

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

Getachew Abebe (BSc)

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

June 2015
Addis Ababa

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List of Abbreviations

AAU	Addis Ababa University
AFB	Acid Fast Bacilli
AFI	Acute Febrile Illness
AFNET	Africa Field Epidemiology Network
ANC	Anti Natal Care
ANRS	Amhara National Regional State
AOR	Adjusted Odds Ratio
AR	Attack Rate
ART	Anti Retroviral Therapy
ASAR	Age Specific Attack Rate
BCC	Behavior Change Communication
BCG	Bacillus Culmate Guerin
BPR	Business Processing and Re-engineering
CBR	Crude Birth Rate
CDR	Crude Death Rate
CFR	Case Fatality Rate
CI	Confidence Interval
CM	Child Mortality
COR	Crude Odds Ratio
CR	Cure Rate
DALY	Disability Adjusted Life year Lost
DOT	Directly Observed Therapy
EFETP	Ethiopian Field Epidemiology Traing Program
EHNRI	Ethiopian Health and Nutrition Research Institute
EPHA	Ethiopian Public Health Association
EPHI	Ethiopian Public Health Institute
EPI	Extended Program for Immunization
EPTB	Extra Pulmonary Tuberculosis
ETB	Ethiopian Birr
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussion
FMoH	Federal Ministry of Health
FMoW	Federal Ministry of Water
GDP	Gross Domestic Product
GPS	Global Positioning System
HEW	Health Extension Workers
HF	Health Facility
HMIS	Health Management Information System
IEC	Information Education Communication
IgM	Immune globulin M

IMNCI	Integrated Management of New borne and Child Illness
IMR	Infant Mortality Ratio
IPD	Inpatient Department
IRS	Indoor Residual Spray
ITN	Insecticide Treated Nets
LLIN	Long Lasting Impregnated Nets
MASL	Meters Above Sea Level
MCV	Measles Containg Vaccine
MDG	Millennium Development Goals
MIS	Malaria Indicator Survey
MMR	Maternal Mortality Ratio
MUAC	Middle Upper Arm Circumstance
NGO	Non Governmental Organizations
NSP	National Strategic Plan
NVP	Neverapine
ONRS	Oromyia National Regional State
OPD	Outpatient Department
PAB	Protected At Birth
PHEM	Public Health Emergency Management
PI	Principal Investigator
PITC	Provider Initiated Testing and Counseling
PMTCT	Prevention OF Mother To Child Transmission
PNC	Post Natal Care
RDT	Rapid Diagnostic Test
RHB	Regional Health Bureau
RR	Reproduction Ratio
SAM	Severe Acute Malnutrition
SNPTB	Smear Negative Pulmonary Tuberculosis
SPH	School of Public Health
SPPTB	Smear Positive Pulmonary Tuberculosis
SPSS	Statistical Package for Social Scientists
TSR	Treatment Success Rate
TVET	Technical Vocational Education Traing
U5MR	Under Five Mortality
USD	United States Dollar
VCT	Voluntary Counseling and Testing
VPD	Vaccine Preventable Disease
WHO	World Health Organization
ZHD	Zonal Health Department

Executive Summary

The Ethiopian Field Epidemiology training program (EFETP) is a competency based training and in-service program in applied epidemiology and public health domain.

The program is a two years field based Masters Program and dedicated, through a combination of 25% classroom learning and 75% on-the-job training and service to applied field oriented public health practice. The objective of this program is to build up public health capacity throughout the country. It is expected that residents spend 75% of the program time in the field assignment location (field base) by performing their expected outputs. The School of Public Health/Addis Ababa University, the Federal Ministry of Health of Ethiopia / Ethiopian Public Health Institute (EPHI), and the Ethiopian Public Health Association (EPHA) / CDC Ethiopia are running the program in collaboration.

This document is compiled body of works accomplished during the two years time in the field epidemiology training program in Addis Ababa university- School of public health. This compiled body of works has nine sections or chapters which all of them were completed during the residency time of the program. All the nine parts are expected minimum outputs during the residency period. These are outbreak investigation (both Measles outbreaks in Fogera of Amhara and Chewaka woreda of Oromyia), report of analysis of surveillance data (magnitude of all form TB in Amhara region from 2010-2013), evaluation of measles and malaria surveillance system (in Jawi woreda of Awi zone during June/2014), description of a health profile report (in Jawi woreda of Awi zone, during March/2014), writing of finalized scientific manuscript for peer reviewed journals (on Fogera measles and Chewaka measles), abstract submission for presentation in scientific conferences (measles and on tuberculosis), writing a protocol/proposal on an epidemiologic research project (assessment of LLINs utilization in high risk groups in malaria control in Jawi district May/2015), summary of a disaster situation visited/conducting a risk assessment in(North Gondar, South Gondar and West Gojjam zones). The purpose of outbreak investigation was to provide guidance on interventions to be taken in the control & prevention of the disease distribution.

The surveillance evaluation was carried out in Jawi, Awi zone, Amhara regional state, North West Ethiopia in June/2014. This surveillance system evaluation was done by taking the Jawi district health office, two health centers (Jawi and work meda health centers), and five health posts. The health profile assessment was also performed in Jawi woreda, Awi Zone and the findings were communicated with woreda health office head. I have also written two abstracts and submitted to the 2015 EIS conference. Data analysis on the magnitude of tuberculosis in Amhara region, on four years data set.

Meher assessment in South Gondar, North Gondar and West Gojjam Zones of Amhara region were incorporated in this body of works as a narrative report of disaster situation visited. A finalized epidemiologic research project proposal entitled “assessment of LLINs utilization in high risk groups in malaria control in Jawi district, Amhara, North West Ethiopia” was written and included as one part of this compiled body of works. In order to accomplish all the above nine outputs of residency and other additional works, I experienced different techniques and methods which helped me to gain a good experience and practice in public health activities at field and in office during office hours.

Other activities such as provision of training for public health emergency management (PHEM) officers working at different levels (regional to health facility level) on public health surveillance and response were also undertaken. The trainings were organized by the Amhara regional health bureau, Public health emergency core process.

The regional and national review meetings were attended in 2014. Great opportunity was also obtained and training was organized in UAE-Dubai city by MENTOR malaria initiative on malaria and other vector borne diseases.

Chapter I – Outbreak/Epidemic Investigations

1.1 Measles outbreak investigation in Fogera woreda, south Gondar zone, Amhara region, North West Ethiopia, December, 2014

Abstract

Background: Globally an estimated number of 20 million cases and 164,000 deaths occur from measles each year. Airborne transmission of measles virus has been documented with reproduction ratio (RR) of 12-18. Measles is still a public health problem in many developing countries, particularly in parts of Africa and Asia. The aim of investigation was to identify etiologic agent, risk factors and institute doable intervention measures.

Methods: A 1:2 unmatched case-control study was applied from December 20-30/2014 and data were collected using structured questionnaire. The data were entered in to SPSS version 16, Epiinfo7 and MS-Excel work sheet, Odds Ratio, 95% CI and P-value were constructed to measure the significance of association in bivariate and multivariate analysis.

Results: The outbreak stayed for 24 weeks and a total of 404 suspected cases of measles and six cases were died with CFR of 1.5%. The mean age of the cases was 11.9 years with a range of 9 months - 35 years and mean age of controls was 5.5 years with a range of 1-21 years. The overall attack rate (AR) of the case was 163/100,000 populations. Odds of illness among non vaccinated (AOR: 5; 95% CI: 1.5-16.2; P: 0.006) compared to vaccinated, odds of illness among people with contact (AOR: 19.6; 95% CI: 1.3-290; P< 0.029) compared to people without contact with cases, odds of illness among people with travel history (AOR: 14.9; 95% CI: 3.8-58; P< 0.001) compared to without travel history, odds of illness among age group from 5-15 years (AOR: 38.5 ; 95% CI: 3.6-410; p < 0.002) compared to others. These were significant factors in both bivariate and multivariate analysis.

Conclusion: Unvaccinated children less than 15 years of age were primarily affected by this outbreak. The case fatality rate was greater than 1%. Delayed case management and late investigation worsened the situation of an outbreak in the affected locality. Absence of vaccination, contact with the suspected individuals and travel history to affected areas were found to be risk factors. Mass vaccination and active case management to contain the epidemics is strongly recommended.

Key words: Measles, Outbreak, Fogera, Ethiopia

Background

Globally an estimated number of 20 million cases and 164,000 deaths occur from measles each year [1] and in 2013 there was 145,700 deaths globally, with majority of under 5 and about 400 deaths every day or 16 deaths every hour and approximately two to three deaths may occur for every 1,000 reported measles cases, even though a safe and cost-effective vaccine is available [2].

Measles vaccination resulted in a 75% drop in measles deaths between 2000 and 2013 worldwide. In 2013, about 84% of the world's children received one dose of measles vaccine by their first birthday through routine health services – up from 73% in 2000. During 2000-2013, measles vaccination prevented an estimated 15.6 million deaths making measles vaccine one of the best buys in public health domain [2, 3].

Measles is an acute, highly contagious viral disease caused by measles virus (genus Morbillivirus of the Paramyxoviridae family) with incubation period of approximately 10–12 days from exposure to the onset of fever and other nonspecific symptoms and 14 days (with a range of 7–18 days), from exposure to the onset of rash. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva [4].

Measles is still a public health problem in many developing countries, particularly in parts of Africa and Asia. According to the World Health Organization (WHO), more than 20 million people are affected by measles each year with more than 95% of measles deaths occurring in countries that have low per capita incomes and weak health infrastructures. Measles does not usually kill children directly; however, as a result of its associated immune-suppression, it can lead to lethal complications, such as pneumonia, croup, and diarrhea. Measles can also lead to lifelong disabilities, including blindness, brain damage, and deafness [4]. The disease has remained the fifth leading cause of deaths among children less than five years of age, worldwide. It accounts for 44% of total deaths due to vaccine preventable diseases (VPD), among children less than 15 years, the highest mortality occurring in poor communities with malnutrition, overcrowding and low vaccination coverage [7].

Infant and under-five mortality are at 75 and 123 per 1,000 live births respectively. The high child mortality rate in Ethiopia is due to combined effects of a high incidence of infectious diseases and inadequate infant and young child nutrition. Measles accounts for 5% of child hood mortality. Ethiopia introduced measles vaccination in 1980, as part of the Expanded Program on Immunization (EPI), with the first dose of measles vaccine administered at 9 months of age. The measles immunization coverage remained below 50% until 2003. Following accelerated efforts to improve performance by the FMOH with

the support from EPI partners, the coverage has progressively improved since 2003. Administrative measles vaccination coverage increased from 44% in 2003 to 81% in 2010 at national level. Key contributing factors to improvement of performance include strengthening of links between health services and the community through the Health Extension Worker Program since 2003, the implementation of the Reaching Every District (RED) approach initiated in 2004 and enhanced routine immunization activities (ERIA) since 2009 [8].

High coverage of vaccination of children below the age of 15 years has led to reduction of measles cases by about 99% in developed or industrialized countries. Developing countries are failing to achieve high vaccination coverage, hence frequent outbreaks of measles with high case fatalities as high as 3- 30% do occur [9].

Ethiopia, being among those developing countries is experiencing measles epidemics throughout the country, though there is routine immunization session in almost all woredas at age of nine months. Measles outbreaks continue to be reported in twenty five *woredas* in Addis Ababa, Amhara, Dire Dawa, Oromyia and SNNP. In 2013, 4780 (6.5/100,000) confirmed measles cases were reported nationwide [14].

Fogera woreda also experienced suspected measles outbreak since 26 August 2014 (WHO-week35), two cases of measles were recorded in unvaccinated one young child and an adult from Guramba kebele of the woreda who have travel history to Estie woreda which was already reporting suspected measles cases. Later on consecutive WHO weeks until the end of December 2014, the woreda health office detected increasing number of cases of suspected measles for which sample was sent to national measles laboratory to be tested for measles IgM. The epidemics became widespread among sixteen kebeles in the Woreda. So, this outbreak investigation was carried out to identify etiologic agent, describe measles magnitude and identify risk factors associated with measles outbreak in Fogera woreda and undertake appropriate public health control measures.

Literature review

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. The WHO/UNICEF coverage estimates for measles vaccination in Ethiopia indicate an increase from 37 % in 2000 to 82% in 2010 [4].

Common source outbreaks associated with airborne transmission of measles virus have been documented with reproduction ratio (RR) of 12-18 and can vary with some sort of factors, (contact duration with ill people, infectiousness of the organism and susceptible population in the affected area) [5].

On 24 august 2013, measles epidemics was happened in Abaya woreda of Oromyia, with a total of 498 suspected cases of measles (incidence of 390 cases per 100,000) and two were died with CFR of 0.4%. The overall attack rate (AR) of the case was 390/100,000 populations. The attack rate is high in males (440 cases per 100,000 populations) than females (350 cases per 100,000 populations). Less than five years were more affected than the others (<5 yrs 1160/100,000 population and >5 yrs 24/100,000 population) [6].

In Ethiopia, the national confirmed measles attack rate recorded for the years 2013 and 2014 were 6.5/100,000 and 14.6/100,000 population respectively [10].

As WHO report of 2011 and 2012 in Ethiopia; Proportion of measles cases in children aged <5 years was higher compared to other age groups. The national measles containing vaccine coverage of 2012 was about 68.2% [11].

In DRC, overall during the 2010–2011 epidemics, 77, 241 measles cases and 1,085 deaths were reported in Katanga province. The overall cumulative AR was 0.71% and the case fatality ratio was 1.40% [12].

FMoH of Sudan conducted in two states in 2004, and identified 1,144 case-patients and 10 deaths within 30 days of rash onset with case fatality of about 0.9% [13].

Objectives

General objectives

The overall purpose of the outbreak investigation in Fogera woreda was, to know route causes and interrupt further transmission of the disease.

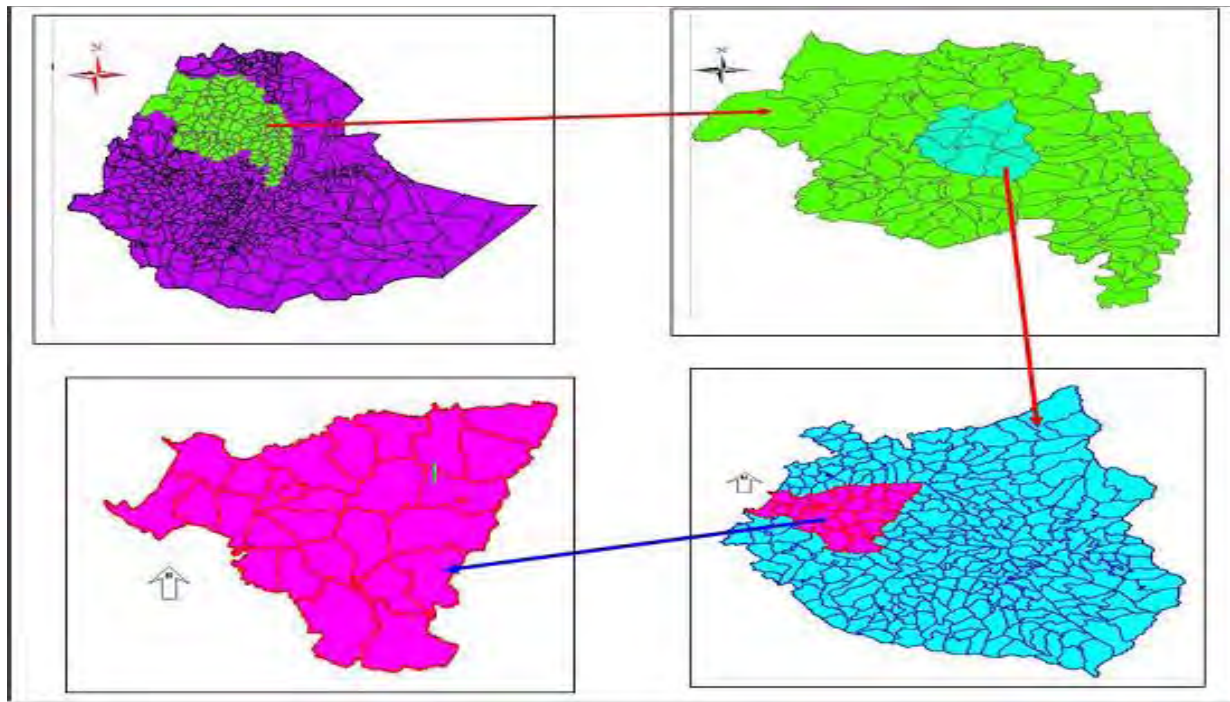
Specific objectives

- ❖ To identify etiologic agent
- ❖ To analyze risk factors and determine extent and magnitude of the outbreak
- ❖ To characterize the outbreak by place, person and time?
- ❖ To institute prevention and control measures to stop further spread of the disease.

Methods and Materials

Investigation area

Fogera woreda is one of the woredas found in South Gondar Zone, Amhara Region and established as woreda in 2000 E.C. The woreda is at a distance of 723 kms from Addis Ababa and 58 kms from regional town Bahir Dar, and bounded by Libokemkem in the North and Dera in the South, Farta in the East and Este in the West directions. The physical area of the woreda is about 117,414 Km² with an altitude range of 1774-2410masl, T° range of 11.48°C-27.37°C, annual rainfall of 1103-1336mm. The woreda has total population of 247,895, of which, 240,154 were rural and 7,741 were urban ones. Over half (51.1%) were males and 33,565 (13.5%) under five years, 58,454 (15-49 females), 8,354 were pregnant. The woreda has 30 rural and 2 urban kebeles, and 9 health centers, 45 health posts and physical health service coverage is 100%. It has sub-tropical weather condition with some low land areas. Malaria is the leading cause of morbidity among top ten diseases, followed by Pneumonia and Helmenthiasis in adults and diarrhea is the leading cause of morbidity in under five.



Map 1: Location of Fogera woreda, south Gondar zone, Amhara region, December 2014

Study period

The study was conducted from December 20-30/2014.

Study design

Unmatched Case-control study design was used and sampling needs more attention as of case-control study is more affected by selection bias, so this should be one of considerations by the designer (limitations)

Target population

All populations in the outbreak affected areas of the woreda, where cases and controls found.

Study population

All cases and populations from who controls were recruited.

Sample size

General formula for unmatched case-control study design

$$n_1 = \frac{(Z_{\alpha/2} + Z_{1-\beta})^2 \bar{p}\bar{q}(r+1)}{r(p_1 - p_2)^2} \quad n_2 = r n_1$$

$$\bar{p} = \frac{p_1 + p_2}{r + 1} \quad \bar{q} = 1 - \bar{p}$$

Sample size was calculated using Epiinfo 7 statcalc for unmatched case-control study

Reference (Kelsey et al, methods in observational Epidemiology 2nd Edition.)

Two sided confidence level $(1-\alpha) = 95\%$

Power (% chance of detecting) = 80%

Ratio of controls to cases = 2

Proportion of controls with exposure = 20%

Proportion of cases with exposure = 43%

Least extreme Odds Ratio to be detected = 3.0

Using Epiinfo statcalc sample size became

For cases = 53

For controls = 106

Total size = 159 (two controls: one case)

Exclusion criteria

For controls, those with prior history of Measles should be excluded, those in similar incubation period with cases excluded whenever they develop the disease.

Inclusion criteria

Individuals without disease of interest may be in the community (similar geographic areas) apart from the points mentioned in the exclusion criteria

Data collection

Structured questionnaire was used to collect data for case-control study and additional data were also collected by line listing which used for the descriptive part and cases were identified using WHO standard case definitions. Data was collected by principal investigator and co-investigator including HEWs upon giving 30-60 minutes on how to identify cases and controls from the community, giving attention on exclusion and inclusion criteria.

Data quality control

To assure the quality of data, the data was primarily collected by principal investigator and well trained co-investigator. Prior to entering the data in to the computer the missing variables and consistency of filling of questionnaires and completeness of data was checked out cautiously.

Data entry and Analysis

The data were entered and analyzed using SPSS version 16, Epi-Info7 version 7.1.3.0, MS-Excel and ArcGIS were used. Results were presented using graph, tables and attack rate and case fatality rate were also calculated. Odds ratio, 95% CI, and p-value were constructed to measure the significance of association in bivariate and multivariate analysis.

Variables

Dependent variable

Measles infection

Independent variables

Age

Vaccination status

Contact history

Travel history

Educational status of family

Ethical issues

The Amhara regional health bureau PHEM wrote consent letter for the woreda health office and as a result the investigation was commenced with the woreda health officers and consent of the interviewees to finish and interrupt the interview was respected.

WHO case definition of measles outbreak and cases

Suspected measles case: Any person with fever and maculopapular (non-vesicular) generalized rash and cough, Coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles. [4]

Confirmed measles case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiologically linked to confirmed cases in an outbreak. [4]

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 or contact with epidemiologically linked cases. [4]

Measles death: 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. [4]

Suspected measles outbreak: is defined as occurrence of five or more reported suspected cases in one month in a defined geographic area, like, kebele, woreda or health facility catchment area [4].

Confirmed measles outbreak: is defined as occurrence of three or more laboratory confirmed cases in one month in a defined geographic area, like, kebele, woreda or health facility catchment area [4].

Laboratory investigation: Prior to the investigation period five blood serum samples were collected and sent to national measles laboratory (EPHI). As part of the investigation the result of laboratory analysis was requested from national laboratory and laboratory result has shown three samples became measles IgM positive (60%) and the outbreak was confirmed and risk factor analysis was done.

Result

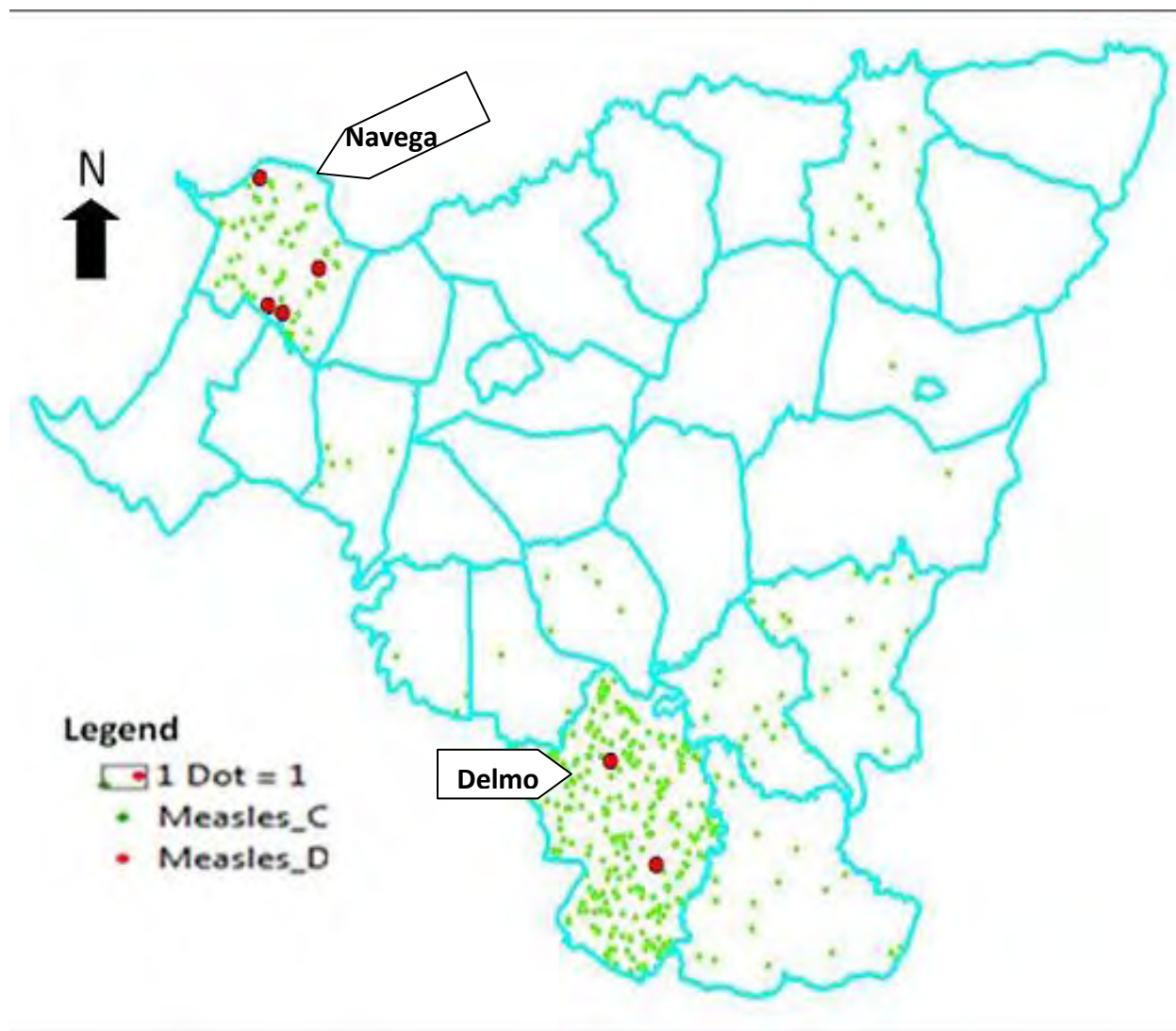
Among the suspected cases 5 blood samples were taken to identify the etiologic agent and laboratory result has shown that three out of five samples has been tested positive for measles IgM.

On 26 August 2014 (WHO-week35), two suspected cases of measles were recorded in unvaccinated one young child and an adult from Guramba kebele of Fogera woreda who have travel history before one week of onset of illness (rash onset), to Estie woreda where confirmed measles cases were reported. The outbreak stayed for 24 weeks and a total of 404 cases (3 confirmed and 401 epi-linked cases) of measles and six community deaths with CFR of 1.5%. The mean age of the cases was 11.9 years with a range of 9 months - 35 years and mean age of controls was 5.5 with a range of 1-21 years.

Table 1: Measles cases and controls by age group and vaccination status, Fogera, south Gondar zone, Amhara, 2014

Age group	Vaccination status						Case + control
	Cases			Controls			
	Yes	No	Total	Yes	No	Total	
< 5 years	4	9	13	38	11	49	62
5-14 years	6	10	16	37	12	49	65
15-44 years	2	19	21	0	2	2	23
45+	0	0	0	0	0	0	0
Total	12 (24%)	38 (76%)	50	75 (75%)	25 (25%)	100	150

The overall attack rate (AR) of the cases was 163/100,000 populations. Less than five years were slightly more affected than the others (AR for <5 years was 400/100,000 population and AR for 5-14years and 15-44 years was 300/100,000 and 100/100,000 populations respectively). The affected kebeles were presented in Table 2.



Map 2: Location of affected kebeles by cases and deaths, Fogera, south Gondar, Amhara, Ethiopia, 2014

Table 2: Measles cases, attack rates and case-fatality rates by kebeles, Fogera, South Gondar Zone, ANRS, 2014

Kebeles	Population	Cases	Deaths	AR (%)	CFR (%)
A/kiros	6952	2	0	0.03	0
A/Selam	8449	11	0	0.13	0
Abagunda	3979	11	0	0.3	0
Alember	5562	2	0	0.04	0
Arida	4,032	7	0	0.2	0
Bebex	7697	4	0	0.05	0
Chalma	8823	1	0	0.01	0
Delmo	4648	240	2	5.2	1.0
Fuafuate	4,032	6	0	0.15	0
Gashene	4,032	5	0	0.12	0
Guramba	5048	16	0	0.32	0
Kinti	5581	20	0	0.4	0
Menguzer	6783	5	0	0.07	0
Navega	5863	63	4	1.1	6.4
Sendega	3979	4	0	0.1	0
Shina	5235	7	0	0.13	0
Total	90,695	404	6		

During the outbreak about sixteen kebeles were affected towards the end of December 2014 with Delmo and Navega being more affected ones in the woreda. From the total 36.6% of the woreda population was directly or indirectly affected by the measles epidemics.

Measles vaccination coverage for the woreda for 2012, 2013 and 2014 was above 100%, despite the occurrence of the outbreak in the woreda. From suspected cases, only 17.8% were vaccinated and 284 (70.3%) were not vaccinated, and 11.9% of cases status was unknown (figure 1).

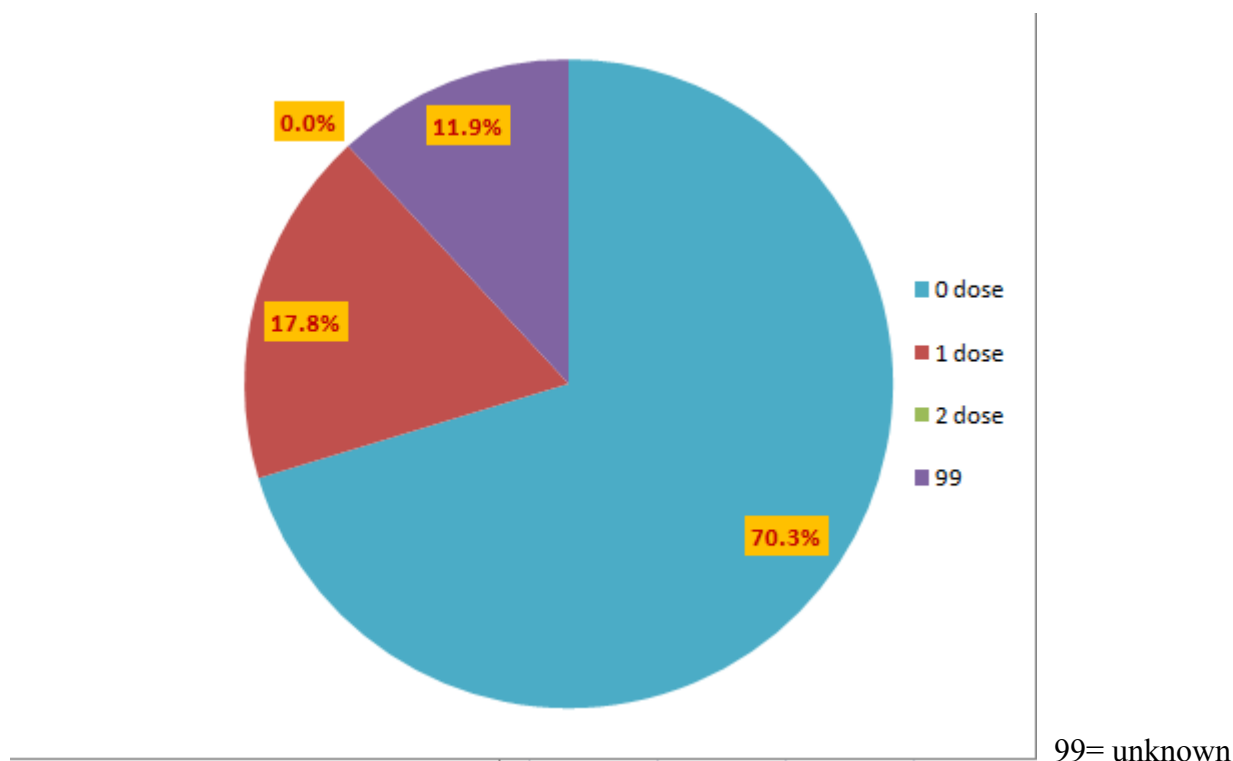


Figure 1: Vaccination status of the cases during the epidemics, Fogera, South Gondar zone, Amhara, 2014(n=404)

When we see the trend of cases, the absolute number show us more cases in the age group 5-14, but the age specific attack rate is relatively higher in the under five age group (Figure 2) and this again shows that the vaccination status in the under five is not satisfactory and needs more emphasis on the performance of community HEWs regarding routine immunization and disease surveillance.

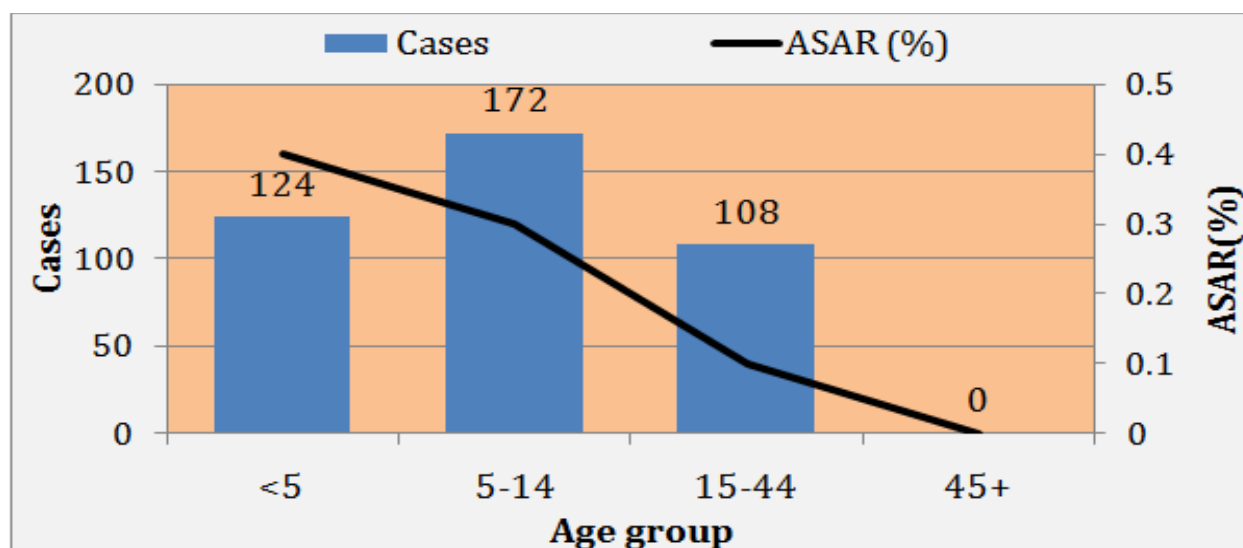


Figure 2: Age specific attack rate among cases, Fogera woreda, South Gondar zone, Amhara, 2014

As it has been shown from the epi-curve, the outbreak seems continuing, unless solution is sought, for instance, enhancing routine immunization and mass vaccination.

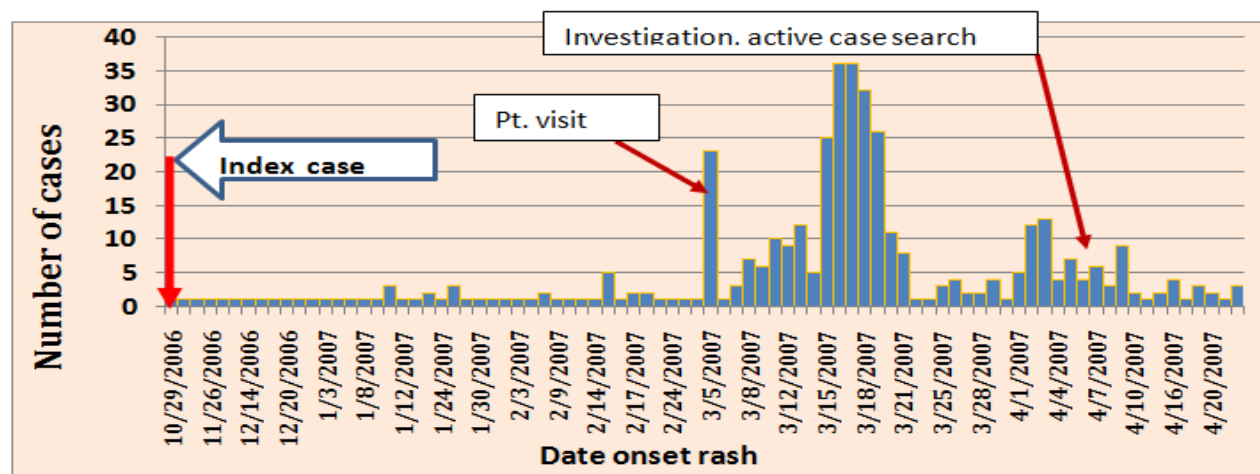


Figure 3: Distribution of Measles Cases by Date of onset of rash-Fogera, South Gondar zone, Amhara, North West Ethiopia, 2014

Could absence of vaccination a risk factor for this outbreak?

