB cure rate _____
- TB Rx success rate _____
- TB defaulter_____
- Death on TB Rx_____
- Total TB patients screened for HIV_____
- Total Leprosy cases_____on Rx_____

HIV/AIDS

- Total people screened for HIV (last one year)_____

- VCT_____ PITC_____PMTCT_____
- HIV prevalence_____
- HIV Incidence (new cases/yr)_____
- Total PLWHA_____
- On ART_____on Pre-ART_____
- Other HIV prevention activities_____

Nutrition

- Total Out Patent Therapeutic Program (OTP) sites_____, total admissions to OTP/yr_____
- Total SC sites,_____, Newly opened/yr_____, total admissions to SC/yr_____
- Is there TSF (targeted supplementary feeding) program in the woreda_____
- CBN program_____ PSNP_____other_____

17. Essential drugs (shortage)

18. **Epidemic prone diseases**

_____
_____
_____,

What do you think the main problems of the district are?

_____
_____
_____
_____
_____

Discussion of the highlights and the main findings of the health profile assessment and description

_____
_____
_____
_____
_____
_____

19. Problem Identification and Priority Setting – set priority health problems based on the public health importance, magnitude, seriousness, community concern, feasibility etc

Annex 5 Health and Nutrition Sector of Belg Assessment Questionnaire of South and South East Tigray Zone, Ethiopia 2014.

Woreda level

Interviewer name _____			Institution:_____	
Interview Date: (dd) ____/(mm)_____/2014_____			Region:_____ Zone:_____ Woreda_____	
Main contact at this location: Name:_____			Position:_____	Tel:_____
SECTION I: SOCIO- DEMOGRAPHIC PROFILE				
1.1. Woreda total population:	M:_____F:_____		Under 5_____	Total:____
1.2. Special Population ***(if any)***:	Pastorals____	Refugees____	IDPs____	Migrant Workers___

SECTION II: HEALTH PROFILE	
2.1. Coordination	
Is there a multisectorial PHEM coordination forum?	Yes□ No□
Is there a PHE preparedness and response plan?	Yes□ No□
Is there accessible emergency response fund?	Yes□ No□

2.2. Morbidity (List top 5 causes of Morbidity) in the year 2006 EC (Jan.- May 30, 2014)

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 Tir 2006 to Ginbot2006 (January–May2014) for the last 5 months

Month	AWD		Malaria		Measles		Meningitis		Other (specify)
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	
Jan. 2014									
Feb. 2014									
March 2014									
April2014									
May 2014									

2.4. Outbreak?	
Was there any outbreak in the last 5 months? YES_____ NO_____	
If yes, specify the type of disease Type of outbreak _____Number of cases _____Deaths ____(specify the time period)_____	
Is there any ongoing outbreak of any disease? YES_____ NO_____	
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____	

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____			
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____			
2.5. Preparedness: Is there emergency drugs and supplies enough for 1 month? Or easily accessible on need?			If yes, indicate the amount
Ringer Lactate (to treat AWD cases)	Yes□ No□		
ORS (to treat AWD cases):	Yes□ No□		
Doxycycline *(to treat AWD cases)*:	Yes□ No□		
Consumables : Syringes, Gloves *(for AWD management):*	Yes□ No□		
Amoxil susp (measles)	Yes□ No□		
Tetracycline ointment (measles)	Yes□ No□		
Vit A (measles)	Yes□ No□		
Coartem for Malaria	Yes□ No□		
Lab supply: RDT for Malaria	Yes□ No□		
Lab supply: RDT (pastorex) for Meningitis	Yes□ No□		
LP set	Yes□ No□		
Number of CTC kit available: (for AWD) _____			
Main shortage (if any): Specify_____			
Is budget allocated for emergency Rapid response by the woreda?	Yes□ No□		