Table 3: Frequency of symptoms among measles cases, Fogera, South Gondar zone, Amhara, 2014

S.No	Symptom	Frequency (%)
1	Fever and rash	50 (100%)
2	Cough	41 (81%)
3	Coryza	40 (79%)
4	Conjunctivitis	39 (78%)
5	Diarrhea and pneumonia	25 (50%)

Table 4: Summary of bivariate and multivariate analysis of independent variables during Fogera measles outbreak risk factor analysis, Amhara, North West Ethiopia, 2014

Bivariate analysis				Multivariate analysis		
Variables	COR	95% CI	P-Value	AOR	95% CI	P-Value
Vaccination status						
Yes	1					
No	11.9	5.3-26.7	< 0.001*	5	1.5-16.2	0.006
Contact history						
Yes	18	2.3-137	0.005	19.6	1.3-290	0.029
No	1					
Travel history						
Yes	46.5	14.6-148	< 0.001	14.9	3.8-58	< 0.001
No	1					
Age group						
5-14	37	7.8-174	< 0.001	38.5	3.6-410	0.002
15-44	1					

Interventions undertaken during the investigation time

The investigation team identified shortcomings that aggravated distribution of the measles infection. These were delay of notification and lack of timely management of cases in the community. During the investigation, technical assistance was provided for health workers on case management, recording and reporting situation. Cases were also treated to prevent further spread; and reduce morbidity and mortality attributable to measles infection. Routine surveillance was strengthened and the situation was closely followed at each level on a daily basis until the epidemics was controlled.

Discussion

Long lasting measles outbreak was occurred in Fogera Woreda, South Gondar zone of Amhara region from August 26, 2014 to end of December 2014 and on wards.

During the outbreak time a total of 404 cases were identified with highest attack rate when compared to the attack rate of measles outbreak recorded nationally, 6.5 and 14.6 per 100,000 population, in 2013 and 2014 respectively [10]. Proportion of measles cases in children aged <5 years was 30.7% and quite similar with figure in WHO report of 2011 and 2012 in Ethiopia; whereas, the measles containing vaccine coverage is higher in the study area than the average national coverage of 2012 (68.2%), though, the real coverage is by far lower than the reported one [11].

The highest attack rate was observed among children under the age of 5 years (0.4%), which is comparable with the observations made by other studies done on measles in DRC in 2010-2011 [12]. In developing countries, the expected case-fatality rate is between 3% and 6%. In certain high-risk populations, case-fatality rates as high as 30% have been reported in infants aged less than 1 year of age [4].

In this measles outbreak investigation six measles deaths (CFR=1.5%) was recorded and greater than 1%. And it is in agreement with the expected CFR in Ethiopia as of developing country CFR is greater than 1% and it is similar with DRC (1.4%) [12] and much greater than study done in Sudan with CFR of 0.9% [13]. This might indicate the level of the quality of case management which was poor during the time of epidemics.

Several factors contributed to the occurrence of this measles outbreak. The first and the most important factor is being not vaccinated with measles containing virus at appropriate time of immunization. When compared to study done in the Republic of Marshall Islands of pacific nation and Abaya woreda of Borena zone Oromyia region, of which 59% and 61% of affected children by measles outbreak were unvaccinated respectively, and the finding of this investigation was higher than these (70.3%) [15]. This might happen because of quality of case management difference in different localities.

The recent (2014) measles vaccination coverage of 90% was greater, when compared to the national target, despite the occurrence of the outbreak in the area [4]. From the total measles cases the highest cases were reported from Delmo kebele and the lowest routine measles vaccination coverage during the year 2013 was reported from this kebele and Navega kebele. According to the investigation findings, there is a strong association between vaccination and the chance of acquiring measles virus and being Vaccinated has protective effect during exposure to infected people in this outbreak.

According to multivariate analysis result, there is a strong relationship between the vaccination of eligible group and the chance of getting measles. Other way round, when people are not getting vaccinated, there were about five fold odds of acquiring measles during an outbreak with (CI: 1.5-16.2; p: 0.006). This finding revealed that contact history before 7-18 days of onset of the symptoms had about 19.0 times odds of acquiring measles compared to people without contact (CI: 1.3-290; p: 0.029). The finding emphasizes that people with exposure history were 14.9 times odds of acquiring measles compared to people without exposure (CI: 3.8-58; p<0.001). Besides, children in the age group 5-14 had 38.0 times odds of acquiring measles compared to people of other age groups (CI: 3.6-410; p<0.002). All the observed associations in this study were similar with the findings of outbreak investigation done in Abaya woreda of Oromyia region in 2013 [6].

According to the multivariate analysis the variables that were significantly associated with measles outbreak in the affected woreda on bivariate analysis were also significant in the multivariate analysis too.

The contact and travel history in this study was in agreement with the concept of secondary attack rate of greater than 90% (12-18 RR). Due to the high transmission efficiency of measles, outbreaks have been reported in populations where only 3% to 7% of the individuals were susceptible and it is not unusual to come across with such findings [4, 5].

Limitations

- ☞ Some families were not volunteer to be interviewed
- ☞ Difficulty in stating the exact date of onset of the epidemics
- ☞ Recall bias on vaccination status

Conclusions

Unvaccinated children less than 15 years of age were primarily affected by this outbreak. The case fatality rate was greater than 1%. Delayed case management and late investigation aggravated the situation of an outbreak in the affected locality. In this study absence of vaccination, contact before 7-18 days with the suspected individuals, travel history to affected area were major contributory factors as of logistic regression analysis.

Recommendations

It is recommended that, routine immunization session to be available at sites by HEWs. Conducting mini-survey by region and zone to realize the real coverage and institute supplementary vaccination campaign in line with WHO field guideline (EPHI, RHB and ZHD)

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1.2 Measles outbreak investigation in Chewaka woreda, Illu-Aba-Bora zone, Oromyia region, South West Ethiopia November, 2014

Abstract

Background: Measles is one of the communicable diseases still causing preventable mortality and morbidity in the world. Globally an estimated number of 20 million cases and 164,000 deaths occur from measles each year. Airborne transmission of measles virus have been documented with reproduction ratio (RR) of 12-18 and can vary with some sort of factors, (contact duration with ill people, infectiousness of the organism and susceptible population in the affected area). Measles is still a public health problem in many developing countries, particularly in parts of Africa and Asia. Measles accounts for 5% of child hood mortality globally. The aim of investigation was to identify etiologic agent, risk factors and institute doable intervention measures.

Methods: A 1:2 unmatched case-control study was applied from November12-26/2014 and data were collected using structured questionnaire. The data entered in to SPSS version 16, Epiinfo7 and MS-Excel work sheet and Odds Ratio, and 95% CI were used to measure the significance of association in bivariate and multivariate analysis.

Results: The outbreak stayed for more than 10 weeks and a total of 225 suspected cases of measles and no death were reported. The mean age of the cases was 6.9 years with a range of one-25 years and mean age of controls was 7.5 with a range of 1-38 years. The overall attack rate (AR) of the case was 324/100,000 populations. Odds of illness among unvaccinated (AOR: 14.3; 95% CI: 2.0-97) compared to vaccinated group, odds of illness among people with contact (AOR: 6.8; 95% CI: 1.0-48.3) compared to people without contact with cases, odds of illness among people living at >5kms distance from health facility (AOR: 11.5; 95% CI: 6.5-59.8) compared to within <5kms radius, odds of illness among groups with MUAC <11cm (AOR: 21; 95% CI: 3-65) compared to MUAC >12.5cm, odds of contracting illness among family size >4 (AOR: 6.5; 95% CI: 5.2-87) compared to <4 members. These are variables that were remained significant in both bivariate and multivariate analysis.

Conclusion: Unvaccinated children less than five years of age were primarily affected by this outbreak. The woreda routine measles vaccination coverage needs due attention and nutritional status of community should be assessed, in reality vaccination coverage among cases was very low (10.2%) and that of the district is only 40.1% for the previous year.

Key words: Measles Outbreak, Chewaka, Oromyia, Ethiopia

Background

Measles is one of the communicable diseases still causing preventable mortality and morbidity in the world. Globally an estimated number of 20 million cases and 164,000 deaths occur from measles each year [1] and in 2013 there was 145,700 deaths globally, with majority of under 5 and about 400 deaths every day or 16 deaths every hour and approximately two to three deaths may occur for every 1,000 reported measles cases, even though a safe and cost-effective vaccine is available [2].

Measles vaccination resulted in a 75% drop in measles deaths between 2000 and 2013 worldwide. In 2013, about 84% of the world's children received one dose of measles vaccine by their first birthday through routine health services – up from 73% in 2000. During 2000-2013, measles vaccination prevented an estimated 15.6 million deaths making measles vaccine one of the best buys in public health domain [2, 3].

Measles is an acute, highly contagious viral disease caused by measles virus (genus Morbillivirus of the Paramyxoviridae family) with incubation period of approximately 10–12 days from exposure to the onset of fever and other nonspecific symptoms and 14 days (with a range of 7–18 days), from exposure to the onset of rash. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva [4]. Common source outbreaks associated with airborne transmission of measles virus have been documented with reproduction ratio (RR) of 12-18 and can vary with some sort of factors, (contact duration with ill people, infectiousness of the organism and susceptible population in the affected area) [5].

Measles is still a public health problem in many developing countries, particularly in parts of Africa and Asia. According to the World Health Organization (WHO), more than 20 million people are affected by measles each year with more than 95% of measles deaths occur in countries that have low per capita incomes and weak health infrastructures. It usually does not kill children directly; however, as a result of its associated immune-suppression, measles can lead to lethal complications, such as pneumonia, croup, and diarrhea. Measles can also lead to lifelong disabilities, including blindness, brain damage, and deafness [4]. The disease has remained the fifth leading cause of deaths among children less than five years of age, worldwide. It accounts for 44% of total deaths due to vaccine preventable diseases (VPD), among children less than 15 years, the highest mortality occurring in poor communities with malnutrition, overcrowding and low vaccination coverage [7].

Infant and under-five mortality are at 75 and 123 per 1,000 live births respectively. The high child mortality rate in Ethiopia is due to combined effects of a high incidence of infectious diseases and

inadequate infant and young child nutrition. Measles accounts for 5% of child hood mortality. Ethiopia introduced measles vaccination in 1980, as part of the Expanded Program on Immunization (EPI), with the first dose of measles vaccine administered at 9 months of age. The measles immunization coverage remained below 50% until 2003. Following accelerated efforts to improve performance by the FMOH with the support from EPI partners, the coverage has progressively improved since 2003. Administrative measles vaccination coverage increased from 44% in 2003 to 81% in 2010 at national level. Key contributing factors to improvement of performance include strengthening of links between health services and the community through the Health Extension Worker Program since 2003, the implementation of the Reaching Every District (RED) approach initiated in 2004 and enhanced routine immunization activities (ERIA) since 2009 [8].

High coverage of vaccination of children below the age of 15 years has led to reduction of measles cases by up to 99% in developed or industrialized countries. Developing countries are failing to achieve high vaccination coverage, hence frequent outbreaks of measles with high case fatalities as high as 3- 30% [9]. Being the part of those developing countries, Ethiopia is experiencing measles epidemics throughout the country, though there is routine immunization session in almost all woredas at age of nine months. Measles outbreaks continue to be reported in twenty five *woredas* in Addis Ababa, Amhara, Dire Dawa, Oromyia and SNNP. In 2013 and 2014, 6,100 (6.5/100,000) and 14,000 (14.6/100,000) confirmed measles cases were respectively reported nationwide [14].

Chewaka woreda also experienced the suspected measles outbreak since 24/Oct/2014 (WHO-week43), one suspected measles case recorded in unvaccinated adult woman who came from Harrarge for visiting her relatives in Chewaka woreda, Gabbina kebele during the afore mentioned time and at that time she became symptomatic for measles infection. Later on consecutive WHO weeks until the end of December 2014, Chewaka woreda health office detected increasing number of cases of suspected measles for which sample was sent to national measles laboratory to be tested for measles IgM. Without stopping, the cases were circulated among 13 other kebeles in the Woreda. So, this outbreak investigation was carried out to identify etiologic agent, describe measles magnitude and identify risk factors associated with measles outbreak in Chewaka woreda and undertake appropriate public health control measures.

Literature review

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. The WHO/UNICEF coverage estimates for measles vaccination in Ethiopia indicate an increase from 37 % in 2000 to 82% in 2010 [4].

Common source outbreaks associated with airborne transmission of measles virus have been documented with reproduction ratio (RR) of 12-18 and can vary with some sort of factors, (contact duration with ill people, infectiousness of the organism and susceptible population in the affected area) [5].

On 24 august 2013, measles epidemics was happened in Abaya woreda, Oromyia with a total of 498 suspected cases of measles (incidence of 390 cases per 100,000) and two were died with CFR of 0.4%. The overall attack rate (AR) of the case was 390/100,000 populations. The attack rate is high in males (440 cases per 100,000 populations) than females (350 cases per 100,000 populations). Less than five years were more affected than the others (<5 yrs 1160/100,000 population and >5 yrs 24/100,000 population) [6].

In Ethiopia, the national confirmed measles attack rate recorded for the years 2013 and 2014 were 6.5/100,000 and 14.6/100,000 population respectively [10].

As WHO report of 2011 and 2012 in Ethiopia; Proportion of measles cases in children aged <5 years was higher compared to other age groups. The national measles containing vaccine coverage of 2012 was about 68.2% [11].

Overall during the 2010–2011 epidemics, 77, 241 measles cases and 1,085 deaths were reported in DRC Katanga province. The overall cumulative AR was 0.71% and the case fatality ratio was 1.40% [12].

FMoH of Sudan conducted in two states in 2004, and identified 1,144 case-patients and 10 deaths within 30 days of rash onset with case fatality of about 0.9% [13].

In Republic of Marshal Islands, Of the 826 reported measles cases in 2003, 766 (92%) occurred in the capital (Majuro) There were 186 (23%) cases in infants aged ,1 year and 309 (37%) of cases in persons aged >15 years. The attack rate was highest among infants (Majuro atoll: 213 cases/1000 infants) and CFR= 0.4% [15].

Objectives

General objectives

The overall purpose of the outbreak investigation in Chewaka woreda was, to know route causes and interrupt further transmission of the disease.

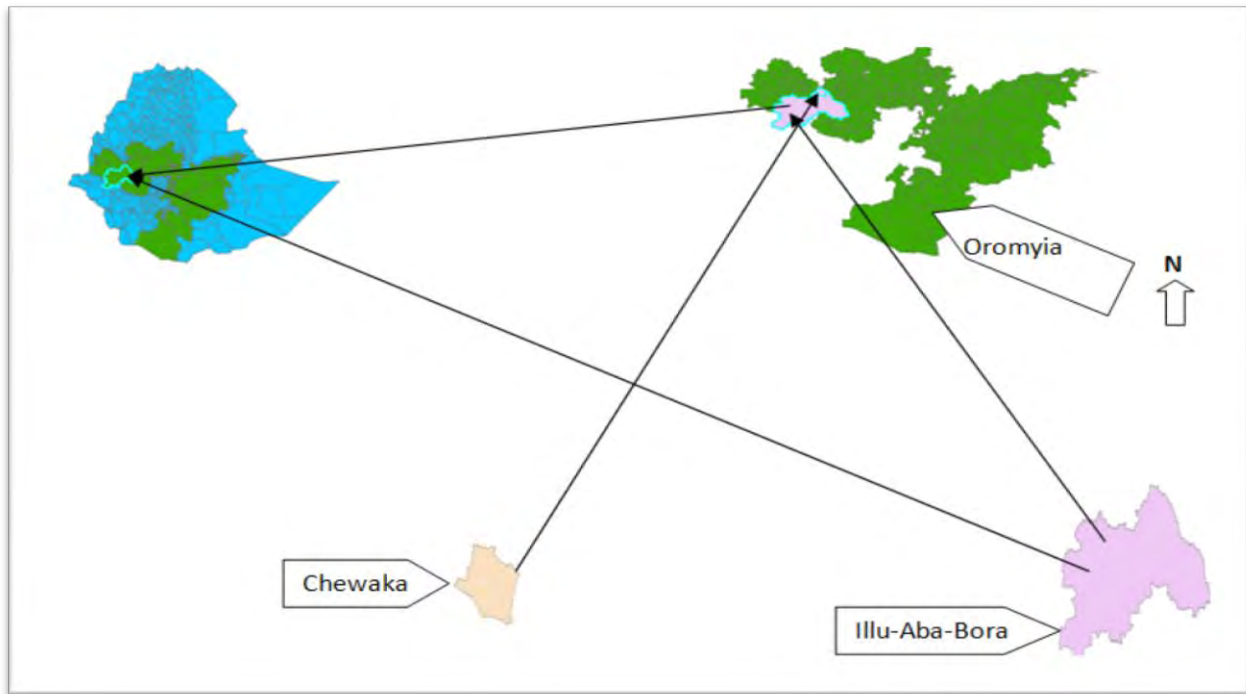
Specific objectives

- ❖ To identify etiologic agent
- ❖ To analyze risk factors and determine extent and magnitude of the outbreak
- ❖ To characterize the outbreak by place, person and time
- ❖ To apply prevention and control measures to stop further spread of the disease.

Methods and Materials

Investigation area

Chewaka woreda is one of the woredas found in, Illu-Aba-Bora Zone, Oromyia Region and founded in 1996 E.C by settlement program of people from parts of Harrarge. The woreda is at a distance of 570 kms from Addis Ababa and bounded by East Wollega in the North and East, Dabo Hanna in the South, East Wollega & Mako woreda in the West directions. The physical area of the woreda is about 5,422 Km² with an altitude range of 900-1400masl, T° range of 37°c-42°c, annual rainfall of 1000-1200mm. The woreda has total population of 69,408, of which, 67,948 were rural and 14,060 were urban ones. About 51.5% were males, 11,404 under five years, 15,339 (15-49 females), 2,408 pregnant women were found. The woreda has 27 rural and 1 urban kebeles, and 3 health centers, 28 health posts and physical health service coverage is 100% with the principle of one health post for one kebele. It has tropical weather condition (low land) and as a result of such weather condition, malaria is the leading cause of morbidity among top ten diseases, followed by AFI and ARTIs.



Map3: Location of Chewaka woreda, Illu-Aba-Bora zone, Oromyia region, December, 2014

Study (investigation) period

The study was conducted from November 12-26/2014.

Study design

Unmatched Case-control study design was used.

Sample size

Formula for unmatched case-control study

$$n_1 = \frac{(Z_{\alpha/2} + Z_{1-\beta})^2 \bar{p}\bar{q}(r+1)}{r(p_1 - p_2)^2} \quad n_2 = r n_1$$

$$\bar{p} = \frac{p_1 + p_2}{r+1} \quad \bar{q} = 1 - \bar{p}$$

Sample size was calculated using Epiinfo 7 statcalc for unmatched case-control study

Reference (Kelsey et al, methods in observational Epidemiology 2nd Edition.)

Two sided confidence level $(1-\alpha) = 95\%$

Power (% chance of detecting) = 80%

Ratio of controls to cases = 2

Proportion of controls with exposure = 20%

Proportion of cases with exposure = 43%

Least extreme Odds Ratio to be detected = 3.0

Using Epiinfo statcalc sample size became

For cases = 53

For controls = 106

Total size = 159 (two controls: one case)

Exclusion criteria

For controls, those with prior history of Measles should be excluded, and those in similar incubation period with cases excluded whenever they develop the disease.

Inclusion criteria

Individuals without disease of interest may be in the community (similar geographic areas) apart from the points mentioned in the exclusion criteria

Data collection

Structured questionnaire was used to collect data for case-control study and additional data were also collected by line listing which used for the descriptive part and cases were identified using WHO standard case definitions. Data was collected by principal investigator and co-investigator including HEWs upon giving 30-60 minutes on how to identify cases and controls from the community, giving attention on exclusion and inclusion criteria.

Data quality control

To assure the quality of data, the data were primarily collected by principal investigator and well trained co-investigator, prior to entering the data in to the computer the missing variables and consistency of filling of questionnaires and completeness of data were checked out cautiously.

Data entry and Analysis

The data were entered and analyzed using SPSS version 16, Epi-Info7 version 7.1.3.0 and, MS-Excel were used. Results were presented using graph and tables and Attack rate and case fatality rate were also calculated. Odds ratio, 95%CI and p-value were constructed to measure the association of statistically significant variables in the bivariate and multivariate analysis.

Dependent variable

Measles infection

Independent variables

Age

Vaccination status

Contact history

Travel history

Educational status of family

Family size

Nutritional status

Distance of health facility

Ethical issues

The Oromyia regional health bureau PHEM and EPHI wrote consent letter for the woreda health office and as a result the investigation was progressed with the woreda health officers and consent of the interviewees to finish and interrupt the interview during investigation was respected.

WHO case definition of measles outbreak and cases

Suspected measles case: Any person with fever and maculopapular (non-vesicular) generalized rash and cough, Coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles. [4]

Confirmed measles case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiologically linked to confirmed cases in an outbreak. [4]

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 or contact with epidemiologically linked cases. [4]

Measles death: 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. [4]

Control: any person living or sharing the same geographic area and any other aspects, except the condition (measles infection)

Suspected measles outbreak: is defined as occurrence of five or more reported suspected cases in one month in a defined geographic area, like, kebele, woreda or health facility catchment area [4].

Confirmed measles outbreak: is defined as occurrence of three or more laboratory confirmed cases in one month in a defined geographic area, like, kebele, woreda or health facility catchment area [4].

Laboratory investigation: Prior to the investigation period five blood serum samples were collected and sent to national measles laboratory (EPHI). As part of the investigation the result of laboratory analysis was requested from national laboratory and laboratory result has shown four samples became measles IgM positive (80%) and the outbreak was confirmed and risk factor analysis was done.

Result

Among the suspected cases 5 blood samples were taken to identify the etiologic agent and laboratory result has shown that four out of five (80%) samples has been tested positive for measles IgM.

On 24 October 2014 (WHO-week43), one suspected measles case was reported in unvaccinated adult woman who has travel history before one week of onset of illness (rash onset) from Harrarge part where confirmed measles cases were reported before. The outbreak stayed for more than 10 weeks and a total of 225 cases (four confirmed 221 epi-linked cases) of measles with no death. The mean age of the cases was 6.9 years with a range of one - 25 years and mean age of controls was 7.5 with a range of one-38 years.

Table 5: Measles cases and controls by age group and vaccination status, Chewaka, Illu-Aba-Bora zone, Oromyia, 2014

Age group	Vaccination status						Grand Total (case +control)
	Cases			Controls			
	Yes	No	Total	Yes	No	Total	
< 5 years	9	15	24(48%)	37	1	38	62
5-14 years	2	20	22(44%)	49	3	52	74
15-44 years	1	3	4(8%)	0	10	10	14
45+	0	0	0(0%)	0	0	0	0
Total	12 (24%)	38 (76%)	50	86 (86%)	14 (14%)	100	150

The overall attack rate (AR) of the cases was 324/100,000 populations. Less than five years were more affected than the others (AR for <5 years was 929/100,000 population and AR for 5-14years and 15-44 years was 309.7/100,000 and 90.7/100,000 populations respectively). The affected kebeles were presented in table 6.

Table 6: Measles cases, attack rates and case-fatality rates by kebeles, Chewaka, Illu-Aba-Bora Zone, Oromyia region, 2014

Kebeles	Total Population	Cases (%)	Deaths	AR (%)	CFR (%)
B/Baraka	3017	2(0.9)	0	0.07	0
B/Biftu	2710	4(1.8)	0	0.15	0
Bonoyyaa	2119	2(0.9)	0	0.1	0
Ch/Megertu	2315	6(2.4)	0	0.3	0
Chekorsa	4466	17(7.5)	0	0.4	0
Damaksa	2354	4(1.8)	0	0.2	0
Gabbina	4715	113(50.2)	0	2.8	0
Gudure	3649	30(13.3)	0	0.8	0
K/Jeneta	2633	3(1.3)	0	0.12	0
Mirgisa	3440	10(4.4)	0	0.3	0
Sh/Tokke	2452	4(1.8)	0	0.2	0
T/Harar	2396	28(12.4)	0	1.2	0
U/Oromyia	2626	2(0.9)	0	0.08	0
Total		225(100)			

During the outbreak about 13 kebeles were affected towards the end of December 2014 with Gabbina and T/Harar being more affected kebeles in the woreda. From the total 56.01% of the woreda population was directly or indirectly affected by the measles epidemics.

Measles vaccination coverage for the woreda for 2013 was only 40.1%. The main reason for low administrative immunization coverage was interruption of routine immunization service in the woreda. From measles cases only 23(10.2%) were vaccinated with one dose of measles containing vaccine, 163 (72.4%) were unvaccinated and status was unknown for 39(17.4%) of cases (Figure 4).

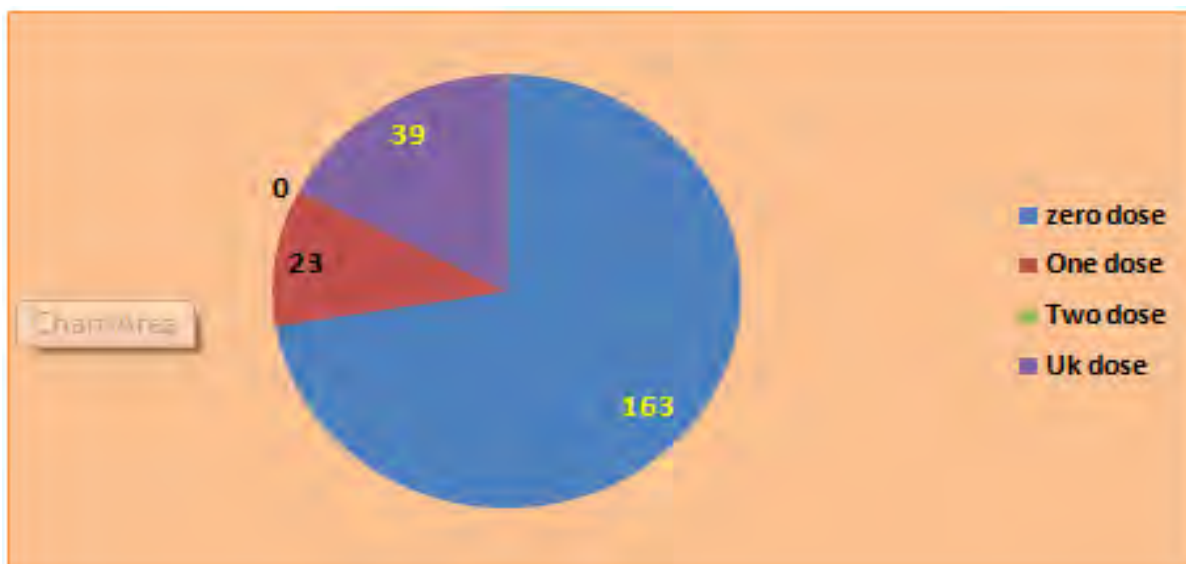


Figure 4: Vaccination status of the cases during the epidemics, Chewaka, Illu-Aba-Bora zone, Oromyia region, South West Ethiopia, 2014

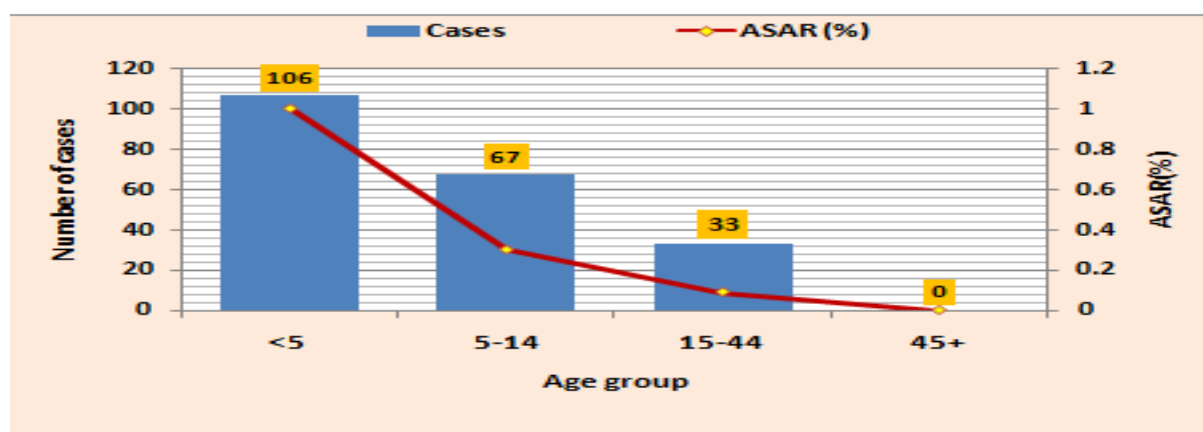


Figure 5: Age specific attack rate among cases, Chewaka, Illu-Aba-Bora zone, Oromyia region, South West Ethiopia, 2014

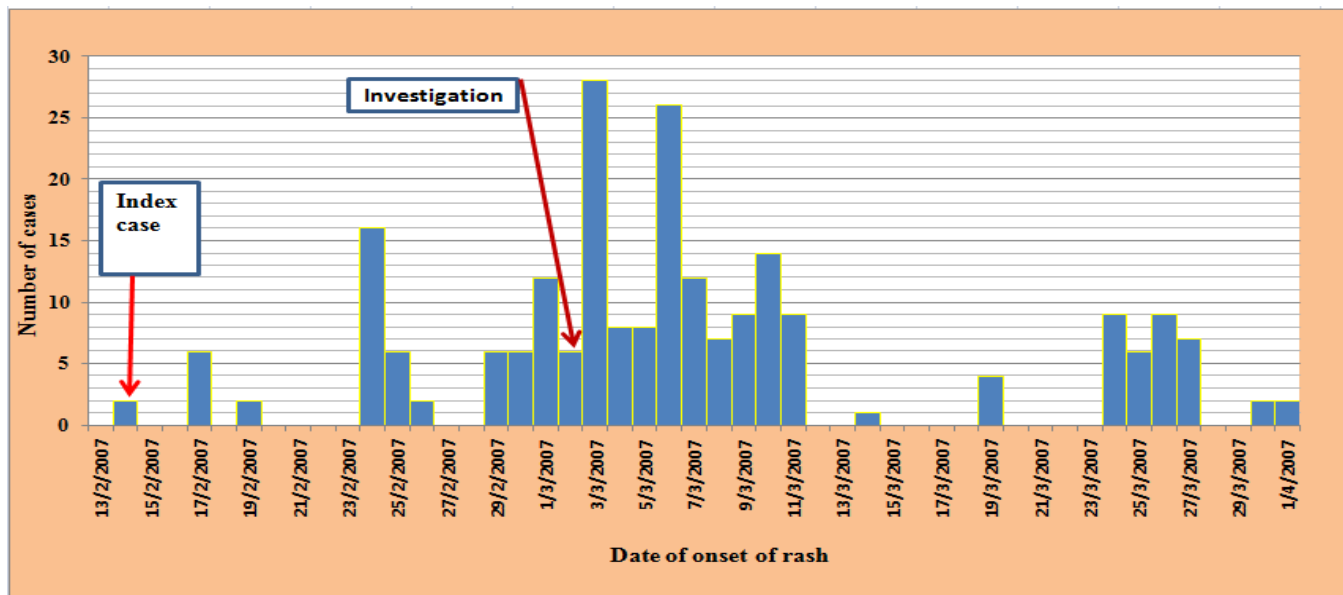


Figure 6: Trend of Measles Cases by Date of onset of rash-Chewaka, Illu-Aba-Bora zone, Oromyia region, South West Ethiopia, 2014

Is absence of vaccination could be risk factor for this outbreak?

Table 7: Frequency of symptoms among cases, Chewaka, Illu-Aba-Bora zone, Oromyia, 2014

S.No	Symptom	Frequency (%)
1	Fever and rash	50 (100%)
2	cough	49 (98%)
3	Coryza	43 (86%)
4	conjunctivitis	31 (62%)
5	Diarrhea	11 (22%)
6	pneumonia	6 (12%)

Table 8: Summary of bivariate and multivariate analysis of independent variables during Chewaka measles outbreak risk factor analysis, Oromyia, South West Ethiopia, 2014

Variables		Crude odds ratio	95% CI	Adjusted odds ratio	95% CI
vaccinated	Yes	1		1	
	No	17.5	7.5-40	14.3	2-97
Contact	Yes	1.5	1.3-65	6.8	1-48.3
	No	1		1	
Travel history	Yes	1.29	0.46-3.5	NI	
	No	1			
Age group	< 5 years	1.5	0.75-2.99	NI	
	15-44	1			
Ditance HF	< 5kms	1			
	>5kms	32.7	12.5-85	11.5	6.5-59.8
Family size	<4	1			
	>4	16.1	6.8-38.3	6.5	5.2-87
Educ. Stat	illiterate	4.9	1.9-12.8	NI	
	> primary	1			
Nutrition	MUAC >12.5 cm	1			
	MUAC < 11cm	8	1.9-32.3	21	3-65
Ventilation	Yes	1			
	No	4.6	1.0-20.7	NI	

NI= Not included

Interventions undertaken during the investigation time

The investigation team identified short comings that worsened distribution of the measles infection. These were delliance in early notification and lack of timely management of cases in the community, interruption of routine vaccination. Technical assistance was provided for health workers on case management, recording and reporting situation. Cases were also treated to prevent further spread; and reduce morbidity and mortality attributable to measles infection. Routine surveillance and vaccination was strengthened and the situation was closely followed at each level on a daily basis until the epidemics became over.



Figure 7: Photo of community education and awareness on advantages of vaccination, Chewaka, Illu-Aba-Bora zone, Oromyia region, South West Ethiopia December, 2014.

Discussion

Long lasting measles outbreak was occurred in Chewaka Woreda, Illu-Aba-Bora zone of Oromyia region starting from October 24, 2014 to end of December 2014 and on wards.

During the outbreak time a total of 225 (324/100,000 population) cases were identified with highest attack rate compared to the attack rate of measles outbreak recorded nationally, 6.5 and 14.6 per 100,000 population, in 2013 and 2014 respectively [10]. Proportion of measles cases in children aged <5 yrs was 47.1% and higher than that of WHO report of 2011 and 2012 in Ethiopia; and, the measles containing vaccine coverage is low in the study area than the average national coverage of 2012 survey (68.2%) [11].

The highest attack rate was observed among children under the age of 5 years (0.92%), which is lower than the observations made by other studies done on measles in Oromyia region in 2013 and higher than study done in DRC in 2010-2011 [6,12]. In developing countries, the expected case-fatality rate is between 3% and 6%. In certain high-risk populations, case-fatality rates as high as 30% have been reported in infants aged less than 1 year of age [4].

For the laboratory investigation, five blood samples were sent to be tested in Ethiopian Public Health Institute (EPHI) laboratory in October, 2014 from Gabbina Kebele. The laboratory result shown that four out of five samples sent were IgM positives. All other cases were epidemiologically linked to laboratory confirmed ones so far. Several factors contributed to the occurrence of this measles outbreak. The first and the most factors are being not vaccinated with measles containing vaccine at appropriate time of immunization. When compared to study done in the Republic of Marshall Islands of pacific nation and Abaya woreda of Borena zone of Oromyia, from which 59% and 61% of affected children by measles outbreak were unvaccinated respectively, and the finding of my investigation found by far higher than these (72.4%) [6, 15]. This might happened because of quality of case management difference in different localities.

Vaccination is known to be the main known protection against Measles throughout the world since 1963. The recent (2014) measles vaccination coverage was lower than the district target (90%), and the occurrence of the outbreak in the area is plausible compared to national target [4]. From the total measles cases the highest cases were reported from Gabbina and the lowest routine measles vaccination coverage during the year 2013 was reported from this kebele. According to investigation findings, there is a strong association between vaccination and the chance of acquiring measles virus and being Vaccinated has protective effect during exposure to infected people in this outbreak.

According to multivariate analysis result, there is a strong relationship between the vaccination of eligible group and the chance of getting measles. Other way round, when people are not getting vaccinated, there were 14.3 times odds of acquiring measles during an outbreak with (CI: 2-97). This finding revealed that contact history before 7-18 days of onset of the symptoms had 6.8 times odds of acquiring measles compared to people without contact during the mentioned time interval (CI: 1-48.3). Family size >4 have 6.5 times odds of acquiring measles compared to <4 (CI: 5.2-87), distance of health facility > 5kms have 11.5 times odds of acquiring measles compared to <5kms (CI: 6.5-59.8), nutritional status of MUAC<11cm have 21 times odds of acquiring measles compared to MUAC >12.5cm (CI: 3-65). These associations were similar with the findings of outbreak investigation done in Abaya woreda of Oromyia region in 2013 [6].

The contact history in this study was in agreement with the concept of secondary attack rate of greater than 90% (12-18 RR). Due to the high transmission efficiency of measles, outbreaks have been reported in populations where only 3% to 7% of the individuals were susceptible and it is not unusual to come across with such findings [4, 5].

Limitations

- ❖ Distance of kebeles (not easily accessible)
- ❖ Community resistance during interview
- ❖ Recall bias on vaccination and date of onset of symptoms

Conclusion

Unvaccinated children less than five years of age were primarily affected by this outbreak. In my study absence of vaccination, contact before 7-18 days with the suspected individuals, distance of health facility, family size and nutritional status were more likely risk factors associated with the outbreak on both bivariate and multivariate analysis.

Recommendations

We recommended, availability of routine vaccination by HEWs, conducting mini survey by region and zone to realize real coverage, assessment of nutritional status of the community and infant/child feeding habits (partners working on nutrition area) and institution of supplementary vaccination campaign as per WHO field guideline (EPHI, RHB, ZHD) and making facilities accessible to the community.

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Chapter II – Surveillance Data Analysis Report

2.1 Magnitude of all form tuberculosis in Amhara regional state, North West Ethiopia, 2010-2013

Abstract

Background: About a third of the world's population is estimated to be infected with tubercle bacilli. There were an estimated 8.7 million new cases and 12 million infected with TB globally, in 2011/12, and about 2.3 million (26%) of new cases occurred in Africa in 2011. Ethiopia ranked seventh in the world and third in Africa for TB burden, with an estimated TB incidence (all forms) of 378 per 100,000 persons and prevalence (all forms) of 579 per 100,000 populations. The objective of this analysis is to determine the incidence of TB in the region and give due recommendations.

Method: The data was collected from Amhara regional health bureau HMIS report and analyzed from March 21-30/2015. Descriptive cross sectional study design was applied to regional TB data on the annual basis. The data was requested and obtained from Amhara regional health bureau HMIS report as quarterly aggregated and annual report of ten zones and three Town administrations. Collected data was, reviewed, cleaned and entered in to computer system and analyzed the trend of magnitude by Microsoft Excel.

Results: A total of 122,626 all form TB cases were included in the trend analysis. Of which 66,685 (54.4%) were males. Among total TB cases reported in the region 11,687 (10%) were less than fifteen years age group and 110,939 (90%) were above fifteen years age groups. The proportion of TB forms for the region from 2010-2013 was found to be 24.7%, 31.5% and 43.8% for PTB+, PTB- and EPTB respectively. The prevalence of all form TB in the region was 636/100,000 populations and 159/100,000 populations for pulmonary positive TB and regional average incidence was about 162/100,000 population.

Conclusion and recommendations: The prevalence rate of all form TB has shown decrement across the years from 2010-2013. It is more prevalent in age groups greater than fifteen years old and as per analysis of regional TB data, male population were slightly affected than females. The analysis shown Extra pulmonary tuberculosis is more reported than other forms of tuberculosis in the area. The reason why TB incidence rate show decrement might be due to government initiatives. The regional health bureau and partners working on TB program should follow and mentor the way of capturing reports.

Key words: Magnitude, all form TB, Amhara, Ethiopia.

Background

About a third of the world's population is estimated to be infected with tubercle bacilli and hence at risk of developing active disease [1]. There were an estimated 8.7 million incident cases and 12 million prevalent cases of TB globally, in 2011, of which 1.1 million (13%) were among people living with HIV. About 26% of the incident TB cases occurred in Africa in 2011. The proportion of TB cases co-infected with HIV is highest in countries in the African region; overall, the African region accounted for 79% of TB cases among people living with HIV [2]. TB is contagious and spread through the air like other air borne diseases; each person with active TB infects on average 10 to 15 people every year. One in ten people infected with the TB bacilli become sick with active TB, the rest stay in latency stage until conditions become favorable to be active. In 2011, an estimated 990,000 deaths occurred among HIV negative cases of TB including 0.30 million deaths among women. This is equivalent to 14 deaths per 100,000 populations. In addition, there were an estimated 0.43 million deaths among incident TB cases that were HIV positive. Thus in total, approximately 1.4 million people died of TB in 2011, making the number of TB deaths per 100,000 populations 20. Of the 8.7 million annual TB cases in 2011, about 0.5 million occur in children (under 15 years of age). The 22 High Burden Countries (HBCs) that have been given highest priority at the global level since 2000 accounted for 82% of all estimated cases worldwide. These countries have been the focus of intensified efforts in DOTS expansion. According to the WHO Global TB Report 2009, Ethiopia ranked seventh in the world for TB burden and third in Africa in 2008, with an estimated TB incidence (all forms) of 378 new cases per 100,000 persons, 163 new smear positive cases per 100,000 persons, and prevalence (all forms) of 579 per 100,000 population [1]

According to the same report, there were an estimated 630,000 MDR TB cases among the world's 12 million prevalent cases of TB in 2011. Ethiopia is one of the 22 high burden countries; though, efforts to control tuberculosis began in the early 1960s with the establishment of TB centers in the country. The national population based TB prevalence survey conducted in 2010/11 revealed that the prevalence of smear positive TB among adults and all age group was found to be 108 and 63 per 100,000 populations, respectively. The prevalence of bacteriologically confirmed TB was found to be 156/100,000 populations and by extrapolations, the prevalence of all forms of TB in Ethiopia is estimated to be 240/100,000 populations. According to the WHO global TB report 2012 which considered the findings from the national TB prevalence survey, there were an estimated 220,000 (258 per 100,000 populations) incident cases of TB in Ethiopia in 2011. According to the same report the prevalence of TB was estimated to be 200,000 (237 per 100,000 populations). There were an estimated 15,000 deaths (18 per 100,000 populations) due to TB, excluding HIV related deaths, in Ethiopia during the same period. According to the 2011 health and health

related indicators of the FMOH, tuberculosis is the third leading cause of death in Ethiopia. During the year 2010/11, a total of 159,017 TB cases were notified in Ethiopia. Among these 151,866 (95.5%) were new cases of TB, all forms. The proportion of new smear-positive, smear negative and EPTB among all new cases is 32.7%, 34.8%, and 32.5% respectively. Re-treatment cases represent about 2.9% of all TB cases notified [2]. WHO was also set two principal global targets for TB control such as Case detection and treatment success rates of $\geq 70\%$ and a treatment success rate of 85% among sputum smear-positive cases of pulmonary TB respectively during the period 1991 to 2005? Case detection rate(CDR) is calculated as, for a given country, the number of notified cases of TB in one year divided by the number of estimated incident cases of TB in the same year, and expressed as a percentage [3].

Rationale of the analysis

The analysis of any data is the back bone in the interpretation of any public health raw data; and as being in the public domain TB data is also in need to be interpreted as of other data as well since it is one of the public health concerns. So that there is no formal and regular data analysis trend on TB data in terms of place, person and time in the area. So, for this reason data analysis in terms of place, person and time has been proposed in line with the aim of residency program in EFETP.

Objectives

General objective

To estimate magnitude of all form TB data in Amhara regional state from 2010-2013 and give doable recommendations to the regional health Bureau

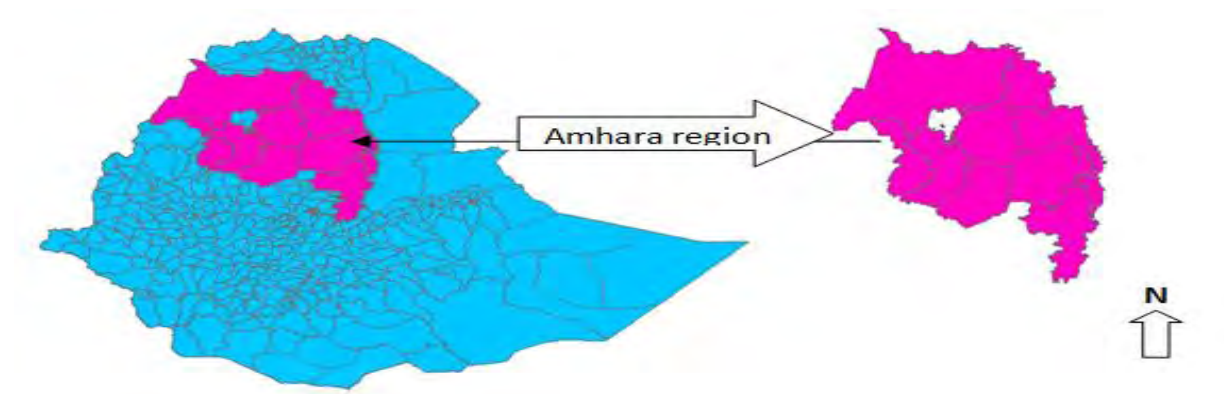
Specific objectives

- ❖ To describe the data in terms of Person, place and time
- ❖ To determine proportion of PTB⁺, PTB⁻ and EPTB
- ❖ To describe treatment outcome by year
- ❖ To show detection and incidence rates by year and/or by zone and region

Methods and Materials

Study area and period

The data was collected from Amhara regional health bureau HMIS and TB program report and analyzed from March 21-30/2015.



Map 4: Location of Amhara region, 2014

Study design

Descriptive cross sectional study design was applied to regional secondary TB data on the annual basis.

Data source

The data was requested and obtained from Amhara regional health bureau HMIS report as quarterly aggregated and annual report from ten zones and three Town administrations.

Sample size

All form TB data of Amhara region reported by HMIS report and TB program, from 2010-2013.

Numerator

Number of TB cases or deaths in Amhara regional health bureau, from 2010-2013

Denominator

Population at risk from 2010-2013 which was obtained from 1997-2007EC projected census data [4].

TB cases classification

- ❖ Smear-positive pulmonary TB (PTB+): a patient with at least two initial sputum smear examination positive for AFB by direct microscopy or one initial smear examination positive and culture positive or one initial smear positive and radiological abnormalities [1].

- ❖ Smear-Negative TB (PTB-): a patient having symptoms suggestive of TB with at least three initial smear examinations negative for AFB by direct microscopy or positive by culture [1].
- ❖ Extra-pulmonary TB (EPTB): TB in organs other than the lungs, proven by one culture positive specimen from an extra- pulmonary site or histo-pathological evidence from biopsy or strong clinical evidence consistent with active EPTB (by decision of clinician [1].

Definition of indicators

- ❖ TB all forms: All types of Tuberculosis; i.e. pulmonary positive, pulmonary negative & extra pulmonary tuberculosis [1].
- ❖ New case (N): A patient who had never treatment for TB, or has been on previous anti-TB treatment for less than four weeks [1].
- ❖ Treatment Failure (F): A patient who, while on treatment, is smear-positive at the end of the fifth month or later, after starting treatment. Treatment failure also includes a patient who was initially sputum smear-negative but who becomes smear-positive during treatment [1].
- ❖ Cured: An initially smear-positive patient who is sputum smear-negative at, or one _month‘ prior to, the completion of treatment [1].
- ❖ Treatment completed: A patient who completed treatment but for whom smear results are not available at 5th or 7th month or one month prior to the completion of treatment [1].
- ❖ Died: A patient who dies for any reason during the course of treatment of tuberculosis [1].
- ❖ Defaulter: A patient who has been on treatment for at least 4 weeks and whose treatment was interrupted for 8 or more consecutive weeks [1].
- ❖ Treatment success: The sum of patients who are declared “cured” and those who have “completed” treatment [1].

Data entry and analysis

Four years quarterly aggregated TB data on annual basis was collected, reviewed, cleaned and entered in to computer system and analyzed by Microsoft office Excel work sheet.

Ethical issues

A letter was written to the regional health bureau TB control program and HMIS unit for legal consent to use retrospective regional TB data from 2010-2013.

Results

A total of 122,626 all form TB cases were included in the analysis. Of which 66,685 (54.4%) were males. Among total TB cases reported in the region during the analysis period, 110,939 (90%) were above 15 years age. The average case detection rate for all form TB and smear positive pulmonary TB was 53.1% and 31.3% respectively. The highest case detection rate all form and smear positive pulmonary TB for four years was 60.7% and 36.7 in 2012 respectively. The proportion of TB forms for the region from 2010-2013 was found to be 24.7%, 31.5% and 43.8% for PTB+, PTB- and EPTB respectively (Table 4). Average prevalence rate of all form TB and smear positive pulmonary TB for the region was 163 and 41 per 100,000 populations respectively. All form prevalence was as high as 185 in 2010 and as low as 146.2 in 2013. Prevalence of smear positive pulmonary TB has shown irregularities. The all form TB cases were high in 2010 and show decrement in following years as shown by (Figure 9). The incidence of all form TB in the region has shown decrement across the consecutive years, and similar trend has been seen in all form TB cases across years as well (Figure 9 and 12).

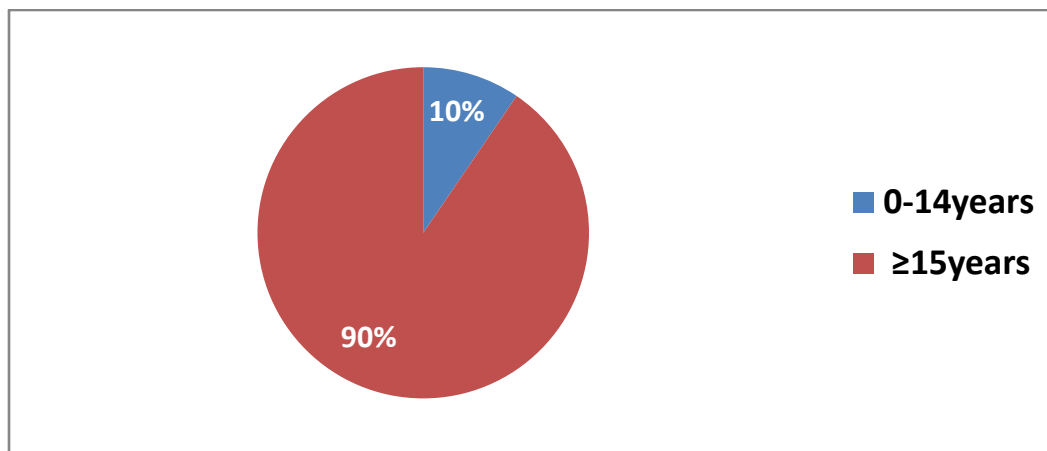


Figure 8: Proportion of all form TB cases by age, Amhara region, North West Ethiopia, 2010-2013

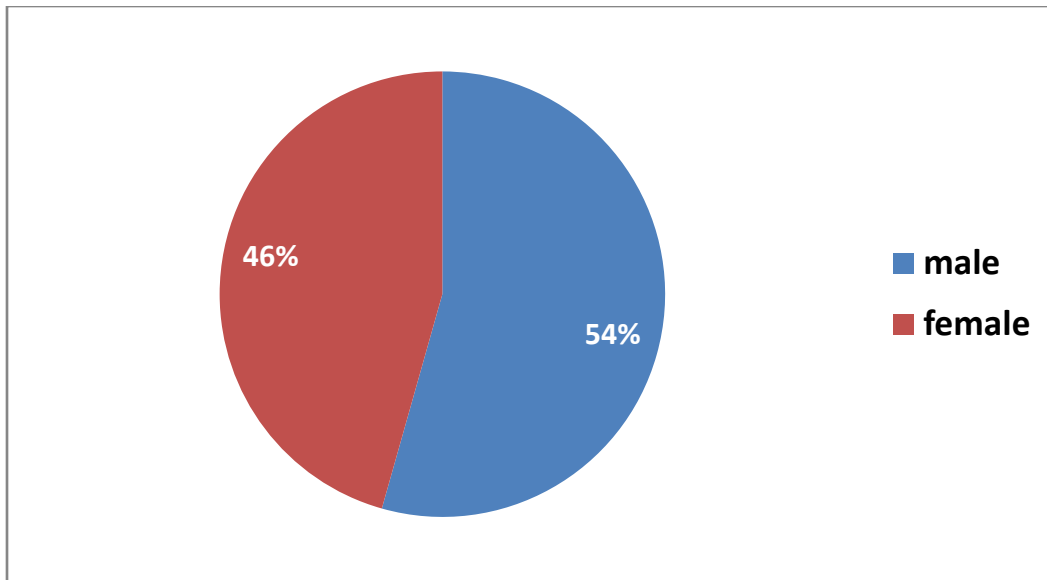


Figure 9: Proportion of all form TB cases by sex, in Amhara region, North West Ethiopia, 2010-2013

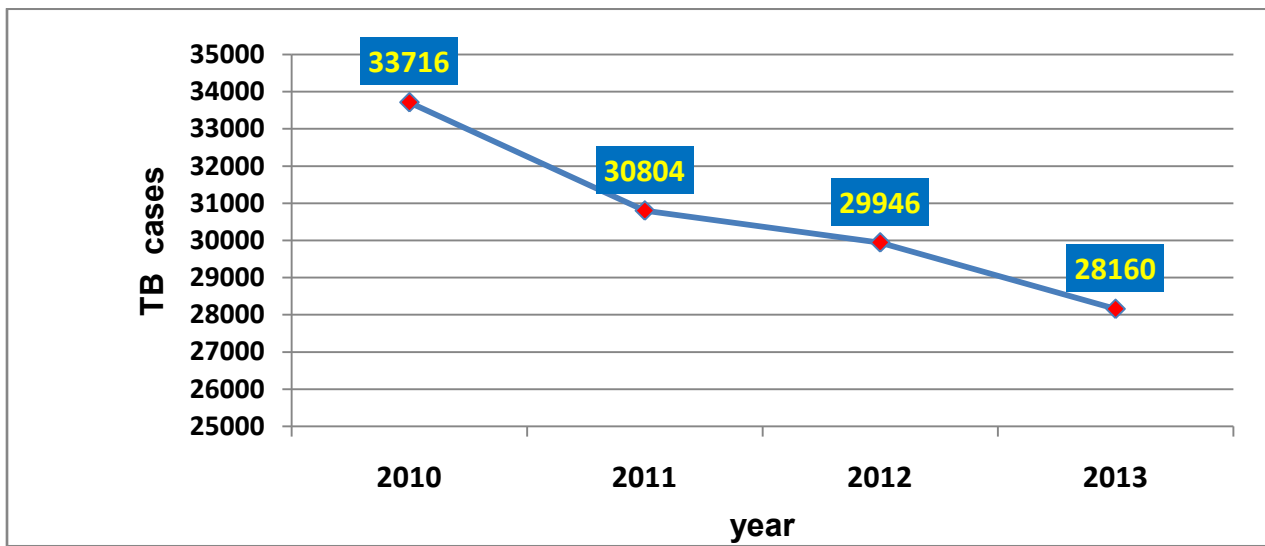


Figure 10: Trend of all form TB cases by year, Amhara, North West Ethiopia, 2010-2013

Table 9: Distribution of TB types by year, Amhara region, North West Ethiopia, 2010-2013

Year	PTB+ [N (%)]	PTB- [N (%)]	EPTB [N (%)]	Total [N (%)]
2010	7872(23.3)	10822(32.1)	15022(44.6)	33716(27.5)
2011	8242(26.7)	9397(30.5)	13165(42.8)	30804(25.1)
2012	7505(25.1)	8687(29)	13754(46)	29946(24.4)
2013	6697(23.8)	9733(34.6)	11730(41.6)	28160(23.0)
Total	30316(24.7)	38639(31.5)	53671(43.8)	122,626

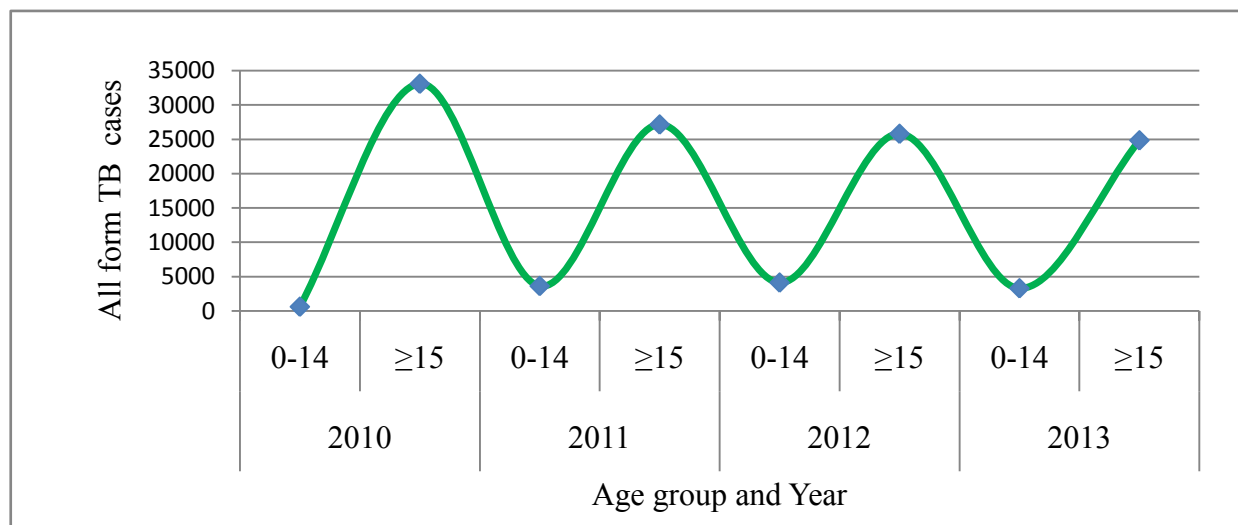


Figure 11: Trend of all form TB cases by age, Amhara, North West Ethiopia, 2010-2013

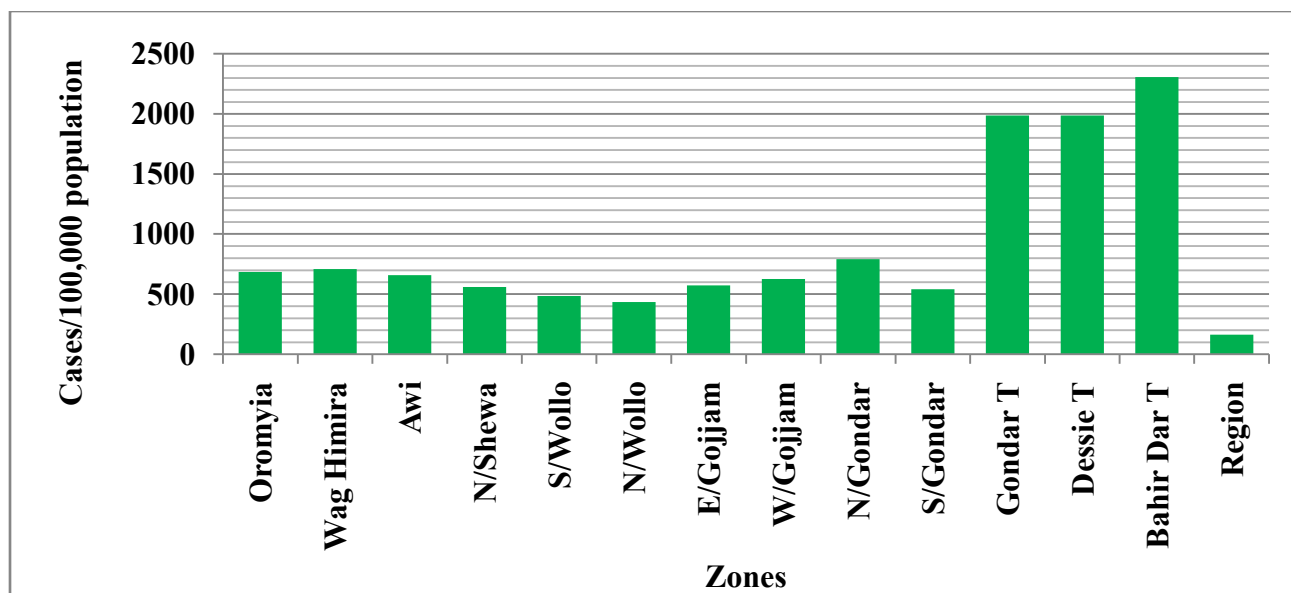


Figure 12: All form TB cases/100,000 population by zone, Amhara, North West Ethiopia, 2010-2013

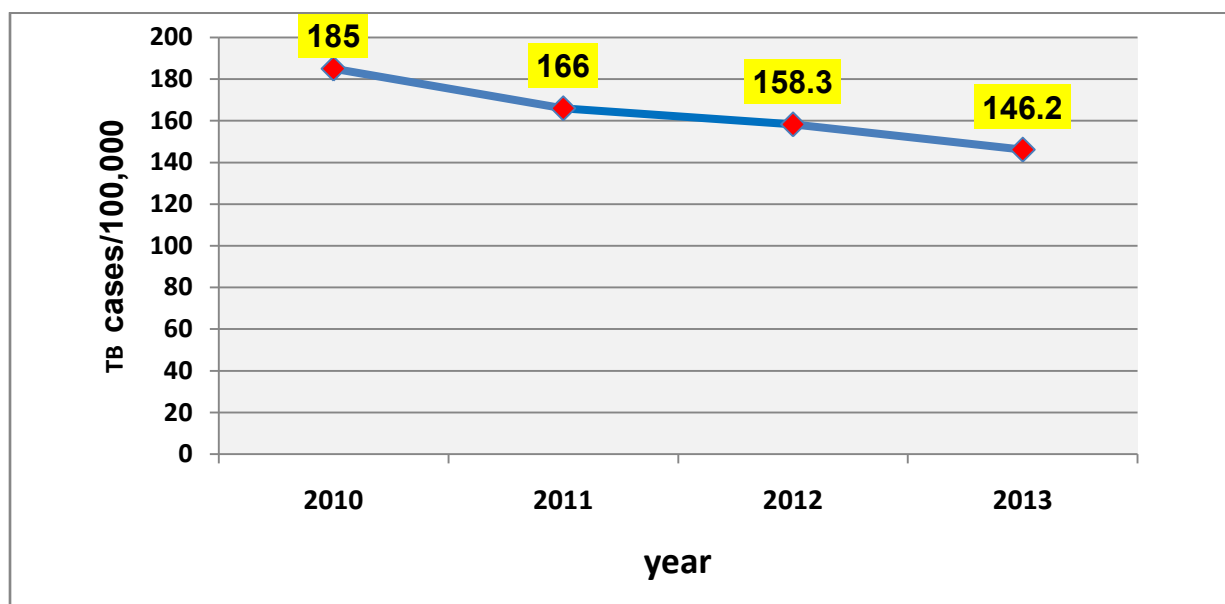


Figure 13: Incidence of all form TB cases/100,000 population per year, Amhara, North West Ethiopia, 2010-2013

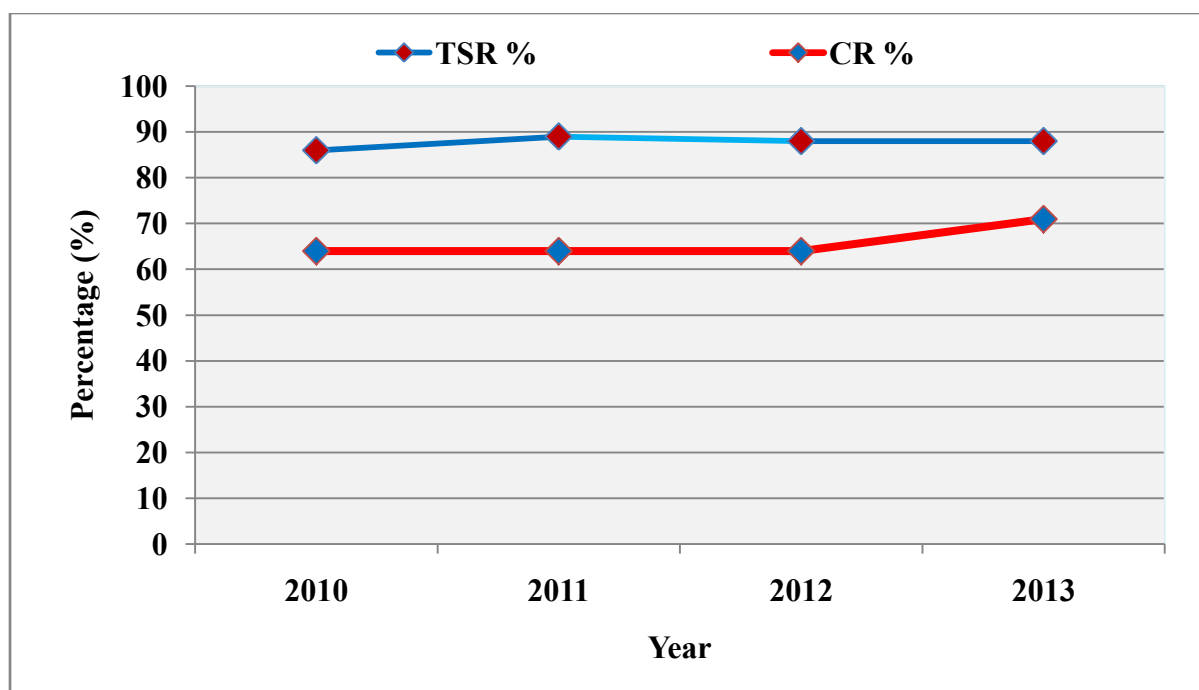


Figure 14: smear positive pulmonary TB treatment success and cure rates by year, Amhara, North West Ethiopia, 2010-2013

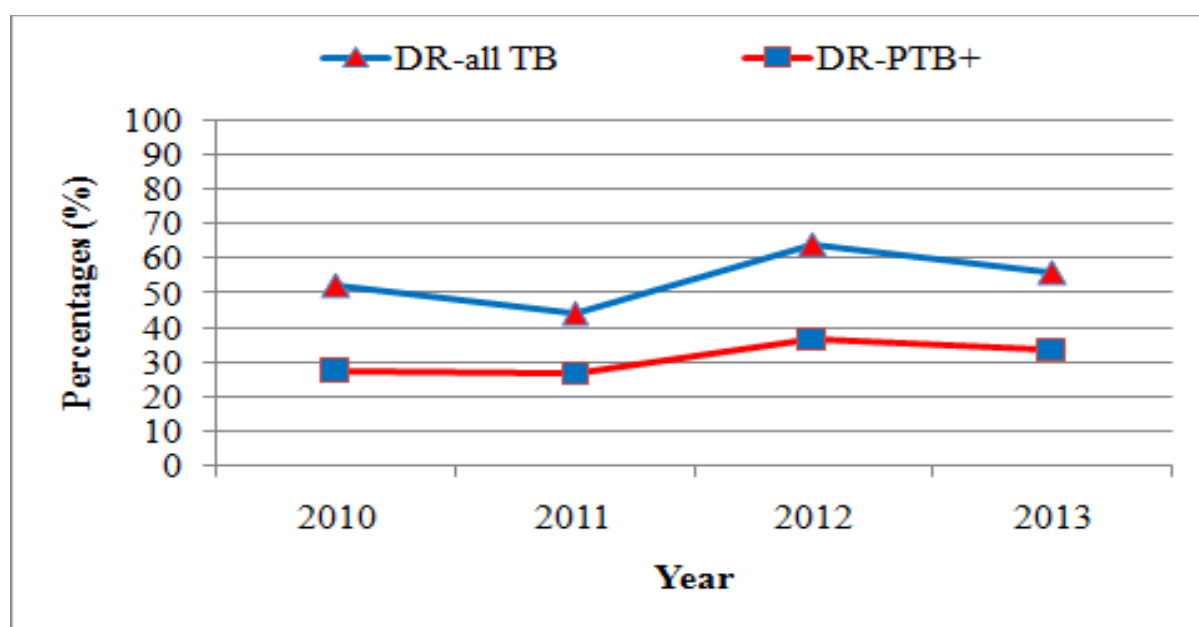


Figure 15: detection rate of all form and pulmonary TB in Amhara, North West Ethiopia, 2010-2013

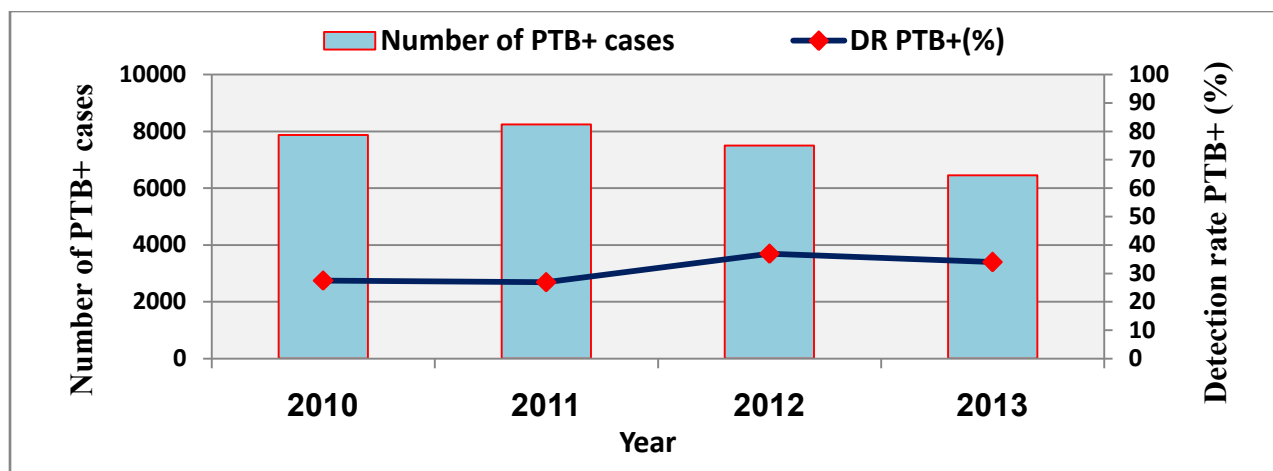


Figure 16: Trend of pulmonary positive TB cases and detection rate by year, Amhara, North West Ethiopia, 2010-2013

Discussion

The four years descriptive data analysis showed TB among less than 15 years and greater than 15 years old age group as 10% and 90% respectively. This is quite similar with finding from TB survey done in Ethiopia in 2012 as 10.5% and 89.5% respectively. This finding is similar with finding in Indian TB control program annual report 2011, as 7% and 93% respectively [5, 6].