SECTION III: RISK FACTORS			
Diseases	**Risk factors for epidemics to occur**	**Yes**	**No**
Malaria	Is it Malaria endemic area?		
	Is there presence of malaria breeding site?		
	Is there interrupted or potentially interrupting rivers?		
	Is there unprotected irrigation in the area?		
	Is LLINs coverage <80%?		
	Indicate the coverage of IRS 2005		
	Is there depleted prevention and control activities?		
	Number of malarious kebeles and total population in these Kebeles	Keb _____ pop _____	
Meningitis	Was there Meningitis epidemic in the last 3 years? (If yes specify date)_____		
	Has vaccination been conducted in the past 3 years?	Yes	No
	If yes: Indicate the date and number of people vaccinated?	Date_____	
AWD	Was there AWD epidemic in the last three years? (If yes specify date)_____	Yes	No
	Indicate Latrine coverage (%) _____		
	Latrine utilization (%) _____		
	Safe water coverage (%) _____		

Measles	Is there ongoing measles outbreak?		
	What is the measles vaccination coverage of 2006 for less than one year old children (Tir 2006-Ginbot 2006)?_____		
	Has SIA been conducted in 2006 EFY from Tir to Ginbot ?	Yes	No
	If yes, Indicate the month and number of children vaccinated including the age group	Month_____	
		No. Vaccinated___	
		Age group_____	

Any other observations you made or any risks of epidemics?

_____

_____

_____

_____

What were the major challenges in your Epidemic response experience?

_____

_____

_____

Section IV: Nutrition - TFP admissions at woreda level January to May 2014

Month	Total SAM Cases	Total Number of TFP (OTP/SC) in the woreda	Number of SC	Number of OTP.	Total Number of OTP/SC reported.	Therapeutic Supplies enough (for the next one month) Y/N			Children Discharged from TFP referred to SFP Y/N
						RUTF	F100	F75	
January									
February									
March									
April									
May									

Any comment

_____

_____

_____

_____

_____

_____

_____

_____

_____

Annex 6. Ebola Virus Disease Self-Response Assessment Questionnaire for Health Professionals in Ethiopia, 2015

This self-response questionnaire is prepared and shared with you just to know your personal views about EBOLA and the prevention preparedness. You are not required to write your name and the facility you are working for. As your responses are highly valued for the better planning and implementing of the EBOLA prevention endeavor in Ethiopia; we highly appreciate getting your views on the following questions, the earliest time possible.

If you have any complaints or questions please contact the PI, Dr. _____ with this Phone No:_____

A. Demographic details

Region----------Zone……Woreda……..

Age……Gender……Work in (Government, Private, NGO)……..

Profession	Educational level					Year of service				Working area (Hospital, HC, Clinic)	Previous EVD Training Yes/No
	Diploma	BSc	MPH/MSc	M D	Specialist	<1	1 - 5	5-10	>10		
Nurse											
Midwife											
Lab personnel											
Environmental Health											
Health Officer											
Medical Doctor											
Specialist											
Other											

B. General Knowledge

No.	Question	Yes	No	Reason
1	Is Ebola a serious disease?			
2	Is EVD unusual in the current outbreak?			
3	Is EVD has an economical impact?			
4	Is there EVD has a potential impact politically?			
5	Is there a potential for rapid spread of the disease to other countries?			
6	Is there an international concern about the disease?			

7. Do you know the reservoir for Ebola virus?
   a. Yes b. No
8. If yes for Q 7, write the name……..
9. Who are the age groups more at risk for EVD?

   a. Children under five years old
   b. 5- 15 years old
   c. adults
   d. All

10. How do you understand the transmission of EVD

    a. From infected animal to animals
    b. From person to person
    c. From animal to person
    d. All are possible answers

11. It is known that EVD and HIV disease are viral fatal disease, is there any difference in their transmission?
    a. Yes b. No
12. If your answer for Q11 is yes, state their difference
13. Do you know the incubation period of EVD? a) yes b)No
14. If your answer for Q.13 is yes write the incubation period of EVD