The proportion of TB forms as of the analysis is 24.7%, 31.5% and 43.8% for SPPTB, SNPT and EPTB respectively. This is somewhat different from WHO global TB report 2012/13 and study done in north Gondar zone as 32.7%, 34.8%, 32.5% and 11.8%, 56.7%, 31.5% respectively [2, 5, 7].

The distribution of Tuberculosis in the region in terms of sex shown slight increase in masculine as 54%. This is similar with annual TB report in India as 53% for males [6].

The overall prevalence of smear positive Pulmonary TB accounts about 41/100,000 in the region, and which is dissimilar with prevalence of pulmonary TB confirmed from national TB survey 2011 Ethiopia as 163/100,000 population and average all form TB prevalence was also about 163 /100,000 populations, which is very lowest compared to 579/100,000 of national TB survey of 2011 [5]. The decrements seen from some figures were might be due to government initiatives applied so far.

Limitation

Data of the region was more of aggregated

No complete treatment outcome for 2010 and 2011

Mortality rate was not calculated because of lack of full death data

Conclusion

The incidence rate of TB has shown decrement across the years from 2010-2013. TB is more prevalent in age groups greater than 15 years old population, according to analysis of region TB data, male population were relatively affected than females. Extra pulmonary tuberculosis is more reported than other forms of tuberculosis in the area, which is paradoxical with the theoretical science. A relatively highest case of TB was reported in 2010. Even though, the prevalence seems decreasing as a region data from 2010-2013, it needs an effort to improve the lives of the community in whom the disease burden is observed. The overall prevalence of all form and smear positive pulmonary TB was very low.

Recommendations

It is recommended to Amhara regional health bureau and other responsible bodies

- The regional health bureau is expected to train health professionals on how to capture and report tuberculosis data appropriately.
- Regional health bureau and local NGOs better work on completeness of treatment outcome of TB data.
- Each zone better send complete TB data
- Regional TB coordinators should supervise and mentor the zonal and woreda TB officers and work to the standard themselves.

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7. Beyene Moges^{1*}, B.A., Fanaye Asfaw³, Andargachew Mulu⁴, Belay Tessema³ and Afework Kassu, High prevalence and poor treatment outcome of tuberculosis in North Gondar Zone Prison, Northwest Ethiopia. 2013.

Chapter III – Evaluation of Surveillance System

3.1 Evaluation of surveillance system of malaria and measles in Jawi district, Awi Zone, Amhara Region, North West Ethiopia, June, 2014

Abstract

Background: Public Health surveillance is the ongoing systematic collection, analysis and interpretation of health related data essential for the planning, implementation and evaluation of public health interventions. A surveillance system should be simple, flexible, acceptable, situation specific and should be established at the beginning of public health activities set up in response to an emergency in a given functioning system. As a first step comprehensive assessment of the existing surveillance, epidemic preparedness and response system of the country was conducted in October 1999. Based on the findings of the assessment the FMOH developed a Five-year strategic plan and plan of action in 2000 for sustainable implementation of IDSR strategy in Ethiopia. The Government of Federal Democratic Republic of Ethiopia has embarked country wide reform initiative aimed at bringing effectiveness and efficiency in execution of various works using the Business Process Reengineering (BPR) as a tool in 2005. So, this evaluation is aimed to assess the performance of surveillance system in Jawi district.

Methods and Materials: The study was conducted from June 24-July 01/2014, and I collected data by applying descriptive Cross-sectional study design on selected priority diseases (malaria and measles) in Jawi district. A total of six study units: one district office, two cluster health centers and three health posts. For the surveillance system evaluation the updated CDC guidelines for evaluating public health surveillance systems was used. The evaluation aimed to evaluate the following system performance attributes, like: simplicity, data quality, flexibility, acceptability, representativeness, timeliness and stability. Primary data were collected using Semi-structured questionnaire and interviews were conducted with representatives from woreda health office, assigned PHEM officer, focal person of HCs and HEWs at HPs. Secondary data were also collected from annual and weekly reports of the district health Office. Data were manually cleaned initially, then entered and analyzed using the Microsoft Excel work sheet 2007. The qualitative data were summarized to supplement the quantitative findings.

Results: The district has a total population of 89,635 of which, 45,266 (50.5%) were females. In the district, malaria and measles are the major disease burdens of all the 20 priority diseases under surveillance in the nation in the given fiscal year. In the district, in 2013/2014 of all outpatient and inpatient visits, malaria accounts 30% (with a total of 31,159 cases) and 48% (with a total of 482 patients) respectively. Positivity rate of malaria in the district was 31,159 (42%) and measles prevalence in the same year was about 565/100,000 population. Timeliness of reporting, analysis and use of the data at the local level was not satisfactory. Laboratory confirmation of cases took a wide range of time; from 20-35 minute for malaria and 3-4 weeks for measles. All assessed health officers responded that they investigated outbreaks and used the findings for intervention, but no written documents, standard procedures for outbreak investigations, and no feedback and Supervision was done. The users of the surveillance system well understood the usefulness of the surveillance system. All respondents also agreed that the case definitions are simple and easy to understand and apply by all levels of health professionals.

Conclusion and recommendation: The overall structural set up of the surveillance system by the current BPR reform and creation of responsible unit /focal person of PHEM at each district and health facility level and involvement of the community is good. The case detection of the surveillance system is affected by; logistics and health seeking behavior of the community for diseases; measles and malaria as per response of officers. The detection rate of measles in the district can't be calculated, because lack of estimated denominator for the year. The health posts were not providing health care service on regular basis. The community prefers other areas of care to health posts and for which the diseases burden in the community remain covered. Overall, the surveillance system is not ahead as per needed or intended detecting capacity. This needs support of the upper bodies like: zonal and regional levels.

Key words: Evaluation, Surveillance System, Jawi, Amhara, Ethiopia

Introduction

Public Health surveillance is the ongoing systematic collection, analysis and interpretation of health related data essential for the planning, implementation and evaluation of public health interventions [1, 2]. Surveillance needs to be linked to timely dissemination of the data, so that effective action can be taken to prevent disease. Surveillance mechanisms include compulsory notification regarding specific diseases, specific disease registries and continuous or repeated population surveys [4].

Data from a public health surveillance system can be used to guide immediate action for cases of public health importance, measure and monitor the burden and trends of a disease, guide the planning, implementation, and evaluation of programs to prevent and control disease, prioritize the allocation of health resources [5, 6]. In addition, a surveillance system should be simple, flexible, acceptable, situation specific and should be established at the beginning of public health activities set up in response to an emergency in a given functioning system [2].

Efforts to establish disease surveillance system was initiated in Ethiopia in 1947 when the government issued quarantine rules. Subsequently several legal and administrative measures were taken to strengthen communicable disease surveillance. However, these efforts were not supported with appropriate resources thus; surveillance was limited in scope and usefulness. In the health sector, various institutional arrangements were implemented to strengthen surveillance services. In 1948, an anti-epidemic service was established that later in 1951 identified 35 priority diseases for surveillance; those diseases were classified into first class disease (Immediately Notifiable) and weekly reportable second-class diseases. These arrangements continued with several minor changes until the 1994 health system reform. The health reform taking into account the resource constraints and the need for strengthening functional surveillance system selected nineteen priority diseases (including those under vertical programs) for surveillance [7].

Lack of functional surveillance system that can guide timely and effective health intervention has been a common problem to the African region. Thus, the African States through the WHO Africa regional office (WHO/AFRO) made a resolution (resolution AFRO/RC48/R2) in September 1998 to develop an integrated disease surveillance and response (IDSR) initiative as a regional strategy to effectively control priority communicable diseases in the African region. IDSR emphasizes on capacity building at district level, integration and coordination of activities at all levels, timely feedback and use of information for action, improve laboratory capacity in support of surveillance, and community participation[7].

The FMOH adapted a comprehensive strategy recommended by WHO for member states during the 48th assembly in 1998 for improving communicable diseases surveillance and response through Integrated

Disease Surveillance and response (IDSR) linking community, health facility, woreda and national levels [8]. To evaluate, as a first step comprehensive assessment of the existing surveillance, epidemic preparedness and response system of the country was conducted in October 1999. The assessment revealed that most disease prevention programs have vertical surveillance systems, resources are scarce for surveillance at all levels, quality of surveillance is compromised by uncoordinated and multiple use of data collection tools, data are not processed timely and completely to guide health interventions, no data processing and utilization at the district level, there is hardly any feedback at all levels, and epidemic preparedness and management capability are weak [4].

Based on the findings of the assessment the FMOH developed a Five-year strategic plan and plan of action in 2000 for sustainable implementation of IDSR strategy in Ethiopia. Following that the MOH of FDRE has adopted the WHO/AFRO generic technical guidelines and training modules for integrated disease surveillance and response, established a National IDSR Taskforce, officially launched the IDSR strategy, strengthened the IDSR team, conducted a series of training from national to district levels for trainers and focal persons, disseminated the IDSR technical guidelines, developed and distributed new reporting formats, standard case definitions, laboratory reagents, provided computers, and established feedback system using monthly bulletin and quarterly newsletters to the stakeholders [3].

After the implementation of IDSR, The Government of Federal Democratic Republic of Ethiopia has embarked country wide reform initiative aimed at bringing effectiveness and efficiency in execution of various works using the Business Process Reengineering (BPR) as a tool in 2005. In line with this, the Federal Ministry of Health and Agencies under the ministry have identified 7 core processes that need reengineering in order to effectively fulfill sectorial visions and missions. Accordingly, Public Health Emergency Management is one of the core processes identified by the Federal MOH for redesign. Public Health Emergency Management is defined as the process of anticipating, preventing, preparing for, responding to and recovering from the impact of epidemics and health consequences of natural and manmade disasters. The sub processes identified for the process include Preparedness, Early Warning, Response and Recovery [9].

In BPR IDSR is included under PHEM core process and before BPR implementation 23 priority diseases included under IDSR by categorizing it in three major groups which are Epidemic-Prone Diseases, Diseases Targeted for Eradication and Elimination, and Other Diseases of Public Health Importance [10]. However, after redesigning those priority diseases modified in to 20 (13 immediately reportable and 7 weekly reportable). Those diseases are selected Based on: Diseases which have high epidemic potential, Required internationally under IHR 2005, diseases targeted for eradication or elimination, diseases which

have a significant public health importance and diseases that have available effective control and prevention measures for addressing the public health problem they pose [11].

Malaria and measles are parts of those reportable disease lists mentioned in the guideline which is on weekly and immediately basis respectively. And also these selected diseases have a public health importance in Jawi district. For instance, there was measles epidemic in the woreda in the past year, 2013/14. On the other hand, in the woreda all kebeles are malarious. The routine flow of surveillance data is usually from reporting sites to the next level up to the central level as indicated in figure 17 below. The community and health facilities especially health posts are the main source of information. The information collected from this site is compiled in standard forms, with simple analysis and then forwarded to the woreda health office. Woreda level uses standard formats to compile aggregate and send the data to zone/region, from which the central level receives. Feedback and information sharing follow the same route if any.

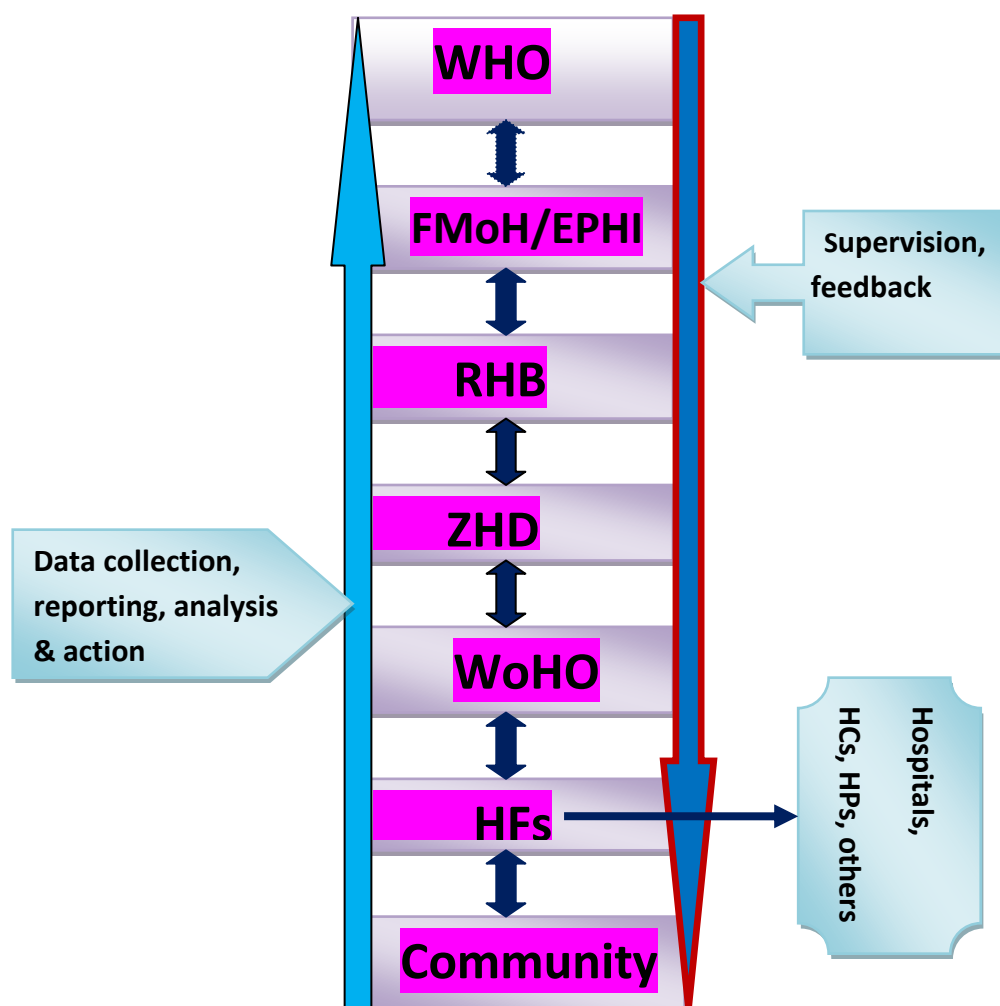


Figure 17: Flow of surveillance data and information across national line (PHEM guideline)

Assessing the effectiveness and efficiency of this system in achieving the stated goals/ objectives is part of development or improvement of the existing resources, infrastructure and design. This improves the information provided and in this way it helps improve service provision and delivery [12]. Mainly, with the implementation of the new structure for surveillance system (PHEM) in the sector, the change in the quality of information need to be assessed particularly for diseases which exert high public health stress. Malaria and measles are of such diseases which can be impacted for the better or worse by the change in the structure.

Rationale of the evaluation

In Jawi district there are no documents that indicate use of the surveillance data at the local level as evidence for public health decision making. In addition to this, Surveillance system evaluation for malaria and measles is not done in the area before and no more is known about the effectiveness and efficiency of the system. Therefore with this surveillance evaluation, in addition to assessing the systems attributes, the attention given for reportable diseases on the sides of timely reporting, data recording and compiling and taking action according to the data that were assessed.

Objectives

General objective

To assess the performance of core activities and attributes of surveillance system of malaria and Measles and recommend better solutions for improved performance in the future in Jawi district.

Specific objectives

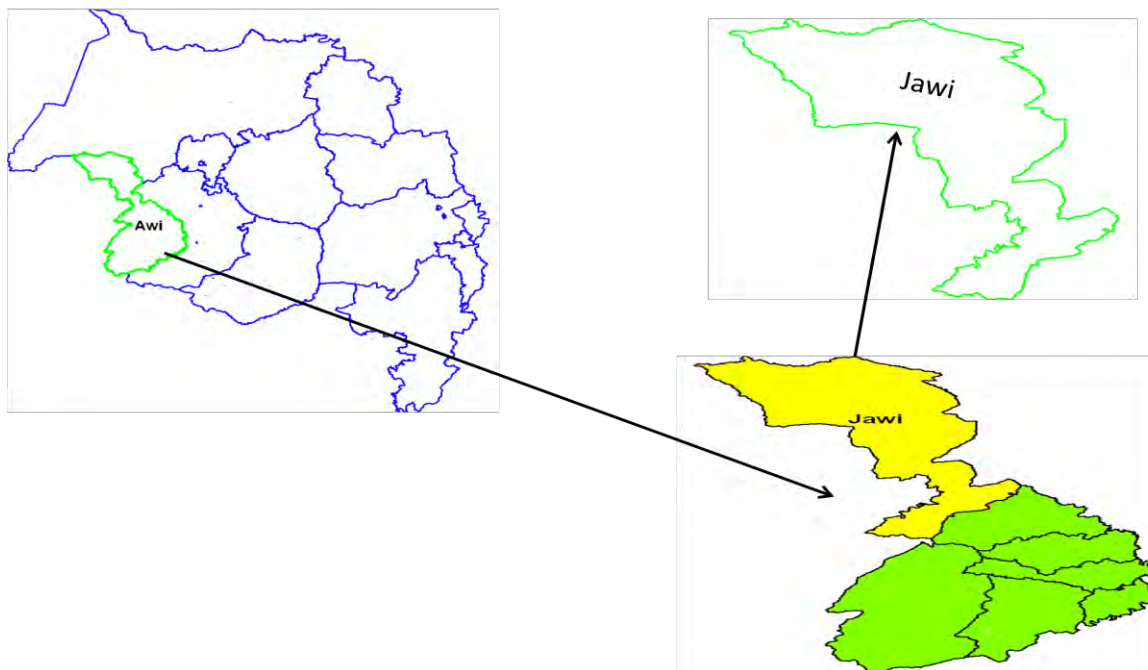
- ☞ To assess the core activities such as case detection, registration, confirmation, reporting analysis and response of the surveillance system in the study area
- ☞ To assess support functions: like training, guidelines, supervisions, resources
- ☞ To assess the usefulness of surveillance system in early detection of morbidity, mortality and outbreaks
- ☞ To describe the linkage of the woreda PHEM department with cluster health centers and health posts on emergency and reporting timeliness and completeness
- ☞ To identify the strong and weak sides of the system in the woreda and suggest applicable solutions

Methods and Materials

Study area

The study area is Jawi district, one of the 7 woreda in Awi zone. The district is about 556 Kms in the North West direction from Addis Ababa, 147 Kms from the regional town Bahir Dar and 103 Kms from zonal town Injibara, with an area of 5154 Km². The district shares Geographical borders to the North Alefa woreda, South and west Benishangul-Gumuz region and Quara to the west and Dangila in the East. The district has a total population of 89,635 [13] of which 87.5% were rurals. The sex composition of the population is 44,369 male, 45,266 female and under five years population of 12,136. The district is administratively sub divided into 27 kebeles, with 2 urban and 25 rural. The district has 5 health centers and 26 health posts. This district is intentionally selected based on the direction given by the field base PHEM core process owner and evaluation of the surveillance system of the district is not done for malaria and measles before.

Map of Jawi woreda



Map 5: Location of Jawi woreda, Amhara, North West, Ethiopia, 2014

Study period and design

The study was conducted from June 24-July 01/2014, by applying descriptive Cross-sectional study design on selected priority diseases (malaria and measles), focusing on main elements:

- ☞ Description of importance of these diseases and relevance of the surveillance system
- ☞ Description of the surveillance system
- ☞ Description of performance and attributes of the surveillance system

To describe the surveillance system of the district we assessed, the structure and the core activities of the surveillance system in the district in general and in the study facilities in particular. The core activities and components included were case definitions, flow charts of the surveillance system and information flow in the surveillance system, population under surveillance, case detection, data collection, registration, reporting, analysis and result dissemination and resources used in the surveillance system. The evaluation of the performance and attributes of the surveillance system involved, assessment of the usefulness of the surveillance system, simplicity of the system, flexibility, quality of the data, acceptability, representativeness, timeliness and stability of the surveillance system.

Sample size and sampling

Convenience sampling was used to select one Administrative woreda in Awi zone on the basis of its being one of new and malaria hotspot area in the region and the occurrence of measles epidemics in the evaluation year in the area.

Study unit

The study units were the health facilities and woreda health office. A total of 6 study units/sites were included in the study. These were Jawi woreda health office, two health centers and three health posts. Selection of the district and the health facilities were done as follows:

From the district, two health centers, and three health posts were selected by convenience method and the district health office was included in the study.

Data collection methods

For the surveillance system evaluation updated CDC guidelines for evaluating public health surveillance systems was used [5]. The evaluation aimed to evaluate the following system performance attributes, such as: simplicity, data quality, flexibility, acceptability, representativeness, timeliness and stability. Semi-structured interviews were conducted with representatives from woreda health office, assigned PHEM officer, focal person of HCs and HEWs at HPs. Usefulness, flexibility and acceptability were evaluated through semi-structured interviews conducted with key staff involved in surveillance, prevention and control strategies.

During session of each visit, we briefed the focal persons the purpose of the assessment which was to evaluate the performance of the system and not merely the individual's performances.

Document review

The purpose of the document review was to understand and assess the data reporting process, and to compare data across different sources to identify any problems with data quality, completeness, and aggregation.

Ethical issues

The consent letter was written to Jawi district health office to cooperate the principal investigator for the matter of realizing that the evaluation is beneficial to the district and gap pointer to the zonal and regional health officers.

Operational Definitions

Acceptability: Willingness of persons and organizations to participate in the surveillance system. And it could be measured quantitatively through reviewing completeness and timeliness of report forms.

Accessibility: Way by which statistical information can be obtained from the organization/agency. This includes the ease with which the existence of information can be ascertained, as well as the suitability of the form or medium through which the information can be accessed. The cost of the information may also be an aspect of accessibility for some users.

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, with still meeting their objectives appropriately.

Flexibility: A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds. Flexible systems can accommodate, for example, new health-related events, changes in case definitions or technology, and variations in funding or reporting sources. In addition, systems that use standard data formats (e.g., in electronic data interchange) can be easily integrated with other systems and thus considered flexible.

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

Sensitivity: The sensitivity of a surveillance system can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease or other health-related events 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.

Specificity: Measure of how at times a system detects false positive health events, i.e., the number of individuals recognized by the system as not being diseased or not having a risk factor, divided by the total number of all persons who do not have the disease or risk factor of concern.

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

Representativeness: A public health surveillance system that is representative, precisely describes the occurrence of a health-related incident over time and its spread in the population by place and person.

Timeliness; Interval between the occurrences of an unwanted health event, detection/identification of the event by the reporting source, reporting to responsible public health agency and the realization of control measures and response to the stakeholders.

Stability; Stability refers to the regularity (i.e., the ability to collect, manage, and provide data properly without stoppage) and availability (the ability to be operational when it is needed) of the public health surveillance system.

Usefulness: A public health surveillance system is useful if it contributes to the prevention and control of unpleasant health-related events, including an improved understanding of the public health implications of such events. A public health surveillance system can also be useful if it helps to find out that an adverse health-related event previously thought to be unimportant is actually important.

Validity: The extent to which statistical information correctly describes the phenomena it was designed to measure.

Completeness: percentage of all expected data reports that were actually submitted to the public health surveillance system.

Data source: Secondary data or surveillance reports, work plan and registration books and key informants interview were among the lists.

Primary data collection tools

Data was collected using in depth interview using check-list. Data were collected by the principal investigator (PI). The questionnaire was adapted from the WHO Guideline based on the objectives of the evaluation [5]. Interview was made to the surveillance officers or focal persons in the selected health facilities and health office for the study.

Secondary data

I used different data sources such as; annual reports of the district, records and documented data at respective levels of the system.

Data analysis

Data was cleaned, entered and analyzed using the Microsoft Excel work sheet 2007 and qualitative data were summarized to supplement the quantitative findings.

Results

The evaluation assessed the surveillance system of one immediately reportable (measles) and one weekly reportable disease (malaria). In all visited health facilities and district health office, the surveillance of these diseases exists and functioning with limitations.

Description of the importance of malaria and measles in the district and the relevance of the Surveillance system:

In the district, malaria and measles are the major disease burdens of all the 20 priority diseases under surveillance in the nation in the given fiscal year.

Malaria: In Jawi district, because of the favorable climatic and environmental conditions, 100% of the district catchment area is malarious and almost all of the populations are at risk of malaria. In the district, in 2013/2014 of all outpatient and inpatient visits, malaria accounts 30% (with a total of 31,159 cases) and 48% (with a total of 482 patients) respectively. In Jawi district, all 5 clusters with a total of 27 (100%) kebeles are malarious. From week 28-26(July-June2013/14) a total of 74,738 cases of suspected and 31,159 (42%) confirmed malaria cases were reported (figure 19), from 74,738 cases of fever suspected for malaria, 20,779 (66.7%) cases were positive for *Plasmodium falciparum* , 9,664 (31.5%) cases were positive for *P.vivax* and 555 cases were positive for both species. The detection rate is not satisfactory in some of reporting facilities; for example, Work Meda cluster report shows irregularity (Figure 18).

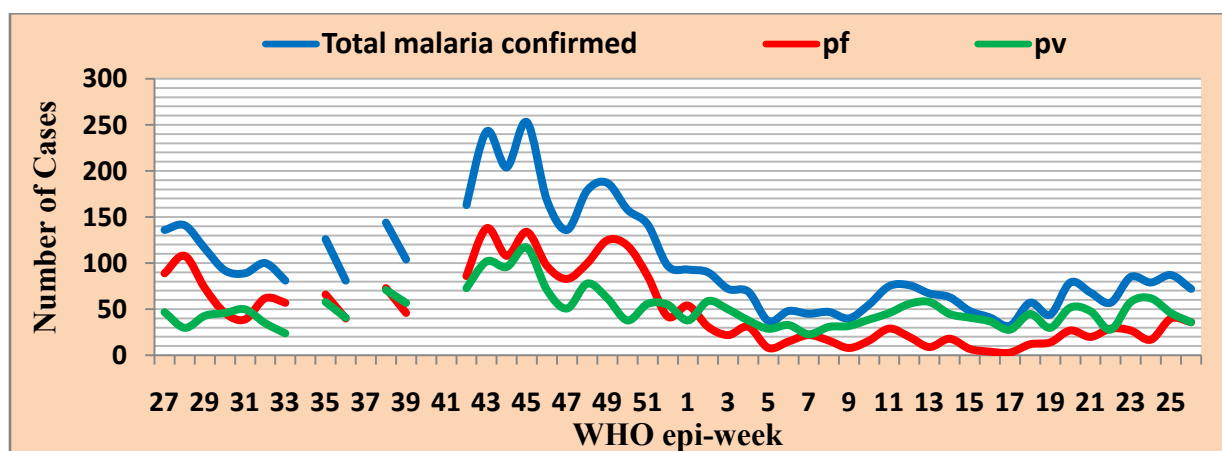


Figure 18: trend of malaria by WHO-week in work meda cluser, in Jawi district, awi zone, Amhara region, July-June 2013/2014

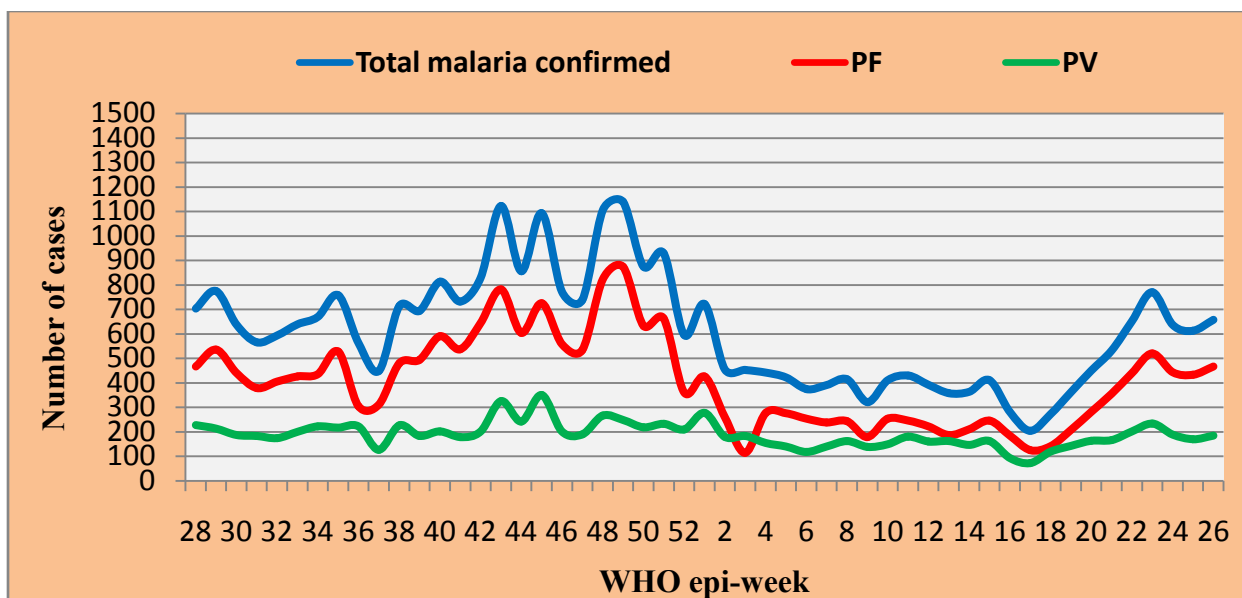


Figure 19: Trend of malaria by WHO-week in Jawi district health office, Amhara, North West Ethiopia, 2013/2014

Measles: In 2013/2014, the detection rate of measles in the district can't be calculated, because lack of estimated denominator for the year. The district reported 507 suspected cases with 7 laboratory confirmed cases and 11 deaths (CFR= 2.2%). From a total of 507 cases of measles reported to Awi Zone, of which Babuluk contributed the highest number of cases 272 (53.6%) followed by Kebele 135 (26.6%). From February-May/ 2014, measles was major burden of disease with epidemics in the district. The possible reason put by district health office head was the remoteness and cold chain gap in health facilities. (Figure 20 below shows cases by epi-week)

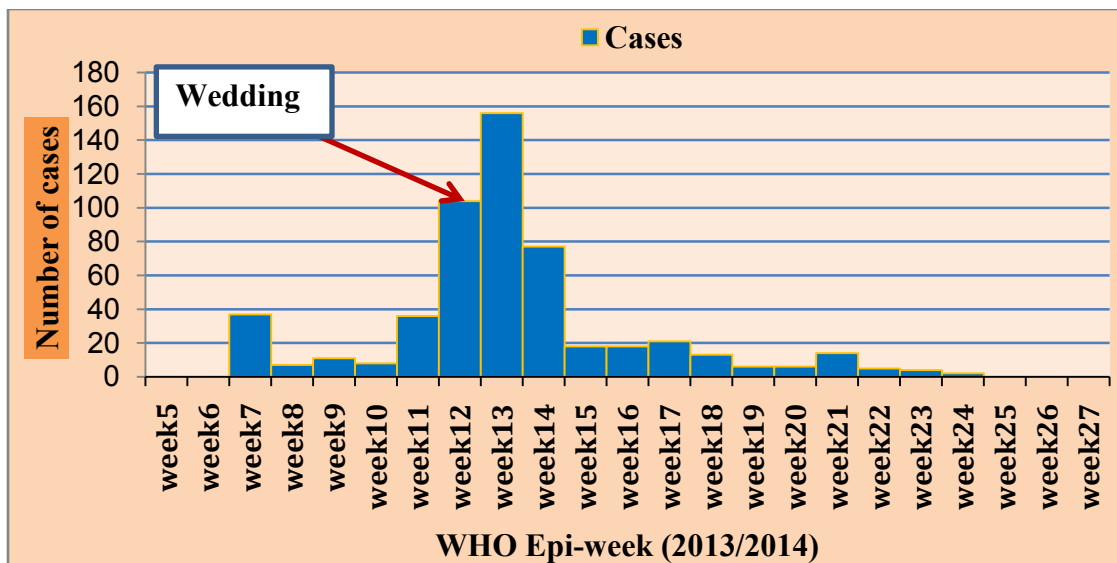


Figure 20: Trend of measles epidemics on weekly basis in Jawi, Amhara, North West, Ethiopia, Feb-May/2014

Target diseases under surveillance in PHEM

Table 9: List of PHEM immediately and weekly reportable diseases

I. Immediately Reportable Diseases		II. Weekly Reportable Diseases	
1	Acute Flaccid Paralysis (AFP)	14	Dysentery
2	Anthrax	15	Malaria
3	Avian Human Influenza	16	Meningitis
4	Cholera	17	Relapsing Fever
5	Dracunculiasis/Guinea worm	18	Typhoid Fever
6	Measles	19	Typhus
7	Neonatal Tetanus	20	Malnutrition
8	Pandemic Influenza A(H1N1)		
9	Rabies		
10	Smallpox		
11	Severe Acute Respiratory Syndrome (SARS)		
12	Viral Hemorrhagic Fever (VHF)		
13	Yellow Fever		

The evaluation assessed the surveillance system of one immediately reportable (measles) and one weekly reportable disease (malaria). In all visited health facilities and district health office, the surveillance of these diseases exists and functioning with limitations.

The national PHEM targets all the population in the country to be under surveillance for all the twenty priority diseases. The Amhara Regional state follows the same structure and the same is true for Jawi district with a total population of about 89,635 (projected from the 2007 national census) [13].

Table 10: The population under surveillance in the assessed district and cluster health centers

Area Under Assessment	Total Population under study in 2013/2014, as of 2007 national census	Urban	Rural
Jawi district	89,635	11,182	78,453
Jawi Cluster	33,909	9518	24,391
W/Meda Cluster	19,420	—	19420

The majority of the communities live in the rural area of the district (Table 10). Regarding the health care services, the district has 5 health centers, 26 Health posts and 3 other health facilities. In terms of arrangement one cluster health center incorporates five satellite health posts and gives service for about 25,000 people in the catchment.

The overall health care coverage of the district is 139%. In all assessed health facilities, the respondents agree that the population under surveillance have unsatisfactory health seeking behavior especially for measles, though there is relative improvement through the effort of the Health Extension Program.

Table 11: Number of health facilities in the study areas expected to report, Jawi, ANRS, July-June, 2013/2014

Administrative Area	Number of Health Facilities Expected to report						Health Coverage	Potential representation of the community in the surveillance Data	Comment given on the health seeking Behavior of the community (Measles)
	H / post	H / Center	Hospital	NGO	Others	Total			
Jawi district	26	5	0	0	3	34	>100%	Both Urban and rural equally	Unsatisfactory
Jawi cluster	7	1	0	0	0	8	>100%	Both Urban and rural equally	Unsatisfactory
W/Meda cluster	5	1	0	0	0	6	>100%	only urban	Unsatisfactory

Case detection and registration

The case definition of malaria and measles was available in all the visited health facilities. The understanding of the available cases definitions by the health care providers was satisfactory, as demonstrated by some of the health care providers at the time of the field visit and interview.

In some of the health posts, the community cases definition of these priority diseases was not distributed to the volunteer community health workers/Community Surveillance Officers, and monitoring of their surveillance activity by the Health Extension Workers was not good. All visited health centers, have interrupted cold chain capacity, have guideline to collect and ship samples for measles to the respective regional or national laboratories. Laboratory confirmation of cases took 3-4 weeks for measles and about 20-35 minutes for malaria microscopy.

Reporting: There was no shortage of reporting form in the past 9 months in all visited health facilities and health office with the exception of one health post. The weekly reporting rates of the visited health facilities over the past 10 weeks (week 16-25/2014) prior to assessment were 95.4% (24.8/26) for health posts, 100% (5/5) for health centers and 100% (3/3) for other health facilities. The overall reporting rate of the visited district to the Zonal Health Department is 96.2% (32.7/34). (Table 12)

Table 12: Reporting rates of health facilities of Jawi district in 10 weeks (week 16- 25)/2014)

S. No	WHO reporting week	H/Post		H/Center		Others		Total no of HFs	
		Expected	Reported	Expected	Reported	Expected	Reported	Expected	Reported
1	16	26	25	5	5	3	3	34	33
2	17	26	25	5	5	3	3	34	33
3	18	26	25	5	5	3	3	34	33
4	19	26	23	5	5	3	3	34	31
5	20	26	26	5	5	3	3	34	34
6	21	26	25	5	5	3	3	34	33
7	22	26	25	5	5	3	3	34	33
8	23	26	25	5	5	3	3	34	33
9	24	26	25	5	5	3	3	34	33
10	25	26	24	5	5	3	3	34	32
Average no of reports/week			24.8		5.0		3.0		32.7
Average reporting rate/week(%) by facility type		95.4%		100%		100%			
District average reporting rate(%) in a week [Average no of reports in 10 weeks in district /expected no of reports]*100									96.2%

All the reports were sent to the next level via mail and telephone. But, reporting through telephone is limited in health posts where there were no telephone services. In case of such setups, the HEWs use their personal mobile phones for emergency situation, for which they were complaining for refund.

Data analysis

In the visited health office and health facilities there was a responsible person for data analysis; however, analysis of the surveillance data was not done for these diseases at the District. The Regional Health Bureau analyzes and follows trend for malaria and measles, also the district has no analysis for malaria other than monitoring chart. The threshold for action was set for malaria at the facilities and district level. None of the visited health facilities analyzed the data collected for surveillance at their capacity.

Epidemic Preparedness and response

All the assessed health facilities have experienced one type of outbreak in the previous years. There was outbreak of measles and it was not responded within 48 hours of report to the respective health office, though there was delay for laboratory confirmation. The sampled health facilities (district health office, cluster health centers and health posts) responded that there was no set epidemic preparedness and response plans for their priority diseases, but have epidemic management committee with rapid response team, which is not active enough. Overall, the district health office has no any stock, nor budget line for emergency, rather they use budget from routine one. The epidemic management committee and the rapid response teams are activated only when there is an event. Moreover, they did not evaluate their experience and preparedness in the district assessed.

Outbreak investigation and case confirmation assessment

The assessed district has experienced one type of outbreak in 2013/14. That was outbreak of measles but not responded within 48 hours of report to the respective health office. There was no malaria outbreak reported in the district in the year. Interviewed health officers responded that they had investigated different outbreak and used the findings for intervention, but there were neither written documents nor standard procedures for outbreak investigations (see table 5 below)

Feedback and Supervision

Dissemination of the surveillance information is not practiced, and supervision at all levels of the health system assessed, and it was not regular supervision, as of response of officers and focal persons assigned.

Training

All assessed health facilities responded that staffs working on surveillance units got short term training or workshops of 2-3 days by district health officers. But the health care providers did not get orientation, except for the health extension workers.

Material resources available for surveillance

Resources for data management, communication, and logistics were all scarce in the district health system. The computers at the district health office level were not functional. The PHEM/ surveillance units at the district and health facility level did not have communication ways- like telephone, fax machines, internet and so on. The logistic and budget constraints were complained by all the health units assessed. These were mentioned frequently as the reasons for poor supervision, and monitoring of the health facility reports. There was no a radio call system in any of the remote areas of the visited district, which affected the timeliness of reports of both immediately and weekly reportable diseases.

The Laboratory

The laboratory capacity to collect, test, transport, and play role in the surveillance of malaria and measles were assessed at the district health office level.

The region has two regional health research laboratories. These are used in the outbreak investigation and confirmation at their Capacities. They are able to do basic tests like blood film, gram stains, cultures and sensitivity, and quality assurance of facility level laboratories. They refer virology samples and samples for further analysis to the Ethiopian public Health and Nutrition Research Institute (EHNRI), currently called EPHI. The health center level laboratories were able to test malaria both by microscopy and RDT (health posts can use only RDT), and able to collect samples for measles. Health centers assessed have limitations of collecting samples of CSF (cerebrospinal fluid). Malaria was confirmed at all levels of the health facilities-health posts and health centers.

Description of the performance and attributes of the surveillance system

Usefulness: Early detection of epidemics of diseases under surveillance was a common understanding of all the respondents as the major use of the surveillance system. But the use of the system for assessment of the effect of prevention and control programs was low. Moreover, this well understood use of the surveillance system has so many challenges in the area of case detection, reporting and response following it. In general, the users of the surveillance system, though they understood the usefulness in this regard, and satisfied with the system and the utility of the system was very low.

Detection of Cases: The surveillance system in the PHEM is organized in such a way that the community, health posts, and all other health facilities under the MoH will have active role in the detection of cases. This was set with cases definitions which are adapted with respect to the reporting body for early and easy case detection. On the other hand, dissemination of case definitions of these diseases was very limited. As a result, there were no community case definitions in all visited health posts.

The health facilities are nearly 100% physically accessible by kebele to the community. There is at least one health post at each kebele in the visited district. However, because of different cultural reasons, for low health seeking behavior of the community (particularly, for measles) and at times when health extension workers have different commitments (like campaign for vaccination,) the detection of the first few cases was usually late in all the visited sites as the focal persons suggested.

Table 13: Measles cases and deaths by place and outbreak start date in Jawi, Awi, ANRS, February-May/2014

Cluster HCs	Cases	Deaths	outbreak start date	Investigation date
Jawi	51	0	3/6/2006	???
Kebtele	135	3	18/6/2006	???
Babuluk	272	8	3/7/2006	???
W/Meda	49	0	10/8/2006	???
Total	507	11		

Regarding case detection of the malaria and measles in the district, detection rate for measles for the year was unknown because of lack of denominator (estimate for the year), but the absolute case number for the past year was 507 with 11 deaths. Malaria accounts (31,159/103,599) (30%) of morbidity in the district in the assessment year. With proportion of Plasmodium Falciparum (66.7%), Plasmodium Vivax (31.5%) and about (2%) mixed infections has been calculated. Malaria positivity rate was also found to be (31,159/74,738) which is about 42% and high because of influx of population in the area as a result of plant of Beles sugar factory.

Providing appropriate and rapid response to epidemics

If there is a suspected epidemic all visited facilities respond late, a rapid response team (RRT) from the woreda health office would be deployed for case detection and case management with delay of more than a month. When there is lack of logistics and transport, the delay exceeds the mentioned time. This was not satisfying the surveillance user at all level (from health post to the district), delay in the detection of cases and response was usually impacting management of case fatality rates and high morbidity.

The usual response focuses on the case management. Investigation of potential causes and risk factors and guiding the response based on these findings was not usual in all visited sites. The epidemic management committee do not usually evaluate their preparedness and response activities, except for annual district health review meetings with a number of other issues.

Simplicity

In the detection of cases: All respondents agreed that the case definitions of these diseases for detection and identification of suspected cases are easy to understand and apply by all levels of health professionals. However, confirmation of cases on time was found usually difficult for reasons related to sample collection, shipment and delay in laboratory result (up to 2-3 weeks, for measles) and shortage of RDTs was also noted some times.

The arrival of data: The route of the data flow is clear and simple as it was set in the surveillance guideline and the reporting bodies do not criticize any problem in this regard. There was no lack of reporting format at woreda health office, yet not mobilized to lower health facilities. And the data collection is assumed to be time taking particularly; the weekly reporting and case based reporting formats which took 15 min or more to fill a single report.

The major difficulty mentioned here was lack of reporting resources to report cases to the next higher bodies especially from the health post to the clusters and woreda health office. Logistics like telephone, public transport, internet, and fax were indicated as constraints. This impacted timeliness of the report. The health workers at the periphery frequently use their personal mobile phones in case of critical conditions.

In the data management: Data from the health facilities were sent to the woreda health office in a paper form and use of the data was also very limited at all levels. However, transcribing the paper based data in to a data base is practiced at the zonal health department and Regional Health Bureau.

Flexibility

The previous IDSR system has been just now changed with the accomplishment of the current PHEM since 2009. This change has made the reporting format more flexible to report other newly occurring health event without much complication and the formats are assumed to be easy and complete e.g. maternal death. The change from the IDSR to PHEM with BPR reform was not easy and flexible. Currently, the district health offices and respective focal persons of facilities responded that as the system is flexible enough to add new health events without affecting other contents.

The Quality of data

The data quality was also assessed on the basis of completeness of the reporting format and the timeliness of the report as put in the guideline. Some of the missed variables in the weekly reporting formats are date of report was sent and the expected number of health facilities to report. The blank variables in the case based reports were, date of admission, vaccination history, address. Sometimes age was filled by year and also written as month: like age 10 years was filled as 10 months on the same form, 30 years adult as if vaccinated for measles (1 dose). The main reasons were either inexperience or not considering some of the variables as important. In addition to this, there were no any regular cross checking of the data and feedback.

Completeness

Completeness of the surveillance system weekly report is measured by dividing the number of facilities that sent report divided by the number of total facilities expected to report. The completeness of the weekly surveillance report for the 2013/2014 was assessed. The completeness seems better as one goes up from Hps to cluster HCs and district health office. But in reality, the incompleteness was masked as the data gets compiled at each step. Even though, overall completeness of the district seemed Very satisfying, as one goes down woreda health office to HPs the completeness decline awfully. Compare the following (Figures 20, 21, 22) [14].

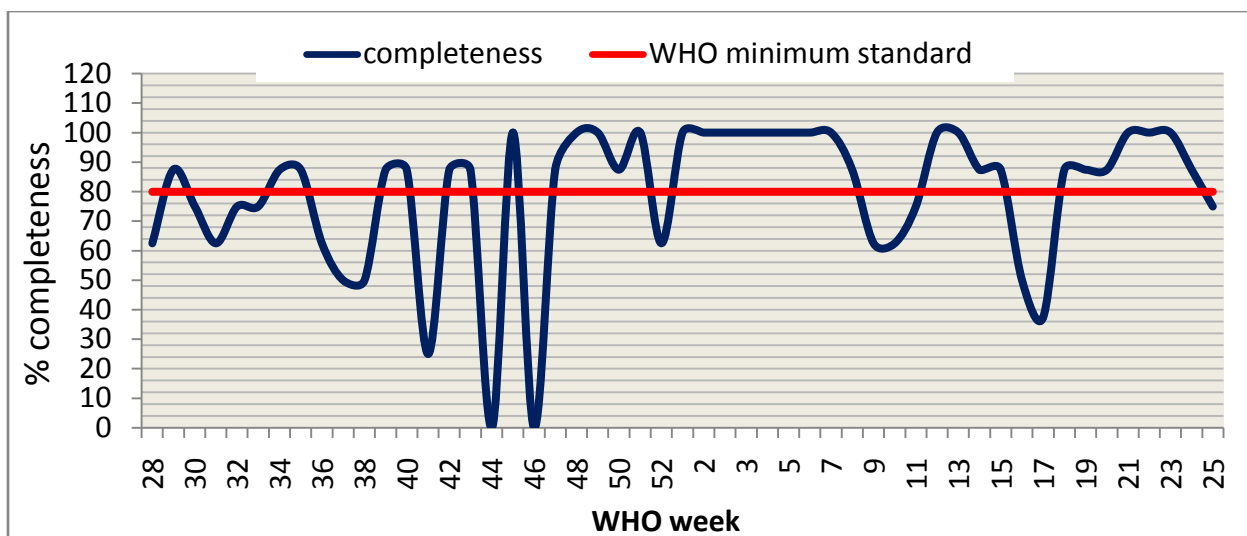


Figure 21: Completeness of report of Jawi cluster, Jawi, ANRS, 2013/2014

Jawi cluster received 17 weeks (32.7%) of reports below WHO minimum standard (80%) completeness in the report year (Figure 21).

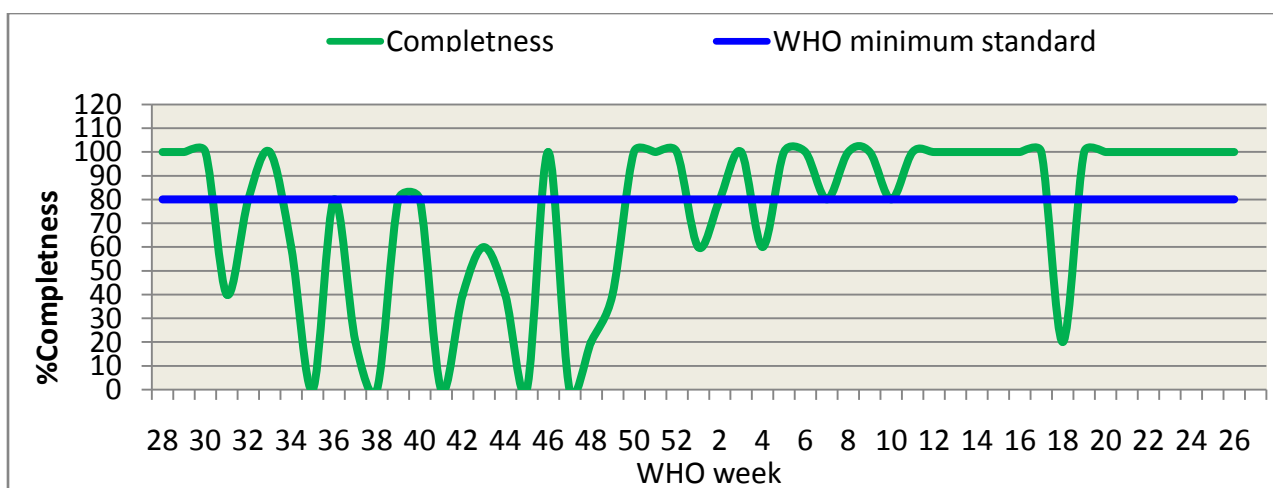


Figure 22: Completeness of report of work meda cluster, jawi, anrs, 2013/2014

As seen from figure 22 above, 15 weeks (29%) report completeness of below the WHO standard received in Work Meda cluster.

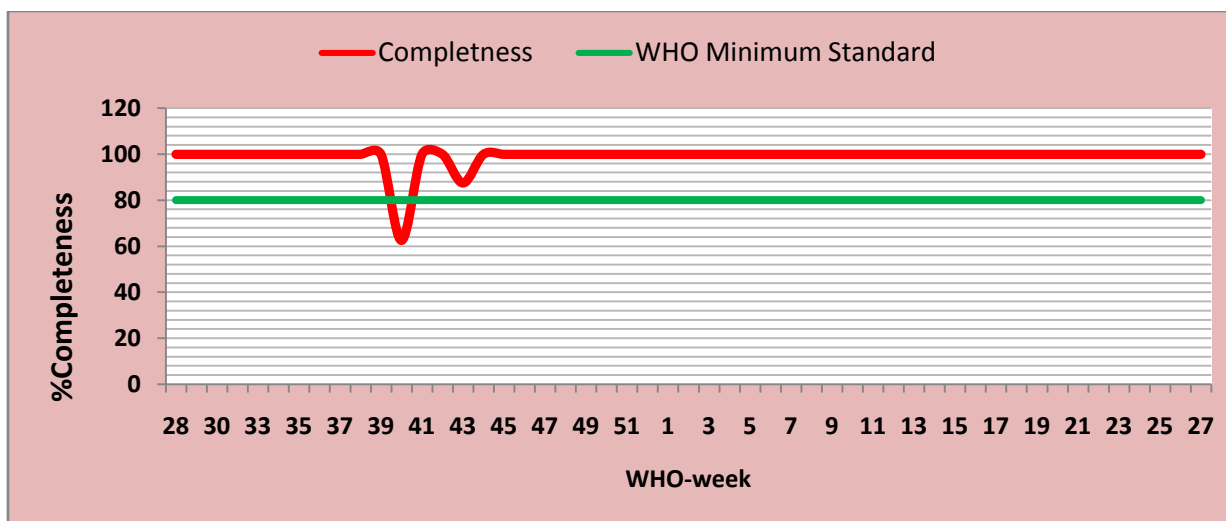


Figure 23: Completeness of report of Jawi district health office, Jawi, ANRS, 2013/14

Acceptability

The acceptability of the surveillance system was assessed based on the promise of the reporting agents and active participation in the case detection and reporting. In the district, the engagement of the reporting agents was as expected and the reporting rate of the health facilities in the district was almost above 80% as seen over 10 recent reporting weeks (figure 23). So, the reporting system at place is acceptable by participant agents and health professionals at large.

Sensitivity

The sensitivity of the surveillance of these diseases in the detection of the cases and outbreaks were seen separately

The surveillance system to detect cases of malaria and measles

Since the surveillance system is based in the health facilities, the capacity of the surveillance system to capture cases in the community is dependent on different reasons: one reason could be the health seeking behavior of the community, which was usually commented as poor, particularly for measles, however, there is improvement with the HEP and the community HW. The other rationale is lack of case management capacity of the health posts, the health post record and report those whom they can give

treatment like anti- malaria (coartem), if not, cases are not recorded. Hence, the number of cases reported from the health post could be high when they have anti-malaria and RDT at hand. The third factor could also be the technical and logistic capacity of the health facilities in detection and laboratory confirmation of cases. These factors undermine the burden of cases in the community and hence the sensitivity of the surveillance to pick the case to be inconsiderate.

The surveillance system to detect an outbreak of malaria and measles

The capacity of the surveillance system to detect an outbreak is influenced by the definition of the outbreak. The sensitivity of the surveillance system to detect an outbreak is relatively low for the reasons mentioned above as of barriers for case detection.

In case of malaria and measles, the sensitivity of the surveillance system is dependent on different reasons, like regular analysis of the data, definitions of the thresholds, case detection and reporting rate of the expected health facilities and so on. There was no regular analysis of the collected data, and there are different definitions of thresholds, like “ease build up” and thus, the sensitivity of the cases detection and outbreak detection of the surveillance system is highly straight to be lowered. Conversely, the sensitivity of the system increases once the number of cases raises high or death starts to occur, clearly, the surveillance system would be sensitive for high epidemics.

The group found it challenging to assess the data completeness of reports delivered to the immediate higher level using additional method. Since, the reports were in crude number and no specific identifiers of each case, wide-ranging inconsistency was noted between reported and registered cases at two of the health centers.

Predictive value positive

It was not likely to measure the PVP of the surveillance system in this evaluation of the surveillance of these diseases. For the reason that, the laboratory confirmation of all suspected cases by the case definition could not be possible, or not experienced. For example, malaria in non epidemic seasons and whenever RDT is available, the health posts treat and register only RDT positives; which seemed to be 100% PVP, but RDT negative cases are usually referred and not registered. Furthermore, data for diseases like measles,

which use external laboratory, were found partially compiled in any of the study units. But, in general, for the case definitions are broad for these diseases especially at the health post and community level, the PVP is expected to be low especially for febrile illnesses.

Representativeness

The representativeness of the surveillance system is related to the health service coverage, the reporting rate of the health facilities, the health seeking behavior of the community, and the technical capacity of the health care providers and so on. Though, these factors are not well met for some of the reasons mentioned above, the representativeness of the system is somewhat good.

Timeliness

The reporting rates of the health facilities in the district were found to be somewhat good irrespective of some reporting gaps at health center level. But, of those that reported, the number of facilities which reported timely was difficult to know exactly, for the reason reports were not segregated, or date report received were not recorded in almost all forms.

Stability (consistency + accessibility)

Stability is consistency (the ability to collect, manage, and provide data properly without failure) and accessibility (the ability to be operational when it is needed) of the public health surveillance system. According to this attribute the surveillance system at the district helps to collect manage and provide data properly and it was operational at any time, but the continuity of the system was repeatedly variable depending on the presence or absence of the particular professional assigned to the PHEM unit. This makes the stability of the system to be questionable. The other thing that has a positive effect on the functionality of the surveillance system was the amount of the running cost allocated for the surveillance system, especially for emergency condition, for which the officers complain.

Discussion

The understanding of the healthcare providers including the health extension workers to the case definitions was found to be good but the collection and registration of data had some gaps and clinical registers and reporting formats are not uniform. As well, the clinical registers and reporting formats are not distributed with good orientation to the surveillance focal persons and the health care providers. In some of the health facilities cases definitions of measles and malaria were posted to the public but not utilized appropriately.

The plane papers are not good to be used as clinical register which might be easily lost and compilation of the report are difficult especially, when these papers are dropped off from shelf or tables.

The structure of data reporting flow from the lower to the upper level is well organized with unidirectional flow of data, with simple and defined role and responsibility of each reporting entities. However, the reporting flow has a number of obstacles such as inadequate infrastructure like transport, telephone, radio, fax and computers for data management and analysis. These impacted the overall generation of reports by the expected health facilities and make the surveillance system to relay on very limited reports. This low reporting rate joined with delay of the collected data can make the surveillance system less useful to meet its objectives. For example, as stated above, if only some of the health facilities in the district analyze and use the data, the utility of the surveillance system is minimum. Which makes the system too weak to pick highly public health sensitive diseases?

This could be due to the poor orientation of all parties, poor supervision and feedback system, low or no legal enforcement to the surveillance activities, lack of incentives, lack of refresher training, lack of sense of ownership, and lack of logistics.

The epidemic preparedness of the district and health facilities has no well organized planning, and no financial and/ or logistic support. Also the epidemic response committees did not review their plans, actions, and learned experiences. This will make the district and the facilities to immediately wait and perceive the support of the Zonal and Regional Health Bureau in case of public health emergencies. This makes all responses to be late and give emergencies to take the chance and stay longer by adversely affecting the public. Moreover, the district health office was allowed for emergency budget from the District Administration Office only after an event has occurred; this slow down timely investigation and mitigation of expected events in the district by the District Health office. Usually there is delay of greater than one month to detect and investigate unusual events in the district, and in the absence of logistics it exceeds the mentioned time dimension. The completeness of reporting of events on immediately and

weekly basis was poor as one goes down to health facilities from woreda health office (see figure 5 and 6 above).

The more proposed reason for the outbreak of measles and case build up of malaria in the district is attributable to poor cold chain, poor reporting consistency and remoteness as well (reporting delay and case accumulation).

In case of epidemics, the rapid response team usually focuses on case management without any protocol for investigation of the risk factors and targeting response based on investigation. The woreda biannual review of the health sector activities did not have detailed revision of all activities related to surveillance, plans, and epidemic preparedness and response. This indicates the attention given to surveillance and response of epidemic prone diseases, like malaria and measles in the district is low.

Limitations

- ☞ Rainy season and difficult to access remote health facilities
- ☞ Information is not easily accessed, as a result of turnover of professionals
- ☞ Duration of data collection period was short

Conclusion

- ☞ The overall structural set up of the surveillance system by the current reform with BPR and creation of responsible unit /focal person of PHEM at each district and health facility level and involvement of the community is good. However, active involvement of all these parties is not satisfactory, and same is true for the surveillance system. The measles outbreak and malaria case build up has brought significant burden to the community. The health posts are not providing the health care service on regular basis, and as a result the community prefers other areas of care to health posts and for which the diseases burden in the community remain covered and which brings about delay in the confirmation of cases by laboratory.
- ☞ As there is delay in case detection, the surveillance system is unsatisfactory to capture unusual events in the community at the right time and place. The potentials of case build up of malaria cannot be avoided in this district for the reason; there is a large sugar factory plant irrigation activity and remoteness for measles vaccine inaccessibility is another factor for measles.
- ☞ Overall, the surveillance system is not proceeding satisfactorily ahead as per needed or intended detecting capacity.

Recommendations

- ☞ Distribution of updated formats down to HEWs (WoHO, ZHD, RHB-PHEM)
- ☞ Enhancing vaccination coverage of remote areas by campaign/outreach (WoHO and HEWs)
- ☞ Conducting prevention measures for malaria (WoHO)
- ☞ Emergency budget allocation (WoHO head with Woreda Administration Head)
- ☞ Improving the health seeking behavior of the community towards vaccination and malaria prevention activities (HEWs)
- ☞ duties and responsibilities of all focal persons in the system should be given in written form; so that the responsibility can be assured (WoHO and ZHD)
- ☞ Training on basic standard procedures for outbreak investigation and use of the result for action should be given to all district RRT members (ZHD)
- ☞ Time frame for the data analysis should be set at all level, so that timely detection of any divergence and investigation can be applied (ZHD and WoHO)

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Chapter IV – Health Profile Description Report

Health Profile Assessment of Jawi woreda, Awi zone, Amhara, North west Ethiopia, 2014

Abstract

Background: Health profile assessment is auditing and compiling, summarizing existing health and health related data in the district. Health profile assessment is very important in prioritizing public health related problems at any level in the community and it is basic in planning and appropriate for public health related interventions and giving direction to conduct operational research in the assessed district. As the purpose of this assessment is to describe health and health related issues in the given district and communication of the local burden of morbidity, mortality, any disaster and other public health related information of the district, it is very important document to be utilized by any stake holders in general and public health professionals in specific.

Methods: From March 10-20/2014 data necessary for health profile description and compilation was collected from Jawi woreda health office, culture and tourism and other sectors reviewing records and using check list for face to face interview of officers. Finally the data was compiled and analyzed using Microsoft excel sheet.

Results: Jawi woreda has 27 kebeles and fendika town being the capital of the woreda. The town has 24hours electric power supply, mobile phone, postal service and banks. However, infrastructures like electric power supply, road and postal services were limited to few sites. The district has estimated population of about 88,024 in 2013, from which males account 46050(52.3%) and with the majority of the population (87.5%) residing in the rural part of the woreda.

The woreda has 46 primaries (1-8), one secondary (9-10) and one preparatory school, and there were no TVET and colleges in the district. The overall student population in the district for the year was 21,141 with male population of 10,916 (51.6%).

The physical health service coverage was 100% in 2013 with the estimation of one health center and five health posts can offer service for 25,000 residents of the catchment area population. ANC, PNC coverage and Proportion of skilled delivery was low with 35.5%,43.5% and 20.4% respectively, and contraceptive acceptance rate of 78.9%. Malaria was the leading cause of morbidity in the district both in adult and under five outpatient departments (70%,74.3% respectively) followed by AFI (17.2%,12% resp.). Vital statistics such as crude birth rates, death rate, life expectancy, under one and five death and educational level were

not recorded in the district. Safe drinking water supply coverage in rural and urban was 61% and 27.1% respectively. Household latrine coverage was 97.1% and there were malaria outbreak, fire and traffic accidents in the woreda during same year (2005EC).

Conclusion and recommendation: Malaria was the leading cause of morbidity in the district both in adult and under five outpatient departments. The second leading cause of morbidity in the district was AFI in both adult and under five outpatient departments. proportion of skilled delivery attended by health personnel was 20.4%.Absence of mortality records, shortage of man power in woreda health office, disasters, maternal and child health were among problems identified in the district. So, prevention and control measures should be implemented to reduce morbidity caused by malaria, AFIs and other priority conditions in the area.

Key words: Health profile assessment, Jawi, Amhara, Ethiopia.

Introduction

The Ethiopia field epidemiology training program is a competency based training program and giving service in public health related issues by using knowledge and skill acquired from applied epidemiology and biostatistics. The program has been launched since 2009GC in Ethiopia. The program is being given through combination of 25% intensive class room learning and 75% field based on-job service training by being assigned at respective regional field bases. The goal of this program is to increase the capacity of residents in detecting public health treats, by engaging in field oriented public health practices and giving chance to produce their own expected competency based outputs.

As health profile assessment report is one of the outputs expected from residents, so, they should do and submit to their respective mentors in the allocated time frame. Health profile assessment is very important in prioritizing public health related problems at any level in the community. Health profile description is basic in planning and appropriate for public health related interventions and giving direction to conduct operational research in the assessed district. It also helps stake holders, in obtaining evidence based information.

As the purpose of this assessment is to describe health and health related issues in the given district (woreda) and communication of the local burden of morbidity, mortality, any disaster and other public health related information of the district, it is very important document to be utilized by any stake holders in general and public health professionals in specific. The study is also helpful in reminding the woreda officers, their past accomplishment and what to be done in the coming future, including plan updates based on the feedback of this assessment in the area.

2. Rationale of the description

Health profile description is very important to understand the demographic, socio-economic status, morbidity, mortality and other health and health related indicators in the given district and the woreda being one of malaria hotspot area, the data needs to be summarized and compiled well.

The information generated from health profile description will help awi zonal health department, Jawi woreda health office and other stake holders in public health planning, resource allocation, intervention and system evaluations as well.

Objectives

General objective:

To assess health and health related issues and to compile and simplify health information, for priority setting, communicate local burden of disease in well made and accessible document, march 2014.

Specific objective:

- To assess health status and health indicators of the district health system
- To describe primary health care coverage of the district
- To assess human resource of the woreda health office and the existing infrastructure of the woreda
- To compile and simplify health related information of the woreda and making it easily accessible/ready to utilization

Methodology and materials

Jawi woreda is selected purposively among districts found in awi zone, because the woreda is one of the malaria hotspot and new woreda. The study area was Jawi district in Amhara regional state. From March 10-20/2014 data necessary for health profile description and compilation was collected from Jawi woreda health office, agriculture and rural development office, education office, communication office, water desk, culture and tourism office and other sectors of the woreda by reviewing records and using check list for face to face interview or by self administering to the officers and recollecting it. Finally the data was compiled and analyzed manually and by using Microsoft excel sheet.

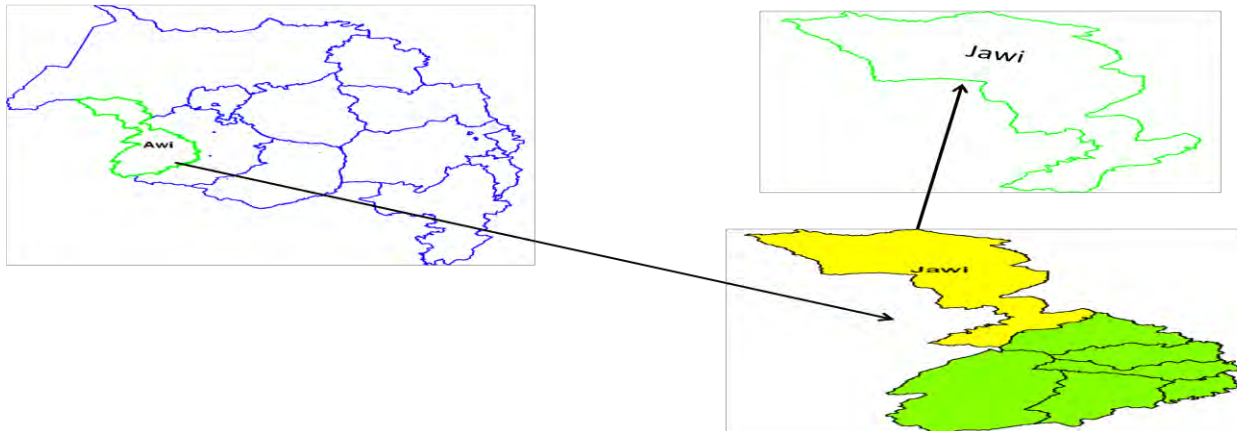
Results

Historical background and culture

Fendika is the town of the woreda, which was established in 1984EC and given the woreda status in 1999EC and the woreda name as Jawi and the town name as fendika which comes from agewigna term ‘fend kit’ which means ‘top area/easily seen from distance’ from forest area (bamboo tree) and it was termed by one of father of early inhabitant kollagna agew peoples called Atnikut Arife (አትኒኩት አርፌ). Previously the area was in the catchment of Dangila woreda, up on the interest of inhabitants and distance of the area from the center (Dangila). It became mandatory to depart as the remoteness affects the development of the area. Besides the above points, the woreda has some historical aspects, like traditional music of kollagna agews called fi-fi (ፊፊ) which is celebrated from July 5- September 19 every year in EC, Bakusa park (51000 hectare), yimala k/mihret monastery, Dir hot spring water and the Belles sugar factory near the town since 1999EC and has opened job opportunity for the people around that area and others.

Geographical Location and Climatic Conditions

Map of Jawi woreda



Map 6: Location of Jawi woreda, Amhara, North West Ethiopia, 2014

Jawi woreda is located at a distance of 103 kms from the zonal town Injibara, 147 kms from regional town Bahir Dar and 556 kms from Addis Ababa in the North West direction. The total catchment area of the woreda is 515,400 hectare. It was situated at an altitude of 800-1400masl with average annual rainfall of 1200-1300mm and average temperature of 35-40C°. Climatic zones of the woreda accounts 98% kola(tropical) and the remaining 2% woinadega(sub tropical). Jawi woreda share boundaries with Alefa woreda to the North, Benishangul gumuz regional state to the South and West, Dangila woreda to the East and Quara to the West.

Socio-demographic characteristics

Jawi woreda has a total population of 88,024. From which 46,050(52.3%) are males with sex ratio of approximately 1:1. The population density of the woreda is 17 people per hectare with annual growth rate of 1.8% and 20471 households with average family size of 4.3. The woreda has 87.5% rural and 12.5% urban populations respectively and it has 20756(23.6%) reproductive age women. Of the total population 48085(54.6%) are in the productive age group; hence the dependency ratio of the woreda is 83%. The ethnic composition of the woreda is 50% agew, 48% Amhara and the remaining 2% are gumuz and others. The religious composition is orthodox Christianity followed by Islam and others (No exact figure).