15. Which of the following signs and symptoms should be considered in EBOLA Viral Disease diagnosis
    a. Sudden onset of fever, headache and muscular pain
    b. Diarrhea, vomiting. Hiccup, bleeding, and abdominal pain

c. Bleeding only
d. A and b

C. Prevention and Control

16. EBOLA virus can be prevented by
    a. Avoiding touching the sick person without the protective devices
    b. Avoiding eating raw meat from wild animals
    c. Avoiding direct contact with blood, any fluid and soiled cloths of patient
    d. All of the above
17. Do you think prevention and control of EBOLA is difficult?
    a. Yes b. no
    If yes, why

    If no, can you state how

18. What is the route transmission of EVD? (you can choose multiple answers)
    a. Oral
    b. via the conjunctivae
    c. after mucous-membrane exposure: nose and mouth
    d. via sexual intercourse
    e. Via a penetrating object infected with body fluids of a patient

D. Preparedness

19. Do you think the health system of Ethiopia is ready in the preparedness of prevention of EBOLA outbreak?
    a. Yes b. No c. I do not know

For any of the response above please give your reasons

Annex 7. Malaria Investigation Questionnaire of Kafta Humera Woreda, Western Tigray, Ethiopia, 2015.

Socio-demographic information:

48. ID number of respondent_____
49. Age in years_____
50. Sex: M☐ F ☐
51. Address: Region _____Zone_____ Woreda_____ kebele _____village_____

52. Occupation: Employed ☐ unemployed ☐ Student☐ Pastoralist ☐ farmer

53. Total family members _____
54. Ethnicity: _____

55. Religious: Orthodox, ☐ Protestant, ☐ Muslim ☐ other ☐

56. Marital status : Married, ☐ single ☐ Widowed ☐ Divorced☐

57. Education status: Illiterate ☐ Primary, ☐ Secondary ☐ tertiary ☐, non-formal ☐

58. Case status

c) Case Yes ☐ ,

d) Control yes☐

Clinical presentations:

***(For case only)**

59. What was the first symptom? _____
60. When was the 1st symptom started(date of onset of symptoms) DD/MM/YY_____
61. What were others symptoms?

ff) Fever: Yes ☐ No☐, if yes duration of fever____ Was it constant fever?: Yes ☐ No☐ or every other days fever? Yes ☐ No☐