Table 14: Population data by age and sex, Jawi, Amhara, 2013

Age group in years	sex		total
	male	female	
0-4	6784	6555	13338
5-9	6980	6522	13501
10-14	5566	4966	10532
15-19	4699	5368	10066
20-24	4583	4754	9337
25-29	4530	4330	8860
30-34	3403	2585	5988
35-39	2581	1943	4524
40-44	1910	1380	3290
45-49	1394	1013	2407
50-54	1078	734	1812
55-59	656	392	1048
60-64	463	290	753
65-69	286	148	434
70-74	150	132	282
75-79	71	51	122
80-84	57	32	89
85-89	27	10	37
90-94	10	11	21
95+	4	4	8
total	46050	41974	88024

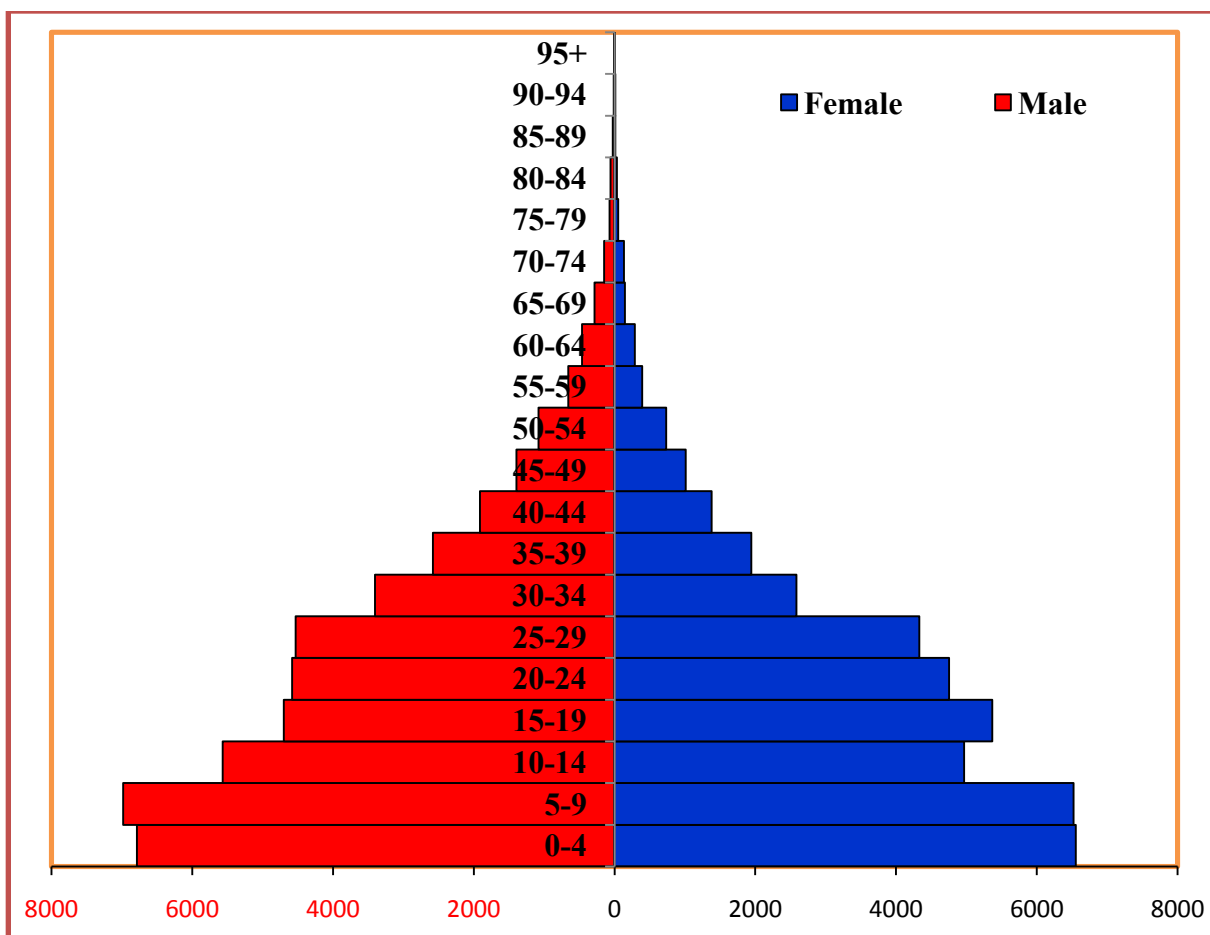


Figure 24: Population pyramid of Jawi district by age group, 2013

Political and administrative divisions

Jawi woreda is divided in to 27 kebeles (25 Rural and two Urban) , of the total 25 rural kebeles, 13 have transportation access throughout the year, 10 kebeles have seasonal transportation access, while the rest two kebeles have no transportation access at all. There are two NGOs, namely, The Carter Center and Save the children working mainly on trachoma and malaria respectively. Approximately 280-300 households have main electricity power supply (fuse box) which they share for others. The woreda has three banks (one commercial, construction and Abay banks) and one post office. Safe water coverage of the woreda is about 61% for rurals and 27.1% for urban. Population getting safe water supply was 49, 963 (46, 966 rural and 2, 997 urban). The daily water consumption per day per person is estimated to be 15 liters for rural and 20 liters for urban population. Data on telecommunication was missing, because of unavailability of data in the hands of the technicians at woreda level.

Education

In the woreda there are 46 (1-8) primary schools with a total of 20,601 students (10,669 males and 9,932 females), one (9-10) secondary school with a total of 490 (220 males and 270 females) and one preparatory school with a total of 50 grade 11 students (27 males and 23 females). Overall, student population was 21,141 with a total educational coverage of 96.3%. There is no TVET and college in the woreda. Crude school dropout rate for 2005EC/2013 was 10.8% and sex specific dropout rate for males and females was 12.3% and 9.2% respectively. The possible reasons for the dropout rate were: family displacement, disease, transfer out, getting married and others. Schools with water supply were 18 and with toilet/latrine for both sexes were 14. Almost all schools have different clubs like: HIV, Traffic, Environmental, Mini-media, Females, Ethics, clever students clubs and so on. The district officers have no data on level of education for 2013.

Productivity and Income

The main source of income for the inhabitants of the district is mixed agriculture. Out of total population, about 85% of households are dependent on crop and animal productions. The cultivated area covers about 60,851 hectares and gives annual estimated GDP of 2,093,781.0195 quintals from both rainy season and irrigation activities. The mainly produced crops were Maize, Sesame (Selit) and others. On the part of animal production, about 120,937 cattle, 53,408 (Goats and Sheep), 12,243 (Donkey and Mules) and 93,617 Hens. There are also 9,722 traditional and 165 modern hives in the woreda. There was no an estimated figure in Ethiopia birr or USD (\$). Sesame (Selit) was the most popular cash crop in the woreda and farmers get more money from selling of it with advanced cost to the merchants from same locality or different area.

Health service institutions and infrastructures

There are 26 health posts, five health centers and no Hospital in the district. In terms of electric power, telephone service and water supply: two health centers have sustainable /24 hours electricity service and three health centers have telephone (mobile + ground line), while two health centers were without telephone service and none of health centers have piped water source. All health posts lack electricity, telephone service and piped water supply. Out of five health centers, three have year round transportation access and the rest two have dry season transportation access, and which is big challenge for health

professionals to transport necessary drugs and other medical supplies to that area. Also it was very difficult for health professionals to supervise the facilities.

Table 15: Population by kebele and distance from woreda town

S.No	Name of Kebele	Population/Distance from woreda town	Cluster H.centers
1	Fendika	9347 0.01 km	Jawi cluster
2	Argabo	2811 1 km	
3	Addis woin	1962 3 km	
4	Ayima	3115 1 km	
5	Alukurand	8266 25 km	
6	Wonbelase	2570 12 km	
7	Kumbir	1186 18 km	
8	Jahimal	4043 35 km	
9	Kava Abo	5408 33 km	W/Meda cluster
10	Wobo	3850 41.5 km	
11	Asech	3553 53 km	
12	Simoda	2635 26 km	
13	Dir	3625 40.83 km	
14	Dek 01	1634 59 km	Dek cluster
15	Work hager	5429 52 km	
16	Zeregenet	3143 55 km	
17	Bunijira	4352 66.1 km	
18	Babuluk	2011 29 km	Babuluk cluster
19	Sewatamp	2151 20 km	
20	Kezkazit	1416 35 km	

21	Bakusa K/Mihiret	3343 39 km	Kebtele cluster
22	Bakusa Mariam	2095 41 km	
23	Kebtele	4700 78 km	
24	Gonj	1513 81 km	
25	Zenzen	806 50 km	
26	Filfil	1807 44 km	
27	Adwanj	1253 50 km	

Table 16: Type of water by source in Jawi woreda in 2005 E.C/2013

S.No	Type of drinking water source	Number	Functional
1	Hand pump	108	107
2	Protected spring	6	6
3	Shallow well	63	62
4	Deep well	1	1
5	Rope pump	11	11

Table 17: Number of health facilities by type in Jawi woreda, 2014

S.No	Type of health institution		No of institutions
1	Hospital		0
2	Number of Health Centers	with sustainable/ 24 hour /electric power	2
		without sustainable/ 24 hour /electric power	3
		with telephone service (cable based/mobile)	3
		without telephone service (cable based/mobile)	2
		with piped water supply	0
		Without piped water supply	5
3	Number of Health centers		5
4	Number of Health post		26
5	Number of private clinics	Lower	0
		Medium	3
		Higher	0
6	Number of Drug vendors		6
7	Number of Drug stores		13
8	Number of Pharmacies		0
9	Number of Diagnostic laboratories		2
10	Health post to population ratio		1:3386
11	Health center to population ratio		1:17605
12	Physical health service coverage		100%

Human resource and man power in health institutions

The distribution of health professionals in the woreda health centers was as follows: 45 Nurse, 9 Medical laboratorians, 10 Pharmacy technicians, 3 Health officers, 4 Environmental health, 3 Midwife, 56 HEWs and 45 non health professionals. The health centers were not equipped with necessary composition of health professionals and the table bellow shows such needs and gaps.

Table 18: Number of health professionals by educational level in health facilities of Jawi woreda in 2014

S. No	Profession type		Educational level	No of professionals				
				Deployed			Required	gaps
				M	F	T		
1	Nurse	Degree	2	1	3	5	2	
		Diploma	28	14	42	50	8	
2	Laboratory	Degree	2	0	2	5	3	
		Diploma	4	3	7	20	13	
3	Pharmacy	Degree	0	0	0	0	0	
		Diploma	5	5	10	12	2	
4	Health officer (HO)		3	0	3	5	2	
5	Environmental Health	Degree	2	0	2	5	3	
		Diploma	2	0	2	—		
6	Midwife	Degree	0	0	0	5	5	
		Diploma	2	1	3	5	2	
8	HEW			56	56	65	9	
9	Community councilors		1	1	2	2	0	
10	HO to population ratio		1:29341					
11	HEW to population ratio		1:1572					
12	Doctor to population ratio		0					
13	Nurse to population ratio		1:1956					

Table 19: Man power in Jawi woreda health office, 2014

S.No	Department	Deployed	Required	GAP
1	Head of woreda health office	1	2	1
2	Health promotion & prevention core process	0	1	1
3	Health and health related case team	1	3	2
4	Public health Emergency case team	1	1	0
5	Plan and program case team	1	3	2
6	Budget & general supplies case team	0	1	1
7	Training case worker	0	1	1

The reason of most of gaps was budget issue and some professionals are not available in the market.

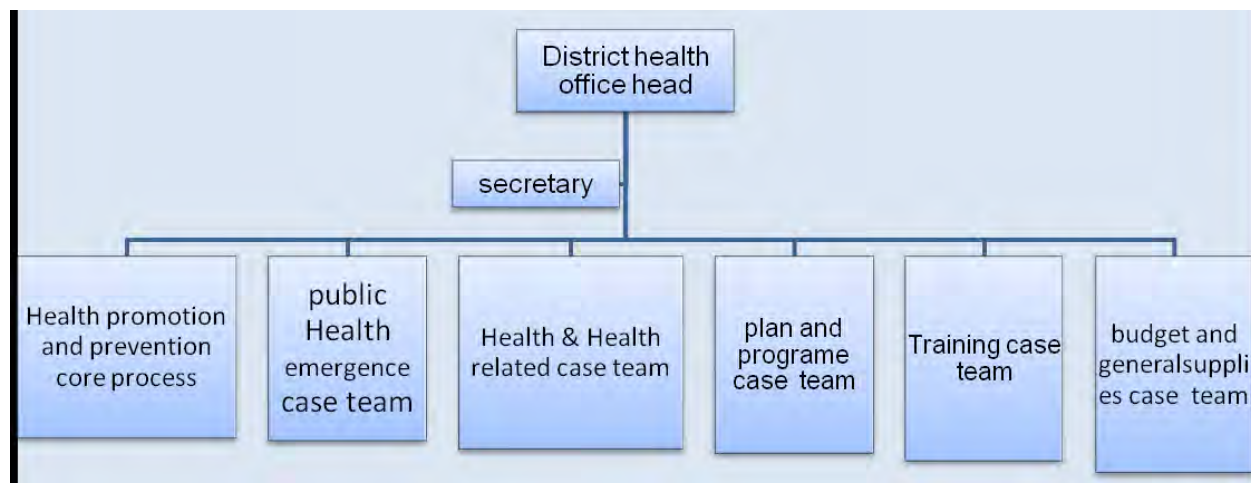


Figure 25: Organo gram of Jawi district, Awi zone, Amhara region, Ethiopia, 2014 (JDHO)

Vital statistics and health indicators

The woreda has total population of 88024. Of which 46,050 (52.3%) are males and 41,974(47.7%) are females with a total of 20,471 households. The average household size is 4.3 people per household. The table bellow shows some of health indicators found in woreda health office register book. Some Vital statistics were missing from the register book, like MMR, CDR, CM, U5MR, and IMR, TFR&CBR.

Table 20: Vital statistics data of Jawi woreda health office, 2014

S. No	Indicators	Number (%)	Remarks
1	Total population	88,024(100)	
2	Male	46,050(52.3)	
3	Female	41,974(47.7)	
4	Under 1 years old	2,438(2.76)	
5	Under 5 years old	11,883(13.5)	
6	Under 15 years old	37,525(42.6)	
7	Productive age female (15-49 years)	20,756(23.6)	
8	Pregnant women	2,817(3.2)	
9	Non pregnant women	17,939(20.3)	
10	Live births	2,588(2.9)	
11	Total fertility rate	-----	No data
12	Crude birth rate	-----	No data
13	Crude death rate	-----	No data
14	maternal mortality rate	-----	No data
15	Child mortality	-----	No data
16	Under 5 mortality rate	-----	No data
17	Infant mortality rate	-----	No data
18	Dependency ratio	83%	
19	Average household size	4.3	

Maternal health service coverage

The woreda maternal health service coverage in 2013/14 was as the following: Antenatal care (ANC) coverage at least one visit was 98.2%, ANC coverage at least four visits are 35.3% which shows low coverage, and contraceptive acceptance rate (CAR) was 78.9% and there is no data of contraceptive prevalence rate (CPR). Proportion of delivery attended by skilled personnel was 20.4% and the post natal coverage was 43.5%.

Child health

All health centers in the woreda provide IMNCI service. During child health and growth monitoring, health professionals identified 229 under 3yrs moderate acute malnutrition cases and 9 severe acute malnutrition cases of the same age group. In the same year (2013/14) there were 12 live births weighing less than 2500gm.

Immunization coverage

As EPI is one of the health sector programs involved in disease prevention and control, it is important to know the EPI status of the district. Full immunization coverage of Jawi woreda in 2013 was 87.1% with pentavalent1 coverage of 107% & pentavalent3 coverage of 98.9%, measles coverage of 88.6%, BCG coverage 2438(100%), protected at birth (PAB) of 60.5%. The dropout rate for measles and penta3 was 17.9% and 8.3% respectively.

Hygiene and Environmental health services

Safe water coverage of the woreda was 61% for rural population and 27% for urban population. Source of water was hand dug wells and deep wells, with latrine coverage of 97.1%. There was no data on utilization rate of the latrine made. Solid waste management accounts for about 85.9% and liquid waste management was 85.9% too. Regular health education was given in the schools, church, health centers and health posts, on harmful traditional practices, HIV, TB, malaria and environmental sanitation.

Disease statistics

Top ten leading causes of outpatient visits

The top ten leading causes of adult outpatient visits in Jawi woreda in 2005EC were: malaria, AFI, Helmenthiasis, pneumonia, disease of respiratory system, disease of muscular skeletal system, disease of digestive system, injury &poison, anemia, and diarrhea. The top ten outpatient visits under five was: malaria, AFI, pneumonia, diarrhea, Helmenthiasis, disease of respiratory system, disease of skin& subcutaneous system, injury, poison and other external causes, disease of ear and mastoid process, and anemia. There was no data on adult /under five morbidity admission and mortality and on sex of outpatient visitors as well.

Table 21: Top ten causes of morbidity/OPD visit/ in Jawi district, Amhara region, 2013

Morbidity in adult OPD			Pediatrics/<5years		
Rank	Disease	No (%)	Rank	Disease	No (%)
1	Malaria	16703(70)	1	Malaria	4874(74.3)
2	AFI	4095(17.2)	2	AFI	789(12)
3	Helmenthiasis	722(3)	3	Pneumonia	294(4.5)
4	Pneumonia	440(1.8)	4	Diarrhea	176(2.7)
5	Disease of resp. system	380(1.6)	5	Helmenthiasis	150(2.3)
6	Disease of musculoskeletal sys.	327(1.4)	6	Disease of respiratory system	137(2.1)
7	Disease of digestive system	316(1.3)	7	Disease of skin& subcutaneous	65(1)
8	Injury, poison, others	311(1.3)	8	Injury,poison,other external	39(0.5)
9	anemia	301(1.3)	9	Disease of ear&mastoid process	27(0.4)
10	Diarrhea	271(1.1)	10	Anemia	12(0.2)
Total		23866(100)	Total		6563(100)

Malaria

In 2005EC Jawi woreda health office received a report of 45,853 confirmed malaria cases and 3010 clinical malaria cases (total of 48,863).Of which *P.falciparum* holds 34,120(74.4%), *P.vivax* accounts 10,291(22.4%) and mixed infection was about 1,442(3.2%). Among all cases 27,693(56.7%) were males and 21,170(43.3%) were females. There were 774 pregnant women cases and 625 admissions. Data on IRs

coverage was obtained in two ways, during major transmission season Deltametrin (77.4%) and minor transmission season bendiocarb (88.9%). Coverage of LLIN (1LLIN/1.8 person) was 57.7% and there was no data on LLIN utilization rate.

Tuberculosis and Leprosy

A number of endemic diseases are common in our country in general and common in Jawi in specific and which is true for tuberculosis and leprosy as well. TB detection rate for all forms was $(184/231 \times 100) = 79.6\%$ and for PTB+ was $27/88 \times 100 = 30.7\%$, and treatment success rate was $(309/317 \times 100) = 97.5\%$, treatment cure rate was $(25/32 \times 100) = 78\%$ with defaulter of one individual and there was no leprosy case for the given year.

HIV/AIDS prevention and control

HIV according to available data was 467 cases with 71 cases the year 2005EC. VCT done was 5,075 individuals with 40 HIV positives and PITC done was 4,869, of which 31 individuals were sero positives. PMTCT service was given to 1466 mothers (education given). Mothers who received NVP from those tested positive were 4 in number. 396 persons were ever enrolled in HIV care, 152 persons ever started on ART and 160 persons were on ART. Data like total tested, age and sex were missing.

Disasters and outbreaks occurred

Malaria case build up was occurred during the two transmission seasons (major & minor). Fire accident covering an estimated area of 33 hectare and loss of 1,815 quintals of crop occurred. Heavy rain with ice on an estimated area of 834.72 hectare with loss of 9,223 quintals happened. There were also about eight traffic accidents occurred in the year with 2 deaths and major & minor injuries with destruction of vehicles.

Health Budget allocation

The total budget for the district health office including health facilities was 4,029,948ETB in that budget year (2013).The head of the district health office had complaints about shortage of budget in that year.

Priorities Identified

- ❖ Maternal and child health services were the most important parts of health service delivery system in developing countries and the same is true for Ethiopia, which is also true for Jawi. The proportion of delivery attended by skilled health professionals in the district was very low, which was 20.4%.Incidence of acute malnutrition in under 3 years old children was the other issue(MAM= 229, SAM= 9 children)
- ❖ Man power is the basic tool to work efficiently and effectively. But the woreda health office man power was not in a way that BPR structure needs and budget allocated for district health system was minimal.
- ❖ There was no well organized way of data retention in the district sectors, especially health sectors.
- ❖ From five health centers available in the district, two of them had seasonal transportation access (dry season) and three of them had transportation access throughout the year.

Discussion

Malaria is the leading cause of morbidity in the district, accounting 70% and 74% in adult and under five OPD visits respectively. This is higher than the national prevalence of OPD visit reported in 2011/2012 as 15.5 % (6).

The other diseases that were leading causes of morbidity next to malaria in the district was AFI both in adult and under five OPDs with magnitude of 17.2% and 12% respectively [1].

There was a case build up of malaria during major and minor transmission seasons, and disaster of fire accident and heavy rain with ice onto the crops and grazing areas. The other issue was man power shortage in the district health office, to mention plan and program case team, deputy head and others.

The LLINs coverage of the district was 57.7%, which was low compared to MIS 2011(>85%) to protect against anopheles mosquitoes bite and that might be the possible reason for malaria case build up to happen [1]. The assessment had shown the presence of poor quality data storage systems which might bring about poor decision making. The Proportion of skilled delivery attended by health personnel was 20.4%, which was better compared to EDHS 2011 and still needs further effort in order to achieve the national millennium target [8]. The district health office better work hard on the documentation issues, so that, appropriate planning can be done. ANC visit should be enhanced to improve the skilled delivery through regular contact with pregnant women and educating during the visiting time. As far as the area is exposed to the Beles sugar plant, care should be given to the HIV patients follow up and testing for new patients visiting the health facilities.

Limitations

Sectors lacking/missing appropriate data/health and health related indicators, for example, mortality records, previous research in the district, telecommunication, electric power supply information, incomplete TB data.

Conclusion and recommendations

Malaria was the leading cause of morbidity in the district both in adult and under five outpatient departments. The second leading cause of morbidity in the district was AFI in both adult and under five outpatient departments. Proportion of skilled delivery attended by health personnel was 20.4%. Health related indicators like, death/mortality, total fertility rates, crude rates were not recorded appropriately. There was a gap in maternal and child health issues which needs attention. Like wise man power shortage in district health office, inaccessibility of transportation to remote health facilities, inadequacy of allocated annual budget were issues that need due attention by the district itself, zonal health department, regional health bureau, regional government in specific and NGOs and other stake holders in general. The district sectors should keep their respective data in appropriate and easily accessible manner.

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5.1: Measles outbreak investigation in Fogera woreda, south Gondar zone, Amhara region, North West Ethiopia, December, 2014

Abstract

Background: Globally an estimated number of 20 million cases and 164,000 deaths occur each year. Airborne transmission of measles virus has been documented with reproduction ratio (RR) of 12-18. The aim of investigation was to identify etiologic agent, risk factors and institute doable intervention.

Methods: A 1:2 unmatched case-control study was applied from December 20-30/2014 and data were collected using structured questionnaire. The data were entered in to SPSS version 16, Epiinfo7 and MS-Excel work sheet. Odds Ratio, 95% CI and P-value were constructed to measure the significance of association in both bivariate and multivariate analysis.

Result: The outbreak stayed for 24 weeks and a total of 404 suspected cases of measles and six cases were died with CFR of 1.5%. The mean age of the cases was 11.9 years with a range of 9 months - 35 years and that of controls was 5.5 with a range of 1-21 years. Odds of illness among unvaccinated (AOR: 5.0; 95% CI: 1.5-16.2; P: 0.006) compared to vaccinated ones, contact history (AOR: 19.6; 95% CI: 1.3-290; P: 0.029), odds of illness among travelers (AOR: 14.9; 95% CI: 3.8-58; P< 0.001) compared to non travelers, odds of illness being in the age group 5-14 years (AOR: 38.5; 95% CI: 3.6-410; p: 0.002) compared to other age groups. These were significant factors in both bivariate and multivariate analysis.

Conclusion: Children under 15 years of age were primarily affected by this outbreak, with case fatality of greater than 1%. Delayed case management and late investigation worsened the situation of an outbreak in the woreda. Absence of vaccination, contact, and travel history were found to be risk factors. Mass vaccination and active case management better used to contain the epidemics.

Key words: Measles Outbreak, Fogera, Ethiopia

Introduction

Globally an estimated number of 20 million cases and 164,000 deaths occur from measles each year [1] and in 2013 there was 145,700 deaths globally, with majority of under 5 and about 400 deaths every day or 16 deaths every hour and approximately two to three deaths may occur for every 1,000 reported measles cases, even though a safe and cost-effective vaccine is available [2].

Measles is an acute, highly contagious viral disease caused by measles virus (genus Morbillivirus of the Paramyxoviridae family) with incubation period of approximately 10–12 days from exposure to the onset of fever and other nonspecific symptoms and 14 days (with a range of 7–18 days), from exposure to the onset of rash. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva [4]. Common source outbreaks associated with airborne transmission of measles virus have been documented with reproduction ratio (RR) of 12-18 and can vary with some sort of factors, (contact duration with ill people, infectiousness of the organism and susceptible population in the affected area) [5].

Infant and under-five mortality are at 75 and 123 per 1,000 live births respectively. The high child mortality rate in Ethiopia is due to combined effects of a high incidence of infectious diseases and inadequate infant and young child nutrition. Measles accounts for 5% of child hood mortality. Ethiopia introduced measles vaccination in 1980, as part of the Expanded Program on Immunization (EPI), with the first dose of measles vaccine administered at 9 months of age [8].

High coverage of vaccination of children below the age of 15 years has led to reduction of measles cases by up to 99% in developed or industrialized countries. Developing countries are failing to achieve high vaccination coverage, hence frequent outbreaks of measles with high case fatalities as high as 3- 30% do occur [9].

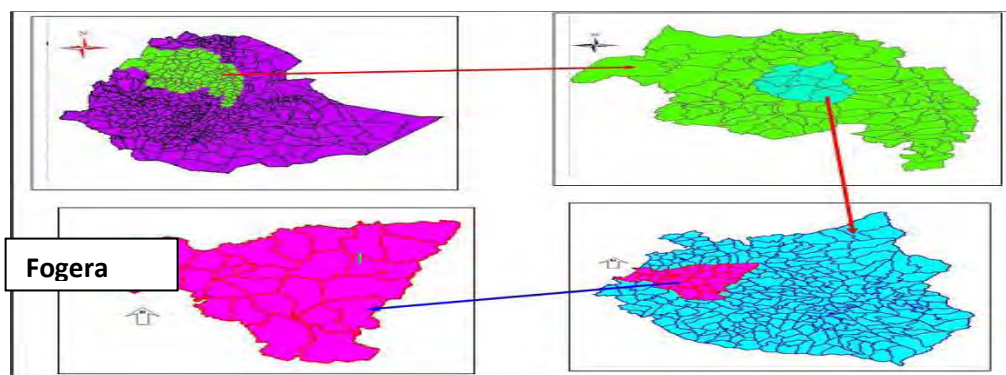
Ethiopia, being among those developing countries is experiencing measles epidemics throughout the country, though there is routine immunization session in almost all *woredas* at age of nine months. Measles outbreaks continue to be reported in twenty five *woredas* in Addis Ababa, Amhara, Dire Dawa, Oromyia and SNNP. In 2013, 4,780 (6.5/100,000) confirmed measles cases were reported nationwide [14].

Fogera *woreda* also experienced suspected measles outbreak since 26 August 2014 (WHO-week35), two cases of measles were recorded in unvaccinated one young child and an adult from Guramba kebele of the *woreda* who have travel history to Estie *woreda* which was already reporting suspected measles cases [15]. The aim of investigation was to identify etiologic agent, risk factors and institute doable intervention.

Methods and Materials

Investigation area

Fogera woreda is one of the woredas found in South Gondar Zone, Amhara Region and established as woreda in 2000 E.C. The woreda is at a distance of 723 kms from Addis Ababa and 58 kms from regional town Bahir Dar, and bounded by Libokemkem in the North and Dera in the South, Farta in the East and Este in the West directions. The physical area of the woreda is about 117,414 Km² with an altitude range of 1774-2410masl, T° range of 11.48°C-27.37°C, annual rainfall of 1103-1336mm. The woreda has total population of 247,895, of which, 240,154 were rural and 7,741 were urban ones. Over half (51.1%) were males and 33,565 under five years, 58,454 (15-49 females), 8,354 pregnant women were found. The woreda has 30 rural and 2 urban kebeles, and 9 health centers, 45 health posts. It has sub-tropical weather condition with some low land areas.



Map 7: Location of Fogera woreda, south Gondar zone, Amhara region, 2014

Study period

The study was conducted from December 20-30/2014.

Study design

Unmatched Case-control study design was used.

Sample size

General formula for unmatched case-control study design

$$n_1 = \frac{(Z_{\alpha/2} + Z_{1-\beta})^2 p q (r+1)}{r(p_1 - p_2)^2} \quad n_2 = r n_1$$
$$p = \frac{p_1 + r p_2}{r+1} \quad q = 1 - p$$

Sample size was calculated using Epiinfo 7 statcalc for unmatched case-control study

Reference (Kelsey et al, methods in observational Epidemiology 2nd Edition.)

Two sided confidence level $(1-\alpha) = 95\%$

Power (% chance of detecting) = 80%

Ratio of controls to cases = 2

Proportion of controls with exposure = 20%

Proportion of cases with exposure = 43%

Least extreme Odds Ratio to be detected = 3.0

Using Epiinfo statcalc sample size became

For cases = 53

For controls = 106

Total size = 159 (two controls: one case)

Exclusion criteria

For controls, those with prior history of Measles should be excluded, those in similar incubation period with cases excluded whenever they develop the disease.

Inclusion criteria

Individuals without disease of interest may be in the community (similar geographic areas) apart from the points mentioned in the exclusion criteria

Data collection

Structured questionnaire was used to collect data for case-control study and additional data were also collected by line listing which used for the descriptive part and cases were identified using WHO standard case definitions. Data collection was

Data quality control

To assure the quality of data, the data was primarily collected by principal investigator and well trained co-investigator. Prior to entering the data in to the computer the missing variables and consistency of filling of questionnaires and completeness of data was checked out cautiously.

Data entry and Analysis

The data were entered and analyzed using SPSS version 16, Epi-Info7 version 7.1.3.0, MS-Excel and ArcGIS. Results were presented using graph and tables and attack rate and case fatality rate were also calculated. Odds ratio, 95%CI and p-value were constructed to measure the significance of association in bivariate and multivariate analysis.

Variables

Dependent variable

Measles infection

Independent variables

Age

Vaccination status

Contact history

Travel history

Educational status of family

Ethical issues

The Amhara regional health bureau PHEM wrote consent letter for the woreda health office and as a result the investigation was commenced.

WHO case definition of measles outbreak and cases

Suspected measles case: Any person with fever and maculopapular (non-vesicular) generalized rash and cough, Coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles. [4]

Confirmed measles case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiologically linked to confirmed cases in an outbreak. [4]

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

Result

Among the suspected cases 5 blood samples were taken to identify the etiologic agent and laboratory result has shown that three out of five samples has been tested positive for measles IgM.

On 26 august 2014 (WHO-week35), two suspected cases of measles were recorded in unvaccinated one young child and an adult from Guramba kebele of Fogera woreda who have travel history before one week of onset of illness (rash onset), to Estie woreda where confirmed measles cases were reported. The outbreak stayed for 24 weeks and a total of 404 suspected cases (3 confirmed cases) of measles and six community deaths with CFR of 1.5%. The mean age of the cases was 11.9 years with a range of 9 months - 35 years and mean age of controls was 5.5 with a range of 1-21 years.

The overall attack rate (AR) of the cases was 163/100,000 populations. Less than five years were slightly more affected than the others (AR for <5 years was 400/100,000 population and AR for 5-14years and 15-44 years was 300/100,000 and 100/100,000 populations respectively). The affected kebeles were presented (Table 22).

Table 22: Measles cases, attack rates and case-fatality cases by kebeles, Fogera, South Gondar Zone, ANRS, 2014

Kebeles	Population	Cases	Deaths	AR (%)	CFR (%)
A/kiros	6952	2	0	0.03	0
A/Selam	8449	11	0	0.13	0
Abagunda	3979	11	0	0.3	0
Alember	5562	2	0	0.04	0
Arida	4,032	7	0	0.2	0
Bebex	7697	4	0	0.05	0
Chalma	8823	1	0	0.01	0
Delmo	4648	240	2	5.2	1.0
Fuafuate	4,032	6	0	0.15	0
Gashene	4,032	5	0	0.12	0
Guramba	5048	16	0	0.32	0
Kinti	5581	20	0	0.4	0
Menguzer	6783	5	0	0.07	0
Navega	5863	63	4	1.1	6.4
Sendega	3979	4	0	0.1	0
Shina	5235	7	0	0.13	0
Total	90,695	404	6		

Measles vaccination coverage for the woreda for 2012, 2013 and 2014 was above 100%, despite the occurrence of the outbreak in the woreda. The main reason of falsely elevated administrative immunization coverage was because of under planning of the eligible population in every kebele as per evidence obtained from the investigation. From suspected cases 284 (70.3%) were not vaccinated at all, only 17.8% vaccinated and status was unknown for 11.9% of cases.

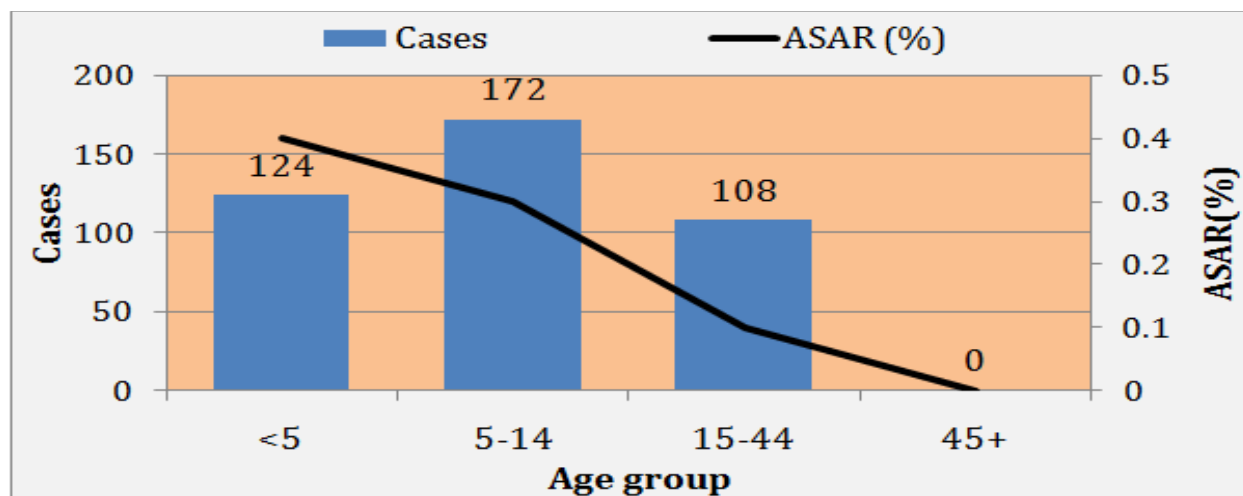


Figure 26: Age specific attack rate among cases, Fogera woreda, South Gondar zone, ANRS, 2014

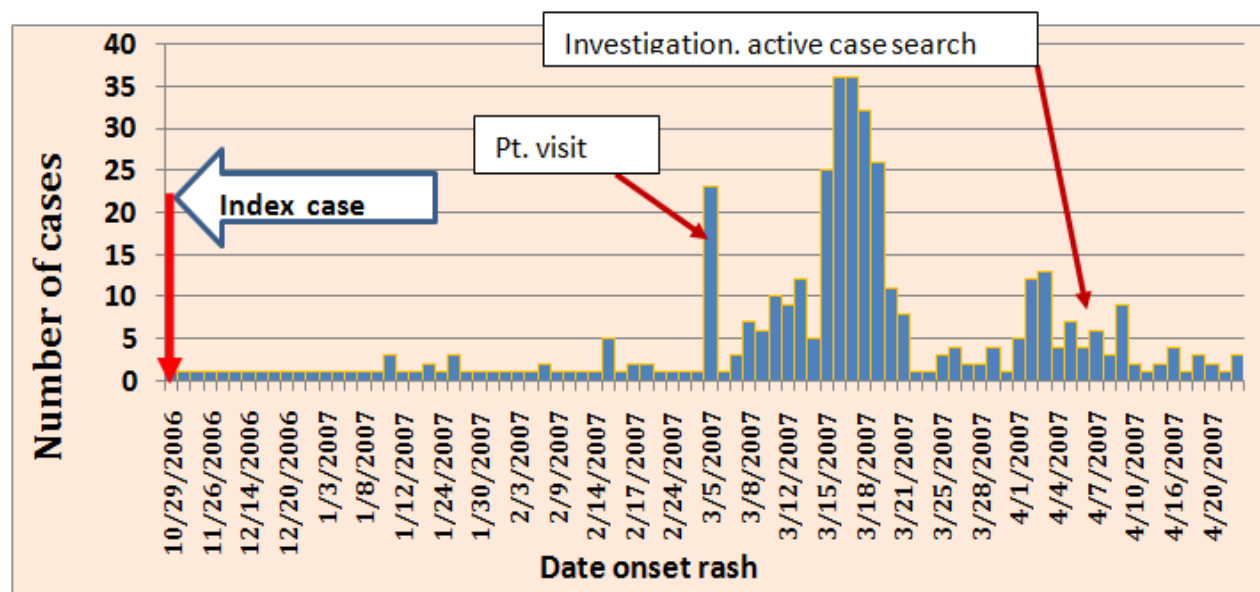


Figure 27: Distribution of Measles Cases by Date of onset of rash-Fogera, South Gondar zone, Amhara, North West Ethiopia, 2014

On Bivariate analysis statistically significant variables were:

Absence of vaccination (OR: 11.9; 95% CI: 5.3-26.7; $P < 0.001^*$), contact history with measles infected person (OR: 18; 95% CI: 2.3-137; $P: 0.005$), travel history prior to 7-18 day before rash onset (OR: 46.5; 95% CI: 14.6-148; $P < 0.001^*$) and age group from 5-15 years (OR: 37 ; 95% CI: 7.8-174; $p < 0.001$).

On Multivariate analysis statistically significant variables were:

The significant variables in the bivariate analysis were again entered in to multivariate analysis to check out the presence of confounders if any. Accordingly, odds of illness among unvaccinated (AOR: 5.0; 95% CI: 1.5-16.2; $P: 0.006$) compared to vaccinated ones, odds of illness among people with contact history with measles infected person (AOR: 19.6; 95% CI: 1.3-290; $P: 0.029$) compared to without contacts, odds of illness among travelers to area with measles (AOR: 14.9; 95% CI: 3.8-58; $P < 0.001^*$) compared to non travelers, odds of illness among age group from 5-14 years (AOR: 38.5 ; 95% CI: 3.6-410; $p: 0.002$) compared to other age groups.

Interventions undertaken during the investigation time

Technical assistance was given for health workers on case management, recording and reporting situation. Cases were treated to prevent further spread and reduce morbidity and mortality attributable to measles infection. Routine surveillance was strengthened and the situation was closely followed at each level on a daily basis until epidemics was controlled.

Discussion

During the outbreak time a total of 404 cases were identified with highest attack rate compared to the attack rate of measles outbreak recorded nationally, 6.5 and 14.6 per 100,000 population, in 2013 and 2014 respectively [10]. Proportion of measles cases in children aged <5 yrs was 30.7% and quite similar with figure in WHO report of 2011 and 2012 in Ethiopia; whereas, the MCV1 coverage is higher in the study area than the average national coverage of 2012 (68.2%), though, the real coverage is by far lower than the reported one [11].

The highest attack rate was observed among children under the age of 5 years (0.4%), which is comparable with the observations made by other studies done on measles in DRC in 2010-2011 [12]. In developing countries, the expected case-fatality rate is between 3% and 6%. In certain high-risk populations, case-fatality rates as high as 30% have been reported in infants aged less than 1 year of age [4].

In this measles outbreak investigation six measles deaths recorded and the CFR was greater than 1% (1.5%). And it is in agreement with the expected CFR in Ethiopia as of developing country CFR is greater than 1% and it is similar with DRC (1.4%)[12] and much greater than study done in Sudan with CFR of 0.9% [13]. This might indicate the level of the quality of case management is poor during the outbreak time.

The finding emphasizes that people with exposure history have 14.9 times odds of acquiring measles compared to people without exposure (CI: 3.8-58; $p < 0.006$). The finding also indicates 5-14 years age group people have 38.5 times odds of acquiring measles compared to people of other age groups (CI: 3.6-410; $p < 0.002$). These all associations were similar with the findings of outbreak investigation done in Abaya woreda of Oromyia region in 2013 [6].

Limitations

- ☞ Some families were not volunteer to be interviewed
- ☞ Difficulty in stating the exact date of onset of the epidemics
- ☞ Recall bias on vaccination status

Conclusions

Unvaccinated children less than 15 years of age were primarily affected by this outbreak. The case fatality rate was greater than 1%. Vaccination coverage among cases was very low (17.8%). Delayed case management and late investigation aggravated the situation of an outbreak in the affected locality. In my study absence of vaccination, contact, and travel history were more likely associated with the outbreak on bivariate and multivariate analysis.

Recommendations

It is recommended that, routine vaccination to be available at doorsteps of the people by HEWs. Conduct mini-survey by region and zone level to realize the real coverage and institute supplementary vaccination campaign as per WHO field guideline (EPHI, RHB and ZHD)

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5.2: Measles outbreak investigation in Chewaka woreda, Illu-Aba-Bora zone, Oromyia region, South West Ethiopia November, 2014

Abstract

Background: Measles is one of the communicable diseases still causing preventable mortality and morbidity in the world. Globally an estimated number of 20 million cases and 164,000 deaths occur from measles each year. Airborne transmission of measles virus have been documented with reproduction ratio (RR) of 12-18 and can vary with some sort of factors, (contact duration with ill people, infectiousness of the organism and susceptible population in the affected area). The aim of investigation was to identify etiologic agent, risk factors and institute doable intervention measures.

Methods: A 1:2 unmatched case-control study was applied from November 12-26/2014 and data were collected using structured questionnaire. The data entered in to SPSS version 16, Epiinfo7 and MS-Excel. Odds Ratio and 95% CI were constructed to measure the significance of association in bivariate and multivariate analysis.

Results: The outbreak stayed for more than 10 weeks and a total of 225 suspected cases of measles and no death were reported. The mean age of the cases was 6.9 years with a range of one-25 years and mean age of controls was 7.5 with a range of 1-38 years. The overall attack rate (AR) of the cases was 324/100,000 populations. Odds of illness among unvaccinated (AOR: 14.3; 95% CI: 2.0-97) compared to vaccinated ones, odds of illness among people with contact history (AOR: 6.8; 95% CI: 1.0-48.3) compared to without, odds of illness among people at distance of health facility >5kms (AOR: 11.5; 95%CI: 6.5-59.8) compared to people living in < 5kms radius, odds of illness among malnouritioned MUAC <11cm (AOR: 21; 95%CI: 3-65) compared to well nouritioned, odds of illness among family size >4 (AOR: 6.5; 95%CI: 5.2-87) compared to < 4 members.

Conclusion: Unvaccinated children less than five years of age were primarily affected by this outbreak. The woreda routine measles vaccination coverage needs due attention and nutritional status of community should be assessed.

Key words: Measles Outbreak, Chewaka, Oromyia, Ethiopia

Background

Measles is one of the communicable diseases still causing preventable mortality and morbidity in the world. Globally an estimated number of 20 million cases and 164,000 deaths occur from measles each year [1] and in 2013 there was 145,700 deaths globally, with majority of under 5 and about 400 deaths every day or 16 deaths every hour and approximately two to three deaths may occur for every 1,000 reported measles cases, even though a safe and cost-effective vaccine is available [2].

Measles vaccination resulted in a 75% drop in measles deaths between 2000 and 2013 worldwide. In 2013, about 84% of the world's children received one dose of measles vaccine by their first birthday through routine health services – up from 73% in 2000. During 2000-2013, measles vaccination prevented an estimated 15.6 million deaths making measles vaccine one of the best buys in public health domain [2, 3].

This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva [4]. Common source outbreaks associated with airborne transmission of measles virus have been documented with reproduction ratio (RR) of 12-18 and can vary with some sort of factors, (contact duration with ill people, infectiousness of the organism and susceptible population in the affected area) [5].

It usually does not kill children directly; however, as a result of its associated immune-suppression, measles can lead to lethal complications, such as pneumonia, croup, and diarrhea. Measles can also lead to lifelong disabilities, including blindness, brain damage, and deafness [6]. It accounts for 44% of total deaths due to vaccine preventable diseases (VPD), among children less than 15 years, the highest mortality occurring in poor communities with malnutrition, overcrowding and low vaccination coverage [7].

Infant and under-five mortality are at 75 and 123 per 1,000 live births respectively. The high child mortality rate in Ethiopia is due to combined effects of a high incidence of infectious diseases and inadequate infant and young child nutrition [8].

Developing countries are failing to achieve high vaccination coverage, hence frequent outbreaks of measles with high case fatalities as high as 3- 30% [9].

Being the part of those developing countries, Ethiopia is experiencing measles epidemics throughout the country, though there is routine immunization session in almost all woredas at age of nine months [14]. Chewaka woreda experienced suspected measles outbreak since 24/Oct/2014 (WHO-week43), one suspected measles case recorded in unvaccinated adult woman who came from Harrarge for visiting her

relatives in, Gabbina kebele during the afore mentioned time and at that time she became symptomatic for measles infection. Later on consecutive WHO weeks until the end of December 2014, Chewaka woreda health office detected increasing number of cases of suspected measles for which sample was sent to national measles laboratory to be tested for measles IgM [16]. The aim of investigation was to identify etiologic agent, risk factors and institute doable intervention measures

Methods and Materials

Investigation area

Chewaka woreda is one of the woredas found in, Illu-ababora Zone, Oromyia Region and founded in 1996 E.C by settlement program of people from parts of Harrarge. The woreda is at a distance of 570 kms from Addis Ababa and bounded by East Wollega in the North and East, Dabo Hanna in the South, East Wollega & Mako woreda in the West directions. The physical area of the woreda is about 5,422 Km² with an altitude range of 900-1400masl, T° range of 37°c-42°c, annual rainfall of 1000-1200mm. The woreda has total population of 69,408, of which, 67,948 were rural and 14,060 were urban ones. Out of total population, males account (50.5%), 11,404 under five years, 15,339 (15-49 females), 2,408 pregnant women were found. The woreda has 27 rural and one urban kebeles, and three health centers, 28 health posts. It has tropical weather condition (low land) and as a result of such weather condition, malaria is the leading cause of morbidity among top ten diseases, followed by AFI and ARTIs.

Study (investigation) period

The study was conducted from November 12-26/2014

Study design

Unmatched Case-control study design was used and sampling needs more attention as of case-control study is more affected by selection bias, so this should be one of considerations by the designer (limitations)

Sample size

Formula for unmatched case-control study

$$n_1 = \frac{(Z_{\alpha/2} + Z_{1-\beta})^2 \bar{p}q(r+1)}{r(p_1 - p_2)^2} \quad n_2 = r n_1$$

$$\bar{p} = \frac{p_1 + r p_2}{r+1} \quad q = 1 - p$$

Sample size was calculated using Epiinfo 7 statcalc for unmatched case-control study

Reference (Kelsey et al, methods in observational Epidemiology 2nd Edition.)

Two sided confidence level $(1-\alpha) = 95\%$

Power (% chance of detecting) = 80%

Ratio of controls to cases = 2

Proportion of controls with exposure = 20%

Proportion of cases with exposure = 43%

Least extreme Odds Ratio to be detected = 3.0

Using Epiinfo statcalc sample size became

For cases = 53

For controls = 106

Total size = 159 (two controls: one case)

Exclusion criteria

For controls, those with prior history of Measles should be excluded, those in similar incubation period with cases excluded whenever they develop the disease.

Inclusion criteria

Individuals without disease of interest may be in the community (similar geographic areas) apart from the points mentioned in the exclusion criteria

Data collection

Structured questionnaire was used to collect data for case-control study and additional data were also collected by line listing which used for the descriptive part and cases were identified using WHO standard case definitions. Data was collected by principal investigator and co-investigator including HEWs upon giving 30-60 minutes on how to identify cases and controls from the community, giving attention on exclusion and inclusion criteria.

Data quality control

To assure the quality of data, the data were primarily collected by principal investigator and well trained co-investigator. Prior to entering the data in to the computer the missing variables and consistency of filling of questionnaires and completeness of data were checked out cautiously.

Data entry and Analysis

The data were entered and analyzed using SPSS version 16, Epi-Info7 version 7.1.3.0 and, MS-Excel were used. Results were presented using graph and tables and attack rate and case fatality rate were also calculated. Odds ratio, 95%CI and p-value were constructed to measure the statistically significant variables in both bivariate and multivariate analysis.

Dependent variable

Measles infection

Independent variables

Age

Vaccination status

Contact history

Travel history

Educational status of family

Family size

Nutritional status

Distance of health facility

Ethical issues

The Oromyia regional health bureau PHEM and EPHI wrote consent letter for the woreda health office and as a result the investigation was put in place with the woreda health officers and consent of the interviewees to finish and interrupt the interview during investigation was respected.

WHO measles case definition

Suspected measles case: Any person with fever and maculopapular (non-vesicular) generalized rash and cough, Coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles. [4]

Confirmed measles case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiologically linked to confirmed cases in an outbreak. [4]

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 or contact with epidemiologically linked cases. [4]

Control: any person living or sharing the same geographic area and any other aspects, except the condition (measles infection).

Result

On 24 October 2014 (WHO-week43), one suspected measles case was reported in unvaccinated adult woman who has travel history before one week of onset of illness (rash onset) from Harrarge part where confirmed measles cases were reported before. The outbreak stayed for more than 10 weeks and a total of 225 suspected cases (four confirmed cases) of measles with no death. The mean age of the cases was 6.9 years with a range of one - 25 years and mean age of controls was 7.5 with a range of one-38 years.

The overall attack rate (AR) of the cases was 324/100,000 populations. Less than five years were more affected than the others (AR for <5 years was 929/100,000 population and AR for 5-14years and 15-44 years was 309.7/100,000 and 90.7/100,000 populations respectively). The affected kebeles were presented in (Table 23)

Table 23: Measles cases, attack rates and case-fatality r by kebeles, Chewaka, Illu-Aba-Bora Zone, Oromyia region, 2014

Kebeles	Total Population	Cases (%)	Deaths	AR (%)	CFR (%)
B/Baraka	3017	2(0.9)	0	0.07	0
B/Biftu	2710	4(1.8)	0	0.15	0
Bonoyyaa	2119	2(0.9)	0	0.1	0
Ch/Megertu	2315	6(2.4)	0	0.3	0
Chekorsa	4466	17(7.5)	0	0.4	0
Damaksa	2354	4(1.8)	0	0.2	0
Gabbina	4715	113(50.2)	0	2.8	0
Gudure	3649	30(13.3)	0	0.8	0
K/Jeneta	2633	3(1.3)	0	0.12	0
Mirgisa	3440	10(4.4)	0	0.3	0
Sh/Tokke	2452	4(1.8)	0	0.2	0
T/Harar	2396	28(12.4)	0	1.2	0
U/Oromyia	2626	2(0.9)	0	0.08	0
Total		225(100)			

Measles vaccination coverage for the woreda for 2013 was only 40.1%. From measles cases, only 23 (10.2%) vaccinated with one dose of measles containing vaccine 163 (72.4%) were not vaccinated and status was unknown for 39 (17.4%) of cases.

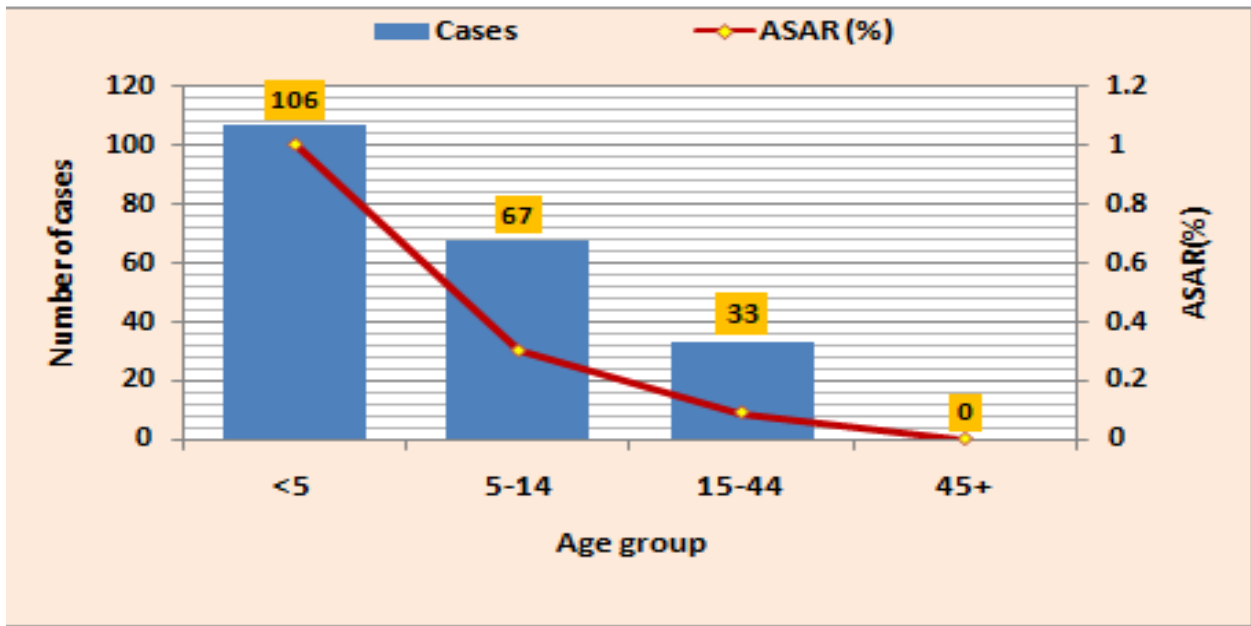


Figure 28: Age specific attack rate among cases, Chewaka, Illu-Aba-Bora zone, Oromyia region, South West Ethiopia, 2014

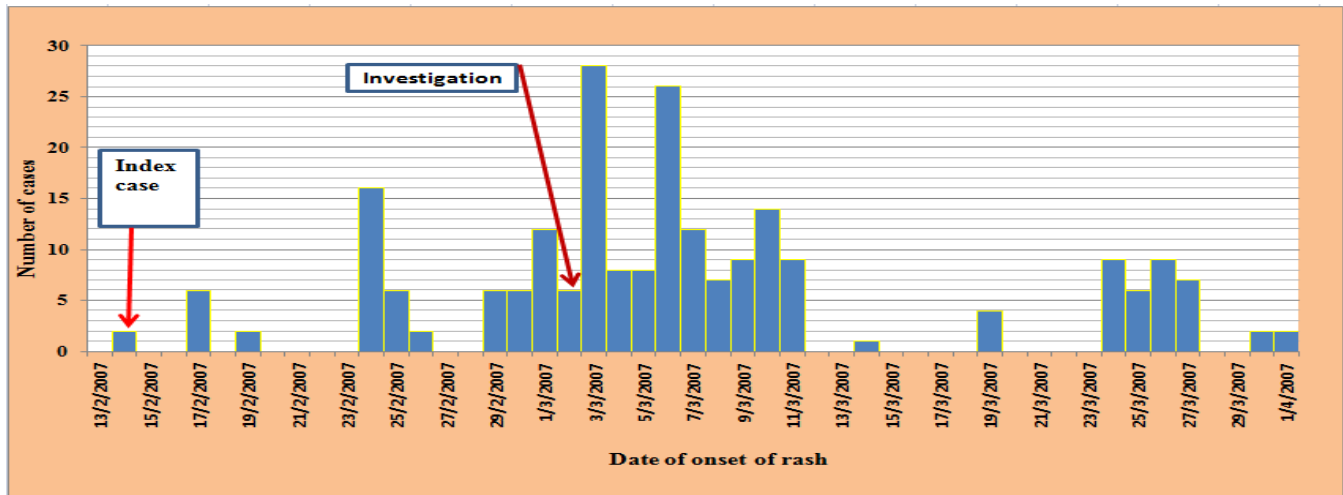


Figure 29: Trend of Measles Cases by Date of onset of rash-Chewaka, Illu-Aba-Bora zone, Oromyia region, South West Ethiopia, 2014

On Bivariate analysis statistically significant variables were:

Odds of illness among unvaccinated (COR: 17.5; 95% CI: 7.5-40.8) compared to vaccinated ones, contact history (COR: 1.5; 95% CI: 1—3.65) , travel history (COR: 1.29; 95% CI: 0.46-3.5) and age group <5 years (COR:1.5 ; 95% CI: 0.75-2.99), distance of health facility >5kms (COR: 32.7; 95%CI: 12.5-85), family size >4 (COR: 16.1; 95%CI: 6.8-38.3), educational status Illiterate (COR: 4.9; 95%CI: 1.9-12.8), nutritional status MUAC <11cm (COR: 8.0; 95%CI: 1.9-32.3) and ventilation of the house (COR: 4.6; 95%CI: 1.0-20.7).

On Multivariate analysis statistically significant variables were:

Odds of illness among unvaccinated (AOR: 14.3; 95% CI: 2-97) compared to vaccinated ones, odds of illness among people with contact history (AOR: 6.8; 95% CI: 1-48.3) compared to without , odds of illness among people with nutritional status MUAC <11cm (AOR: 21; 95%CI: 3-65) compared to MUAC > 12.5cm, odds of illness among living at distance of health facility >5kms (AOR: 11.5; 95%CI: 6.5-59.8) compared to within < 5kms radius, odds of illness among households with family size >4 (AOR: 6.5; 95%CI: 5.2-87) compared to < 4 members. These were variables remained significant both in bivariate and multivariate analysis.

Interventions undertaken during the investigation time

The investigation team identified shortcomings that aggravated distribution of the measles infection. These were absence of early notification and lack of timely management of cases in the community, interruption of routine vaccination. Technical assistance was given for health workers on case management, recording and reporting situation. Cases were treated to prevent further spread; and reduce morbidity and mortality attributable to measles infection. Routine surveillance and vaccination was strengthened and the situation was closely followed at each level on a daily basis until the end of epidemics. Community education on the advantages of vaccination at nine months.

Discussion

During the outbreak time a total of 225 cases were identified with highest attack rate compared to the attack rate of measles outbreak recorded nationally, 6.5 and 14.6 per 100,000 population, in 2013 and 2014 respectively [10]. Proportion of measles cases in children aged <5 yrs was 47.1% and higher than that of WHO report of 2011 and 2012 in Ethiopia; and, the measles containing vaccine coverage is low in the study area than the average national coverage of 2012 (68.2%) [11].

The highest attack rate was observed among children under the age of 5 years (0.92%), which is lower than the observations made by other studies done on measles in Oromyia region in 2013 and higher than study done in DRC in 2010-2011 [6,12]. In developing countries, the expected case-fatality rate is between 3% and 6%. In certain high-risk populations, case-fatality rates as high as 30% have been reported in infants aged less than 1 year of age [4].

The first and the most factors are being not vaccinated with measles containing vaccine at appropriate time of immunization. When compared to study done in the Republic of Marshall Islands of pacific nation and Abaya woreda of Borena zone of Oromyia, from which 59% and 61% of affected children by measles outbreak were unvaccinated respectively, and the finding of this investigation was by far higher than these (72.4%) [15].

The contact history in this study was in agreement with the concept of secondary attack rate of greater than 90% (12-18 RR). Due to the high transmission efficiency of measles, outbreaks have been reported in populations where only 3% to 7% of the individuals were susceptible and it is not unusual to come across with such findings [4, 5].

Limitations

- ❖ Distance of kebeles (not easily accessible)
- ❖ Community resistance during interview
- ❖ Recall bias on vaccination and date of onset of symptoms

Conclusion

Unvaccinated children less than five years of age were primarily affected by this outbreak. The woreda routine measles vaccination coverage needs due attention. In this study absence of vaccination, contact before 7-18 days with the suspected individuals, distance of health facility, family size and nutritional status were more likely risk factors associated with the outbreak on both bivariate and multivariate analysis.

Recommendations

We recommended availability of routine vaccination at doorsteps of the people by HEWs, conducting mini survey by region and zone to realize real coverage, assess nutritional status of the community and infant/child feeding habits (partners working on nutrition area) and institution of supplementary vaccination campaign in line WHO field guideline (EPHI, RHB, ZHD).

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Chapter VI – Abstracts for Scientific Presentation

6.1: Measles outbreak investigation in Fogera, south Gondar zone, Amhara region, Ethiopia, December, 2014

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Presenter: Getachew A (abebegetachew338@gmail.com)

Abstract

Background: Globally an estimated number of 20 million cases and 164,000 deaths occur each year. Airborne transmission of measles virus has been documented with reproduction ratio (RR) of 12-18. The aim of investigation was to identify etiologic agent, risk factors and institute doable intervention.

Methods: A 1:2 unmatched case-control study was applied from December 20-30/2014 and data were collected using structured questionnaire. The data entered in to SPSS version 16, Epiinfo7 and MS-Excel work sheet. Odds Ratio, 95% CI and P-value were used to measure the significance of association in bivariate and multivariate analysis.

Result: The outbreak stayed for 24 weeks and a total of 404 epi-linked measles cases and six deaths were reported with CFR of 1.5%. The mean age of the cases was 11.9 years with a range of 9 months - 35 years and that of controls was 5.5 with a range of 1-21 years. Odds of illness among unvaccinated (AOR: 5.0; 95% CI: 1.5-16.2; P< 0.006) compared to vaccinated population, odds of illness among people with contact history (AOR: 19; 95% CI: 1.3-290; P: 0.029) compared to without, odds of illness among people with travel history during epidemics (AOR: 14.9; 95% CI: 3.8-58; P< 0.001) compared to no history of travel, odds of illness among age group 5-14 (AOR: 38.5; 95%CI: 3.6-410; p; 0.002) compared to others.

Conclusion: Children under 15 years of age were primarily affected by this outbreak, with case fatality of greater than 1%. Delayed case management and late investigation exacerbated the situation of an outbreak. Absence of vaccination, contact, and travel history were found to be risk factors. We recommended mass vaccination and active case management to contain the epidemics.

Key words: Measles Outbreak, Fogera, Ethiopia

Word count: 274

6.2: Magnitude of all form tuberculosis in Amhara regional state, Ethiopia, 2010-2013

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Abstract

Background: About a third of the world's population is estimated to be infected with tubercle bacilli. There were an estimated 8.7 million new cases and 12 million infected with TB globally, in 2011/12, and about 2.3 million (26%) of new cases occurred in Africa in 2011. Ethiopia ranked seventh in the world and third in Africa for TB burden, with an estimated TB incidence (all forms) of 378 per 100,000 persons and prevalence (all forms) of 579 per 100,000 populations. The objective of this analysis is to determine the prevalence of TB in the region and give due recommendations.

Methods: A retrospective cross sectional study design was applied to study the prevalence of TB in the region. The data were collected from Amhara regional health bureau HMIS report and analyzed from March 21-30/2015. Incidence and proportions of TB all forms were analyzed using Micro soft Excel sheet.

Result: A total of 122,626 TB cases all forms were included in the trend analysis. Among total TB cases reported in the region, 110,939 (90%) were above fifteen years age groups and more than half (54.4%) were males. The proportion of pulmonary positive, pulmonary negative and extra pulmonary TB for the region from 2010-2013 was 30,289 (24.7%), 38,627 (31.5%) and 53,710 (43.8%) respectively. The prevalence of all forms TB in the region was 636/100,000 populations and 159/100,000 populations for pulmonary positive tuberculosis.

Conclusion: The prevalence rate of tuberculosis has decreased across the years from 2010-2013. Decrement is probably due to the recent initiative towards TB program by the government. Extra pulmonary TB is more prevalent than other forms of tuberculosis.

Key words: Magnitude, all form TB, Amhara, Ethiopia

Word count: 263

Chapter VII – Narrative Summary of Disaster Situation Visited

7.1: Meher Needs Assessment (Health, Nutrition), November 30-December 21/2014

Table 24: Assessed zones and woredas, Amhara, Ethiopia, 2014

Zones	Woredas
N/Wollo	Bugina, Lasta, Meket and Raya kobo
S/Wollo	Delanta, Mekdela, Legehida
W/Gojjam	Dega Damot
E/Gojjam	Basoliben , Gozamen
N/Shewa	Kewot, Efrata Gidim, Midaweromo, Merhabete
Awi	Ankesha, Guangua, Chagni
N/Gondar	Metema
S/Gondar	Tach Gayint
Waghemira	Sihala, Ziquala, Sekota zuria
Oromo National zone	Bati, Jile Timuga

Table 25: Team Members during the assessment time, Amhara, Ethiopia, 2014

Name	Agency	Position	Telephone	E-Mail
Getachew Abebe	EPHI/EFTP	Member	0910438939	abebegetachew338@gmail.com
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Yimenu Adane	UNICEF/B/Dar	OTL	0912953060	Yimenu13@yahoo.com
Dr Ahmed	UNICEF/B/Dar	TL		
Tesfaye Tilaye	WHO/PSR	Member	0911677055	tesfayeti@yahoo.com
Yetemwork	FMoW	Member		
Asmare Bihonegn	BoWRD	Member	0918162045	

Executive Summary

Meher season assessment was conducted from 30th November to 21 December 2014 in ten zones and 17 selected Woredas (Table 20). Assessment was done on food and non- food causes of hazards, magnitude, capacity to manage and gaps. Non- food assessment comprised health and nutrition, WASH and education emergencies. Many suffer of multiple natural and artificial crises. Malaria, AWD, Measles, Malnutrition, lack of safe and adequate water and school absenteeism or dropouts are all associated with natural calamities or disruption of healthy human activities in the given ecosystem or living environment.

The objectives of the assessment were to determine magnitudes of hazards of different types, to identify risk factors, gaps/challenges and make recommendations to take reliable intervention measures that address problems encountered.

According to the assessment findings, malaria, diarrhea, pneumonia, upper respiratory tract infections (URTI), intestinal parasitosis (IP) and skin disease were the leading cause of morbidity in both under five and above five years of age in the year 2006 (2014) in the visited Woredas. Malaria was found to be the leading cause of morbidity in most visited woredas of N/Gondar, S/Gondar, W/Gojjam, N/Wollo and Oromyia zones.

A total of **555,629** malaria cases and **22** deaths with 0.004% CFR have been reported in the year 2014, January – October 2014 from the Region. The recent data review also indicated that there were **10,420** measles cases and **64** deaths with 0.61% CFR in the year 2014, January to October. Measles ongoing outbreak was reported from 10 woredas of N/Gondar, S/Gondar, and Waghemira and S/Wollo zones.

In the regional stock, drugs and supplies for meningitis control (meningitis vaccine, LP set, RDT for meningitis and oily CAF), drugs and supplies for AWD (CTC kits, PPE such as duty gloves) Doxacycline and Ringer Lactate (R/L, ORS, Amoxil suspension, Cotrimoxazole, for measles Tetracycline Ointment are the major gaps.

It was found that there is established a multi sectorial PHEM coordination forum at regional, zonal and in most visited woredas but it is not active at all level. Regional and zonal EPR plan is not funded at all. However, EPR plan in visited woredas of S/Wollo and Oromyia are funded but not adequate. In the region high turnover of trained PHEM officers is reported.

As to risk factors, most woredas are at risk for malaria, measles, and AWD. Possible reasons include low LLINs utilization, uncontrolled irrigation sites, low measles vaccine coverage, and low latrine utilization.

Regarding malnutrition, currently the nutrition situation is normal and stable in the assessed woredas of the region. However, woredas in Wag Hamira and N/Gondar Zones and others identified currently food insecure areas need close follow up.

A total of **9,376,477** beneficiaries are estimated for six months for Malaria, AWD, Measles and Meningitis and **39,403,120.40** ETB are calculated to address them.

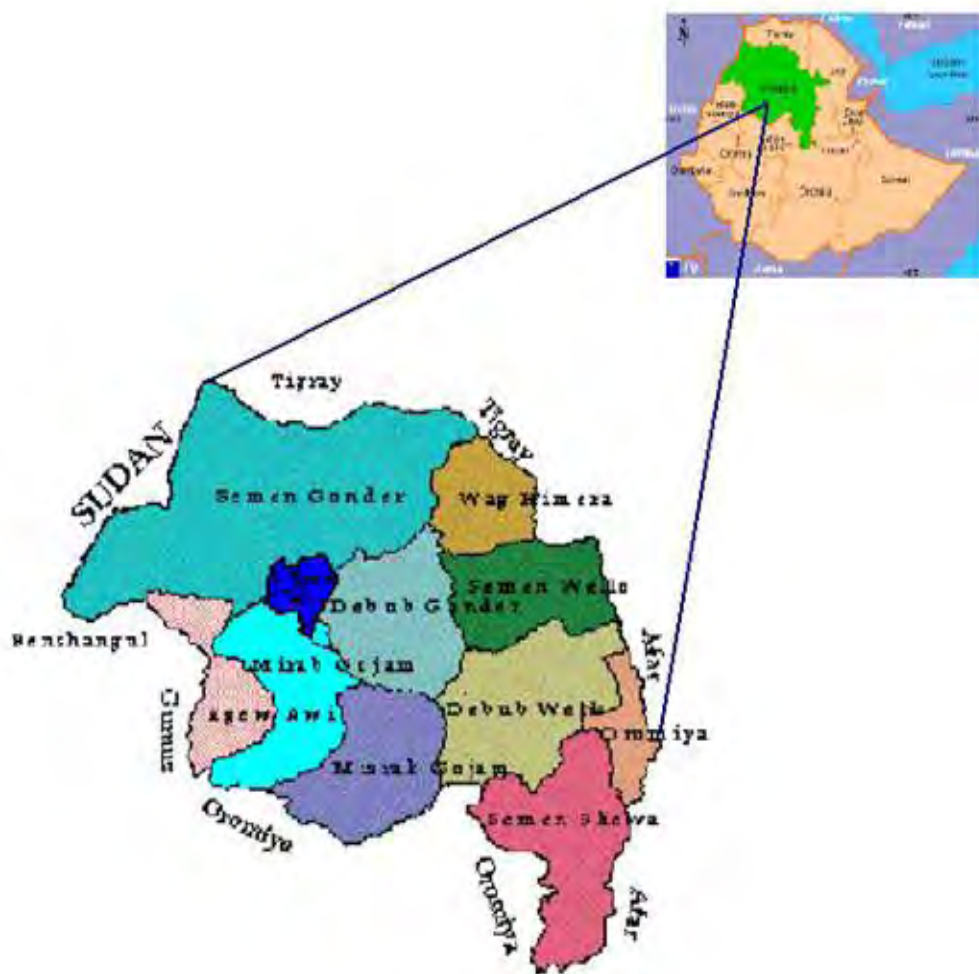
Reactivation of multi sectoral PHEM coordination forum at all levels, strengthening surveillance and preparedness activities, strengthening of malaria prevention and control activities are recommended.