gg) Vomiting : Yes ☐ No☐

hh) Diarrhea : Yes ☐ No☐,

ii) Anorexia (appetite loss): : Yes ☐ No☐,

jj) Headache: Yes ☐ No☐

kk) sweating,: Yes ☐ No☐,

ll) Chilling and shivering : Yes ☐ No☐,

mm) Weakness : Yes ☐ No☐,

nn) Caught: : Yes ☐ No☐,

oo) back pain : Yes ☐ No☐,

pp) muscle pain : Yes ☐ No☐,

qq) rigor: Yes ☐ No☐,

➧ ***Ask the following signs and symptoms for complicated malaria only***

rr) Altered consciousness (e.g. confusion, sleepy, drowsy, comma) Yes ☐ No☐,

ss) Not able to drink or feed Yes ☐ No☐,

tt) Severe dehydration, Yes ☐ No☐,

uu) Persistent fever, Yes ☐ No☐,

vv) Frequent vomiting Yes ☐ No☐,

ww) Convulsion or recent history of convulsion Yes ☐ No☐,

xx) Unable to sit or stand up Yes ☐ No☐,

yy) pallor (Anemia) Yes ☐ No☐,

zz) No urine output in the last 24 hours Yes ☐ No☐,

aaa) Bleeding Yes ☐ No☐,

bbb) Jaundice (yellowish coloration) Yes ☐ No☐,

ccc) Difficult breathing Yes ☐ No☐,

ddd) Other conditions that cannot be managed at this leve_____
_____

62. Did you visit health facilities? Yes☐ No☐, if yes, when did you visit health facilities? DD/MM/YY_____

63. Blood samples taken: Yes-☐ No ☐

64. If yes Q16, what was the result : Positive ☐ negative ☐

65. Did you get any treatment 1.Yes ☐ No☐, If yes, what treatment did you get?

(f) Coartem Yes ☐ No☐, was it for PF Yes ☐ No☐,

(g) Chloroquine? Yes ☐ No☐, was it for PV Yes ☐ No☐,

(h) Quinine tablets Yes ☐ No☐, was it for pregnant and <5 Kg? Yes ☐ No☐,

(i) Quinine injection Yes ☐ No☐, was it for sever malaria Yes ☐ No☐,

(j) Other treatment given

_____

_____

_____

66. Did you recover completely after the treatment: Yes-☐ No ☐

67. Place of residence during 2 weeks before onset of illness;_____

Risk Factors:

***(For both cases and controls)**

68. Currently specific living areas woreda _____ Kebele _____Village

69. Sleeping areas inside home _____outside home_____

70. Working time Day-☐ Night ☐ Day and night ☐

71. Do you stay outside over night? Yes-☐ No☐

72. Is there anybody who stays with you with similar sign and symptoms? Yes-☐ No☐

73. Did you travel outside your village in the past 2-3 wks Yes-☐ No ☐

74. If yes Q 26, indicate

(d) date of travel DD/MM/Y_____

(e) the place of travel_____

(f) date when you returned back DDMMYY_____

75. If Q 26 is yes, Is there sick patients (same symptoms) in the place where you have been Yes-☐ No☐

76. Do you have bed net in your household (in the place where you stay) Yes-☐ No☐, If yes, how often do you use Always☐ Sometimes ☐Never ☐

77. Do mothers and children given priority of using bed nets? Yes-☐ No☐

78. If yes Q 29 the number of bed nets _____

79. Was deltamethrine sprayed this year? Yes-☐ No☐

80. If yes Q29 when?_____

81. If yes Q 29 how many? Once ☐ twice ☐

Environmental investigation

82. Place of stay during night? woreda_____kebele____Village_____

83. Is there any artificial water -holding containers close to your home? such as :

k. old tires: Yes-☐ No☐,

l. Plant in the containers /flower –pots Yes-☐ No☐,

m. Plant with temporary water pools Yes-☐ No☐,

n. Open deep well: Yes-☐ No☐,

o. Broken glass bottles Yes-☐ No ☐,

p. Cans Yes-☐ No☐,

q. Plastic container Yes-☐ No☐,

r. Gutter to collect rainwater: Yes-☐ No☐,

s. Uncovered water storage/ septic tank Yes-☐ No☐,

t. Stagnant water Yes-☐ No☐,

84. Presence of mosquito vectors/ mosquitoes breeding sites around the home/work place or vicinity? Yes-☐ No☐,

85. If Q37 yes, presence of larvae in breeding sites Yes-☐ No☐,

86. Types of house screened Yes-☐ No ☐, unscreened Yes-☐ No ☐, No house Yes-☐ No ☐,

87. Do you use repellents Yes-☐ No☐,

88. Protective clothing Yes-☐ No☐,

89. Unprotected irrigation Yes-☐ No☐,

90. Presence of Intermittent rivers cloths to the community Yes-☐ No☐,

Awareness assessment

91. Do know malaria? Sign and symptoms ----------

92. How it transmitted?----------

93. How it can be prevented?----------

Declaration

I, the undersigned, declare that this is my original work and has never been presented by another person in this or any other University and that all the source materials and references used for this thesis have been duly acknowledged.

Name: Desta Gidena

Signature _____

Place: Ethiopian Public Health Institute

Date of Submission: 15-May-2015

The thesis has been submitted for examination with my approval as a university advisor.

Name of advisor: Dr. Daddi Jima

Signature: _____

Date _____