Section I: Background

Amhara region is one of the nine administrative regions in the country. It is the second populated with the total population of **20,398,999** with mean annual growth rate of 1.8%. The region is shared boundary with four national regions (Oromyia, Tigry, and Afar& Benishangul Gumze) and one international country Sudan. In the region there are 10 zones, 3 Town administrations 167 woredas and about 3431 kebeles, from which 318 are urban kebeles.

The livelihood of Amhara population has been affected by different types of hazards including recurrent drought, and disease outbreaks such as acute watery Diarrhea (2006-2009), H1N1 influenza (2009 in Gondar University), Typhoid fever (mostly Eastern Amhara (N/Wollo & S/Wollo), Meningitis (2009 in S/Wollo), Measles (2010/2011& 2013/2014) in all 11 zones and still in some areas of the region, Rabies (usually from, N/Gondar, N/Wollo & S/Wollo), Anthrax(Waghemira & N/Shewa), Bloody diarrhea (2011 in Gondar University, N/Wollo & S/Wollo), Malaria (predominantly from Western part of the region), and flood and flood associated problems. In the region, a total of **10,420** measles cases were reported in the year 2014 and about **555,629** malaria cases were reported in the year 2014. Currently, malaria build up is reported from most of the assessed zones and ongoing measles outbreak in eleven woredas of N/Gondar (5), S/Gondar (4), Waghemira (1) and S/Wollo (1) zones of the region.

Unlike to previous years, due consideration has been given to non-food emergency assessment and the current assessment has identified immediate risk factors associated with the possible occurrence and distribution of health and nutrition emergencies such as Acute Watery Diarrhea (AWD), measles, Malaria, meningitis outbreaks Sever Acute Malnutrition (SAM), in the region. Woredas/Zonal/regional capacity was also identified.



Map 8: Location of Amhara region, 2014

Objectives of the assessment

General objective

To contribute in ensuring appropriate and effective humanitarian planning and responses that leads to reducing morbidity and mortality in the most vulnerable areas of the assessed zones.

Specific objectives

- To assess the extent, types, magnitude, severity and likely of the different hazards (drought, human epidemics, sever and acute malnutrition, etc) and risks to the populations in the most vulnerable Woredas (including to identify the most vulnerable populations) for epidemic prone problems considering health and nutrition emergencies.
- To assess the existing capacity of the health services to address health and nutrition emergencies likely to occur during the coming six months of 2015;
- To determine the shortcomings (gaps) in the capacity of the existing health services to address health and nutrition emergencies likely to occur between January to June 2015;
- Based on the findings on the assessment of risks for, and the need to address, potential health and nutrition emergencies during January through June 2015, to formulate workable mechanisms and develop necessary plans for fostering preparedness of Health and nutrition for appropriate and adequately addressing the potential emergencies;
- To identify areas where health and nutrition emergency assistance might be needed during the coming six months of 2015 due to acute problems and come up with reasonable estimates of the size of the population needing emergency assistance.

Section II: Methods

- Briefing was conducted at zonal and each assessed woreda
- primary and Secondary non-food related data were collected using checklists
- Formal discussion and interview was made with respective sector offices
- Debriefing was made on assessment findings to visited woredas and zones.

Section III: Assessment Findings

Regional level

Coordination

Amhara regional health bureau has functional multispectral coordination forum which conducts meeting every month. But, it is not represented particularly by all relevant government sectors.

Ongoing outbreak

In the region, there are reported ongoing outbreaks of measles, reported from N/Gondar, S/Gondar, Wag Hamira and S/Wollo Zones.

Outbreak in the last three months

There were measles, malaria, typhoid fever, food poisoning and rabies outbreaks in different areas of the region in the last three months, 2014.

Anticipated Epidemics

The region is at risk of Malaria, AWD, Measles and Meningitis outbreaks in different Zones and woredas. Malnutrition could also be a major problem especially in Easter part of Amhara.

Table 26: Anticipated epidemics in Amhara region, December 2014

Finance Required based on population at risk				
Region	Woreda at risk	Type of risk	At risk population	Required finance
Amhara	40	Malaria	6,677,350	23,496,896.60
	38	AWD	11,877	596,310.50
	36	Measles	1,812,165	1,576,933.70
	19	Meningitis	875,085	13,732,979.50
Total				39,403,120.40
12/17/2014				

Public Health Emergency Management

At regional level, there is public health emergency preparedness and response plan but not budgeted or funded. There are about 2 trained PHEM focal personnel at regional level and there is lack of trained PHEM focal personnel on public health emergency preparedness and response at zonal and woreda level.

Emergency drugs and supplies

In the regional stock, drugs and supplies for meningitis control (meningitis vaccine, LP set, RDT for meningitis and oily CAF), drugs and supplies for AWD (CTC kits, PPE such as duty gloves) Doxacycline and Ringer Lactate (R/L, ORS, Amox. suspension ,Cotrimoxazole, for measles Tetracycline Ointment are the major gaps.

Table 27: Emergency drugs and supplies, Amhara region, 2014/15

S.No	Items	Unit	Required	Available	Gaps	Unit Price	Total price
1	RL/NS bag of 1000ml	Bag	69680	0	69680	25	1,742,000
2	ORS [sachets]	Each	75475	0	75475	2	150950
3	Doxacycline 100 mg of 1000 Caps/TIN	Tin	30	0	30	245	7350
4	PNGT	Each	261	0	261	1.5	392
5	ANGT	Each	1393	0	1393	1.5	2090
6	IV Cannula	Each	9289	0	9289	10	92893
7	Scalp Vein	Each	871	0	871	0.5	435
8	Erythromycin 250 mg tab, 1000/Tin	tin	3	0	3	345	1035
9	Amoxicillin 250mg/5ml susp, 100 ml/bottle	Bott	1742	0	1742	25	43543
10	CTC kit	PK	60	0	30	10000	300000
11	Artemether 120 mg plus 20 mg lumefantr of 24 tab	Dose	556516	9360 dose	547156	15	8,207,335
12	Artesunate (Rectal) of 50 mg	Dose	166955	0	166955	5	834773
13	Quinine 600 mg (PO) of 1000 tab	Tin	234		234	295	68952
14	Chloroquine 150 mg of 1000tab	Each	2226	162 tin	2066	210	433873
15	RDT of 25 pcs	pk	779122	15200	763922	10	7639219
16	Meningococcal vaccine bivalent A+c	Dose	1226247	0	1226247	15	18393706
17	CAF oil of 3gm injection	Box	7357	0	7357	120	882898

	of 100						
18	TI bottle	Each	307	0	307	250	76750
19	LP set		307	0	307	640	196480
20	syringe with needle 5 ml 1000	Box	2452	0	2452	150	367800
21	Vit A Of 1000 caps	Tin	250	60	190	370	70,000
22	Tetracycline eye ointment of 100 tube	Box	200	0	200	210	42000
23	Amoxicillin Syrup of ml250/5ml of 100	Bottle	2000	0	2000	30	60000
24	Amoxicillin 500 mg of 1000 caps	Tin	50		50	295	14750
25	B.ASA of 100 mg	Tin	40	0	40	220	8800
26	Antipain supp	Tube	320	0	320	640	204,800
Total							39,572,654

Zonal level

Health and nutrition part of the Meher Assessment 2014 was conducted in South Wollo, North Wollo, Waghemira, Awi, East Gojjam, North Shoa, Oromyia, South Gondar, North Gondar and West Gojjam, zones of Amhara region.

Coordination

Multisectoral coordination forums were established in N/Shewa East Gojjam, S/Wollo, and Oromyia zones, but not in Awi zone. However, the forums in all the four zones are not active and have no regular meeting. The N/Shewa East Gojjam, zones, reported that meeting is not expected if there is no emergency.

Disease outbreak in the last three months

During the last three months, there has been measles outbreak in different woredas of N/Gondar, S/Gondar, Waghemira, S/Wollo, and Awi zones. On top this, malaria, typhoid fever food poisoning and anthrax outbreaks were reported in the given time. Bati town administration of Oromo national zone also reported Rabies. However, there is no outbreak of any disease has been reported in N/Shewa and E/Gojjam zones except malaria case build up.

Ongoing outbreak

Of the visited ten zones, there is ongoing measles disease outbreak in eleven woredas of N/Gondar (5) S/Gondar (4), Waghemira (1) and S/Wollo (1) zones.

Anticipated epidemics

Malaria, measles, water borne diseases including AWD and Rabies are the anticipated epidemics in all the ten visited zones. In addition, meningitis, typhoid fever and dysentery are anticipated in S/Wollo and N/Shewa zones as well as Oromo national zone.

Public Health emergency management

All ten visited zones have public health emergency preparedness and response plan. However, their plan is not funded. With respect to training, most of the assessed zones reported high turnover of trained manpower. Zones couldn't give the specific number of trained PHEM officers. Information from N/Shewa has revealed that currently there are only 13 trained PHEM officers in the zone. Meanwhile, E/Gojjam and Awi zones have 108 and 65 HWs trained on PHEM, respectively. All ten zones have no trained Rapid Response Team (RRT). As to emergency drugs and supplies, the assessed zones have required emergency drugs and supplies for meningitis, AWD, malaria and measles.

All the visited zones have public health emergency preparedness and response plan and south wollo have budget. There is no trained man power on PHEM at zonal level.

Comments given by the assessed zones

- The need to train PHEM officers as high turnover of trained ones. Almost 16 woredas have no trained PHEM officers. 88 health centers and 3 district hospitals have trained PHEM focal points.

- Special attention should be given to Tsedikane Mariam in Mojan Wadra woreda and Shenkora Yohannes in Minjar Shenkora woreda due to increased number of attendants every year.
- IRS and ITNs strategies should get emphasis for the coverage is compromised this year, 2014.
- Budget is critical shortage to strengthen supportive supervision in emergency risk areas.
- Rapid response team needs training.
- Emergency preparedness and response plan should be supported by budget.
- Cognizant of that the primary responsibility of allocating budget for emergency response is theirs, as there is a budget constraint at their level; they need support from the region and partners.

South wollo

- They have been requesting trainings on emergency management issues like risk mapping, risk identification, stock estimation matrix, etc.

Socio-demographic profile

17 woredas were assessed. A total population of 2,145,748 was covered by the assessment.

Table 28: socio-demography of population included in Meher 2014 assessment

Zones	Assessed Woredas	Total Zonal Population	Population Assessed	Male	Female
Oromo National zone	Bati and Jille Timuga	2,113,419	177,926	87,834	90,092
South Wollo	Delanta, Mekdela and Legehida	2,496,325	385,106	191,380	194,475
N/Gondar	Metema	3,183,657	141,949	71,684	70,268
S/Gondar	T/Gayint	2,395,981	98,983	49,374	49,609
W/Gojjam	Dega Damot	2,382,541	171,839	85,060	86,779
N/Shewa	Mida Weromo, Merabete, Kewot and Efratan-Gidim	2,206,321	461,795	171,143	161,681
E/Gojjam	Gozamen & Baso liben	2,496,325	311,646	150,230	161,416
Awi	Chagni, Guangua & Ankesha	1,198,756	396,504	196,605	199,899

Health Profile

According to the assessment findings, diarrhea (non-bloody), pneumonia, Acute Febrile Illness (AFI), diarrhea (with blood), and upper respiratory tract infections (URTI) were the leading cause of morbidity in children under five years of age. Moreover, malaria, AFI, intestinal parasitosis (IP), pneumonia and trauma were the leading cause of morbidity among adults above five in the year 2006/2007 (2014) in the visited Woredas.

Morbidity and Mortality Data

Malaria

A total of 57,627 Malaria cases and 4 deaths were reported from the assessed 17 woredas, namely (see list of woredas). From June 2014 to November 2014 the deaths were reported from Chagni, Metema and Dega Damot woredas.

Measles

A total of 181 confirmed measles cases and 2 deaths were reported from August to October 2014 from assessed woredas.

Other diseases

A total of 29 Typhoid fever, 8 food poisoning and 12 anthrax cases and 1 death were reported from south wollo. On top of this, 13 dog bites and 3 suspected deaths have been reported from Bati woreda of Oromo national zone.

Outbreak

In the last three months (August – October 2014)

There was an outbreak of measles in the eleven assessed woredas in the last three months. Malaria case build up was reported from all visited woredas. Remarkable malaria case build up was reported from Metema in N/Gondar zone, Chagni and Guangua woredas of Awi zone in November 2014.

Ongoing outbreak

Currently, there is ongoing measles outbreak in eleven assessed woredas of N/Gondar, S/Gondar, and Waghemira and S/Wollo zones.

Emergency drugs and supplies for preparedness

All the assessed woredas of ten zones have anti malarial drugs but not adequate for the upcoming one month. It was also found that they have adequate supplies for AWD and measles but they don't have supplies for meningitis. A total of 18 CTC kits are available in the assessed woredas, except Gozamen in E/Gojjam. Antimalaria drugs (coartem, Artesunate injection and suppository), syringes, Doxacycline, & TTC eye ointments are major shortage of woredas.

Coordination

All of the visited woredas in ten zones have multisectoral PHEM coordination forum but not active/functional. They also have public health emergency preparedness and response plan but only few of the assessed woredas have access for emergency response fund/finance allocated (Woredas in the S/Wollo zone, Mida Weromo and EfrataGidim in N/Shewa, Chagni and Guangua woredas of Awi zone).

Risk Analysis

Malaria

Except woredas from Wag Hamira and N/Wollo (data were not complete), all the seventeen visited woredas of N/Gondar, S/Gondar, W/Gojjam, S/Wollo, Oromo national zone, N/Shewa, E/Gojjam and Awi zones have endemic kebeles, breeding sites and interrupting rivers. Unprotected irrigations are major breeding sites in Mida weromo, Merabete and Gozamen woredas. As to LLINs, except Merabete in N/Shewa and Degadamot in W/Gojjam (distributed in 2007/2008), all the remaining woredas have LLINs coverage of greater than 80%. However, woredas in S/Wollo and Oromyia national zone have LLINs coverage less than 80%.

Of seventeen visited woredas, six woredas have IRS coverage less than 85%, due to shortage of chemical. It was reported that IRS operation was started late almost in all woredas. It was also found that malaria prevention and control activities are almost depleted in most visited woredas. A total of 270 malarious kebeles are found in the assessed woredas and a total of 1,480,089 people are living in these kebeles and at risk of malaria.

Meningitis

All the visited woredas reported no meningitis epidemic in the last three years. Men A vaccination campaign was conducted in October 2013 in all woredas of west Amhara including N/Gondar, S/Gondar, W/Gojjam, E/Gojjam and Awi zones. However, it was not conducted in the rest assessed woredas of zones. Data indicating the date and number of people vaccinated could not be accessed.

AWD

There was no AWD epidemic in the last three years in all assessed woredas. However, most are at risk of outbreak due to history of AWD, low safe and adequate water, and low latrine utilization. Woredas such as Gozamen in E/Gojjam, Mekdela and Legehida in S/Wollo and Jille Timuga in Oromo national zone reported Latrine coverage and utilization more than 85% and 80% respectively. Water coverage is in the range of 65%-75%.

Measles

Ongoing measles outbreak reported in some the visited woredas. More than 90% measles vaccination coverage is reported by all the assessed woredas. The assessment also identified that there was SIA in some of the assessed woredas in the year 2006/2014.

Nutrition

A total of 1,721 SAM cases were reported from the assessed woredas during the first six months of 2014 from 330 OTPs and 22 SC (22 health centers). The reporting rate in the assessed woredas ranged from 90% to 100%. All assessed woredas reported that they have adequate supply for the coming one month.

Challenges/ Gaps

- Inactive emergency preparedness and response forum
- Lack of fund access for EPRP and most did not allocate budget for emergency.
- High turnover of trained PHEM officers.
- No trained RRT
- Low action in environmental activities for prevention and control of malaria
- Shortage of budget and chemicals for IRS operation.
- Difficulty to get the right persons/experts for the information during woreda visiting
- Difficulty to get the required data easily at all levels
- Inadequate time for conducting Meher emergency needs assessment

Recommendations

- Activate emergency preparedness and response forum
- Strengthen the surveillance preparedness for the identified risk
- The prepared EPRP budget should be funded at all levels
- Prevention and control of malaria should be enhanced
- Attention should be given during such national assessment
- Adequate time should be allocated for emergency needs assessment

Chapter VIII – Protocol/Proposal for Epidemiologic Research Project

Assessment of long lasting Insecticide Treated Nets utilization among high-risk groups for Malaria Control in Jawi District, Amhara, 2015

ADDIS ABABA UNIVERSITY
FACULTY OF MEDICINE
SCHOOL OF PUBLIC HEALTH
MASTER OF PUBLIC HEALTH
RESEARCH PROJECT SUBMISSION FORM

This proposal is submitted to the School of public Health Addis Ababa University in partial fulfillment of the requirements for the degree of masters in Field Epidemiology

Name of investigator	Getachew Abebe (BSC)
Name of advisors	1. Dr. Jemal Haeider (MD, associate professor) 2. Mr. Teklehymanot Gebrehiwot (BSC, MPH)
Full title of the research project	Assessment of long lasting Insecticide Treated Nets utilization among high-risk groups for Malaria Control in Jawi District, Amhara, 2015
Duration of the project	April- May/2015
Study area	Jawi woreda
Total cost of the project	\$4,746
Address of investigator	Cell phone :+251-910438939 E-mail: abebegetachew338@gmail.com

Executive summary

Background: Malaria is life threatening protozoan disease worldwide, especially, sub-Saharan African countries. Less than five years and pregnant women are at high risk, unless uses LLINs at night. The aim of this study is to have evidence on utilization of nets among afore mentioned risk groups and corresponding determinants.

Method: Community based cross-sectional study design will be applied in the rural and urban areas of the district. Based on random sampling technique 854 households will be interviewed from selected kebeles. In the case of net possession and utilization by high risk groups, qualitative data will be collected using focus group discussion (FGDs), to identify ownership and utilization rates. Data will be entered Epiinfo 7 and analyzed using SPSS version 16.0.

Work plan: The study period will be from mid April-end of May/2015.

Budget: The required cost for the accomplishment of the project is estimated as \$4,746.

Introduction

Malaria is a life-threatening disease affecting the world's most under-developed countries and regions where basic healthcare infrastructure is lacking, as well some developed countries. Malaria is a major cause of morbidity and mortality in Africa, especially in sub-Saharan African countries [1]

According to 2014 report, the World Health Organization estimated that malaria was responsible for as many as 198 million illnesses (range 124–238 million) and 584,000 deaths (range 367,000–755,000) worldwide in 2013. More than 90% of all malaria deaths occur in sub-Saharan Africa, where *Plasmodium falciparum*, the most lethal species of malaria parasite, predominates than other species [2].

In the last 10–15 years dramatic progress has seen in the fight against malaria, especially in sub-Saharan Africa. Scale-up of malaria control interventions between 2001 and 2013 has resulted in an estimated 4.3 million fewer malaria deaths. Of these, 3.9 million (92%) were in children less than five years of age in sub-Saharan Africa. The ten countries with the highest estimated malaria burden in 2000 accounted for 57 percent of malaria cases and 68 percent of malaria deaths averted between 2001 and 2013. During the same time period, estimated malaria mortality decreased by 54 percent in the WHO African Region overall and by 58 percent in children under the age of five [2].

In 2013, there are 97 countries and territories with ongoing malaria transmission, and 7 countries in the prevention of reintroduction phase, and territories in which malaria is presently considered endemic. The world health assembly and Roll Back Malaria map for malaria control and elimination to achieve at least a 75% reduction in malaria incidence and death by 2015[1]. Currently malaria is endemic in area around the equator, in areas of the Americas, many parts of Asia, and much of Africa; however, it is in sub-Saharan Africa where 85– 90% of malaria fatalities occur [3].

In Ethiopia, Malaria is ranked as the leading communicable disease, accounting for about 30% of the overall Disability Adjusted Life Years lost. Approximately 57.3 million (68%) of the 84.3 million (75%) population of Ethiopia live in areas at risk of malaria. According to the FMOH, malaria was the leading cause of outpatient visits and health facility admissions in 2010/2011, accounting for 15% of reported outpatient visits and nearly 15% of admissions. Malaria also was among the ten leading causes of inpatient deaths among children less than five years of age. Malaria in Ethiopia is characterized by widespread epidemics occurring every 5-8 years and the western, central, and eastern highlands between altitudes 1,500-2,000 meters, as well as the highland-fringe areas along the Rift Valley are especially vulnerable to epidemics [4]. Malaria is one of the leading causes of illness and death among young children. Many

children under the age of five year in malaria endemic areas die of cerebral malaria, low birth weight, respiratory distress, hypoglycemia, severe anemia or repeated convulsions [5].

Appropriate to the unstable and seasonal pattern of malaria transmission, the protective immunity of the population is generally low, and all age groups are at risk of infection and disease. Most malaria cases are observed in persons over five years of age, although children under five and pregnant women are most vulnerable to the severe effects of infection [6]. Malaria is also very serious among pregnant women since their immunity is compromised due to the pregnancy. Malaria during pregnancy, if not properly treated, can cause anemia, miscarriages, stillbirths, low birth weight and maternal deaths. At this time, a variety of effective malaria control interventions are being scaled up in Ethiopia to improve access and evenhandedness to preventive as well as curative health services. These initiatives include prompt and effective treatment of malaria, selective vector control including insecticide treated nets (ITNs) and indoor residual spraying (IRS), and prevention and control of epidemics [7].

Aligned with the Roll Back Malaria (RBM) initiative and the Abuja Declaration¹³, Ethiopia has strengthened its fight against malaria. Important steps have been under taken particularly to scale-up the implementation of ITNs in the country. The 2011 MIS shows that 1.3% of all age groups were positive for malaria using microscopy and 4.5% were positive for malaria using RDTs below 2,000 meters, and of which 54.8% of household have at least one LLIN (MIS, 2011) even if less than 2007's net ownership. *P. falciparum* constituted 77% of these infections. The 2011 MIS survey demonstrated a significant demarcation of malaria risk at an altitude of 2,000 meters, with thirteen-fold higher malaria prevalence at lower altitudes compared to higher elevations. There was essentially no *P. falciparum* detected by microscopy among persons surveyed within households having measured elevations above 2,000 meters in the 2011 MIS. [8, 9]

The Strategic Plan presented here is therefore the product of a strong collaboration between all actors in the fight against malaria in Ethiopia and is the revised version of the 2011-2015 national strategic plans. It is a working document that will serve as a guideline for the period 2014-2020, and may be amended and updated as needed, based on outcomes of annual programme reviews. The purpose of this NSP is to elaborate the country's malaria prevention and control directions and implementation strategies so that all efforts by RBM partners are coordinated and match towards sustaining widespread coverage and setting Ethiopia on track to malaria elimination through an integrated health systems approach. However, changes in the health care delivery system and provision of anti-malaria interventions by themselves might not necessarily be followed by changes in the behavior or knowledge about the causes of disease and

prevention among the population. The scaling up and effectiveness of anti-malaria interventions are dependent on the local understanding, perceptions and household behavioral practices of the community. One of the problems in the implementation of effective malaria interventions is lack of adequate information about the knowledge, attitude, behavior and practice of the local community towards malaria, its prevention and control [10]

Ownership of insecticidal mosquito nets has dramatically increased in Ethiopia since 2006, but the proportion of persons with access to such nets who use them has declined. So, it is important to know individual level net use factors in the context of the residence to modify programmes so as to maximize net use [11].

The finding of higher net use in urban compared to rural areas in MIS 2007 was surprising, since urban dwellers might be expected to associate net use with villagers and rural life. However, another study in Ethiopia observed the same higher use of LLIN in urban areas [12].

Such studies are almost rare in the country and at regional levels. This study examined the Relationship between household ITN uses vs. altitude in a community based survey in Jawi District. It also explored determinants of the effective use by high-risk groups (under five years, pregnant women, poors, refugees, displaced people, and seasonal workers [13]. Based on the findings, possible alternatives will be recommended to sustain and strengthen the ITNs program at regional level in order to target the high-risk groups. Jawi district also seeks this study to have information on the status of intervention relevance and risk groups so far.

Literature review

Malaria occurs sporadically at high altitudes, and that the prevalence of malaria increases towards the lowlands. Malaria occurs throughout the year, but predominantly after the main rainy season. However, the prevalence varied greatly among villages at all altitudes. More children had malaria in the lowlands than in the highlands, which suggest that the highland population has lower immunity to malaria, as a result of limited prior exposure to the disease. [14].

Malaria is a major factor in Africa's high rate of infant and maternal mortality, of low birth weight, school absenteeism, and low productivity in farming and other work. Every year, In Africa, almost 24 million pregnant women are at risk of malaria, to date less than 5% receive treatment [15]. In Ethiopia, malaria was estimated to account for 10.4% of the total 59,125 disability adjusted life years lost (DALYs) per 100,000 population. In a study of subsistence farm households in western Ethiopia, malaria had a statistically significant effect on total revenue, reducing average income by 24%-45%, depending on criteria used to define a malaria case [16]

The use of ITNs has been shown to be very cost-effective, resulted in a 20% mortality reduction in protected, at a cost of about US\$ 5 per child. A total of 80 million children in Africa are currently at risk, and the use of ITNs would prevent 480,000 deaths per year [17].

The MDGs target 8 indicated to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases and RBM partnership to halve malaria-associated mortality by 2010 again by 2015. Indicator 21 is about prevalence and death rates associated with malaria and indicator 22 is regarding proportion of population in malaria-risk areas using effective malaria prevention and treatment measures [18].

According to the policy of ITNs use in Ethiopia, it has been fully agreed and endorsed for free distribution of ITNs to children less than five years of age and pregnant women living in targeted areas [10]. Series of trials in Africa have shown that proper mosquito net use reduces malaria incidence among children by anywhere from 14 to 63 %. With ITNs use, all causes of mortality in Children have been shown to decline by 25 % in The Gambia, 33 % in Kenya, and 17 % in Ghana [19].

In Malawi, a national survey conducted in 2004, revealed that 43% of households own at least one net, compared to only 5% in 2000. More significantly, 35% of children less than 5 years of age and 31% of pregnant women sleep under an ITN, and four districts out of 27 have achieved the Abuja target [20].

A baseline survey for implementation of ITNs conducted in Amhara Region (Bahir Dar, Metema), Oromyia Region (Gida Kiremu), and Southern Nations, Nationalities Peoples Region (Alaba,), revealed that the household mosquito net ownership was found 12.9% [21].

So, Jawi woreda also needs to be assessed for ITNs utilization.

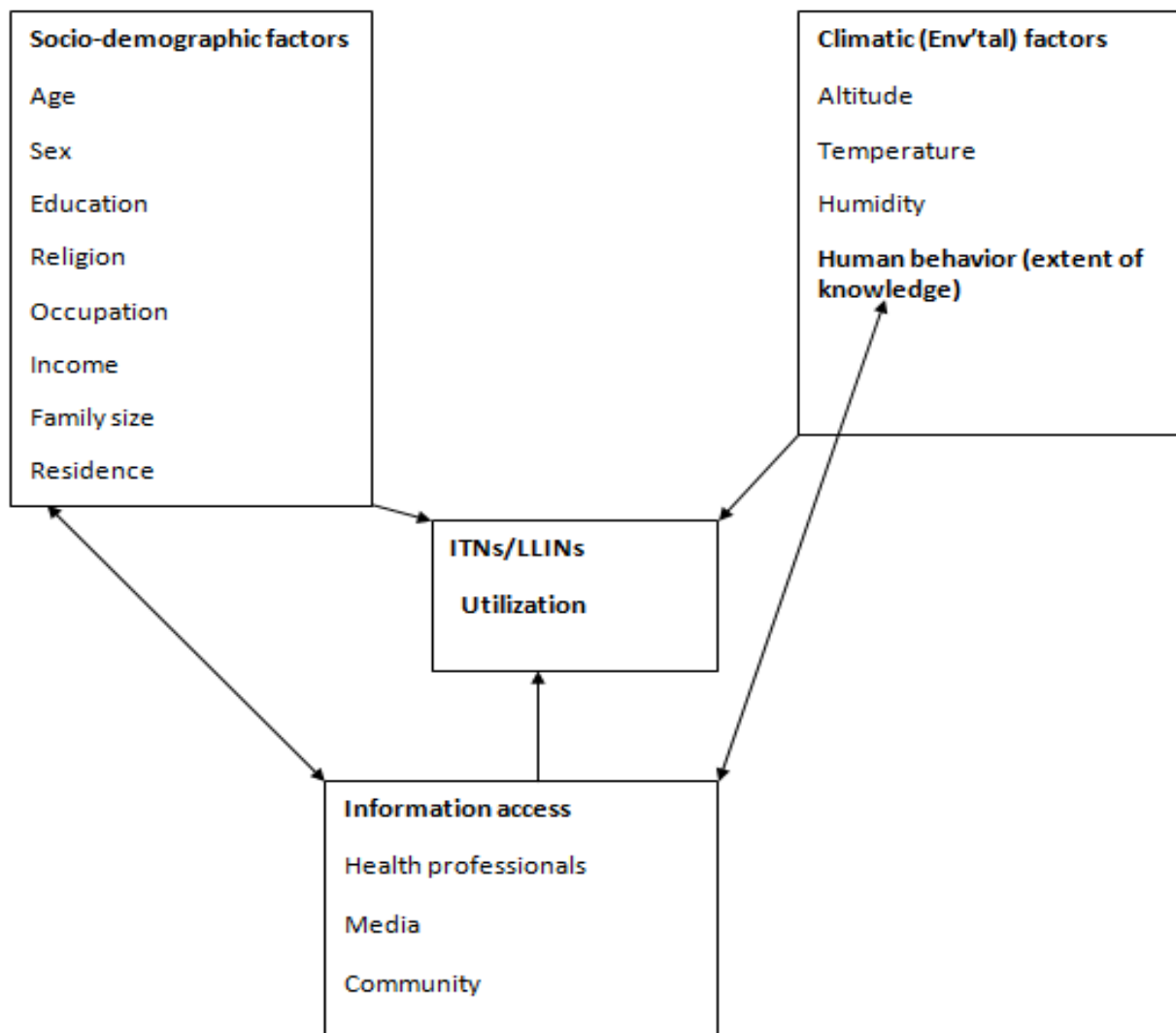


Figure 30: conceptual frame work for ITNs utilization and perceived determinant factors, in Jawi, Amhara, Ethiopia, May, 2015

Justification of the study

The first and most reasonable issue is, Jawi woreda is among malaria hotspot woredas in the Amhara region and known by malaria case build up year round in the region as well. In addition to this, the ITNs utilization rate is not studied so far.

Objective

General objective

- To assess the use of LLINs by household and determinants in the utilization of Insecticide Treated Nets

Specific objectives

- To assess household Insecticide Treated Nets possession (ownership)
- To assess Insecticide Treated Nets use by children under five years of age and/or Pregnant women
- To identify determinants in ITNs utilization

Methods and materials

Jawi woreda is located at a distance of 103 kms from the zonal town Injibara, 147 kms from regional town Bahir Dar and 556 kms from Addis Ababa in the North West direction. The total catchment area of the woreda is 515,400 hectare. It was situated at an altitude of 800-1400masl with average annual rainfall of 1200-1300mm and average temperature of 35-40C°. Climatic zones of the woreda accounts 98% kola(tropical) and the remaining 2% woinadega(sub tropical). Jawi woreda share boundaries with Alefa woreda to the North, Benishangul gumuz regional state to the South and West, Dangila woreda to the East and Quara to the West. The district is administratively sub divided into 27 kebeles, with 2 urban and 25 rural. The district has a total population of 89,635, of which 87.5% were rurals. The sex composition of the population is 45,266 (50.5%) female and under five years population of 12,136 (13.5%), 2007 census estimate.

Study setting

The district has 5 health centers and 26 health posts with physical health service coverage of 100%. Malaria has been a major health problem of the district. Its transmission follows the unstable pattern that follows the big rains (summer-Kiremt) and the small rains (autumn-belg). The area is selected because it's one of malaria hotspot woreda in the region and favorable conditions for malaria (altitude and temperature), Tana beles sugar plant with irrigation activities, malaria case build up throughout the year.



Map 9: Location of the study area, Jawi, Awi zone, Amhara region, Ethiopia, 2015

Study design

Community based descriptive cross-sectional study design will be used

Source/target population

Source population includes all households with pregnant women and/or Children less than five years of age in the district. It includes the permanent residents of the District, irrespective of possession of insecticide treated nets and utilization

Study population

Quantitative study

All households with pregnant woman and/or children less than five years of age who resided in randomly selected kebeles (clusters)

Sample population: All households with pregnant woman and/or children less than five years of age selected by probability proportional to cluster size

Qualitative study

This study use a qualitative research approach to data collection based on in-depth interviews and focus group discussions (FGDs) among the recruit members helps to understand the ‘_how’ and ‘_why’ malaria as a risk to health, understanding of malaria transmission and mosquitoes, treatment seeking behavior, who is risk group perceived to be vulnerable to malaria, attitudes and practices of the use of malaria preventive measures to develop effective IEC/BCC messages.

Inclusion criteria

All households with at least one under five years of age and/or pregnant women will be include in the study

Exclusion criteria

People residing temporarily as labor worker, like migrant laborer. Even if, with children less than five years of age and/or pregnant women will be excluded from the study

Sample size determination

Sample size is calculated using a single proportion population formula with a 95% confidence level, 5% margin of error and 51.2 % estimated ITN bed net utilization in the Amhara Region (MIS 2011). 10% non-response rate and a design effect of 2 were considered, and 845 households will be selected.

$$N = \frac{DE \times Z^2 \times p(1-p)}{d^2}$$

$$d^2$$

P= prevalence of ITN use as 51.2% (MIS 2011)

Design effect (DE) = 2

Precision (d) = 5%

Confidence level ($\alpha=0.05$, 95% $Z_{1-\alpha/2}$) = 1.96

The required sample size was 767.8. Add 10% to the sample size to compensate for non-response, so the required sample size become 845.

Sampling Procedure

Initially kebeles will be stratified in to urban and rural kebeles. Then 8 rural and 2 urban kebeles will be select by lottery method. Households will be randomly selected from a list provided by the district administration. The list of households with at least one under five years of age and/or pregnant women regardless of their ITNs utilization status will be considered as the sampling frame from those selected kebeles. From the list, the required households will be selected using systematic random sampling for the

respective Kebeles where households within these kebeles will be distributed by population sample proportional to size.

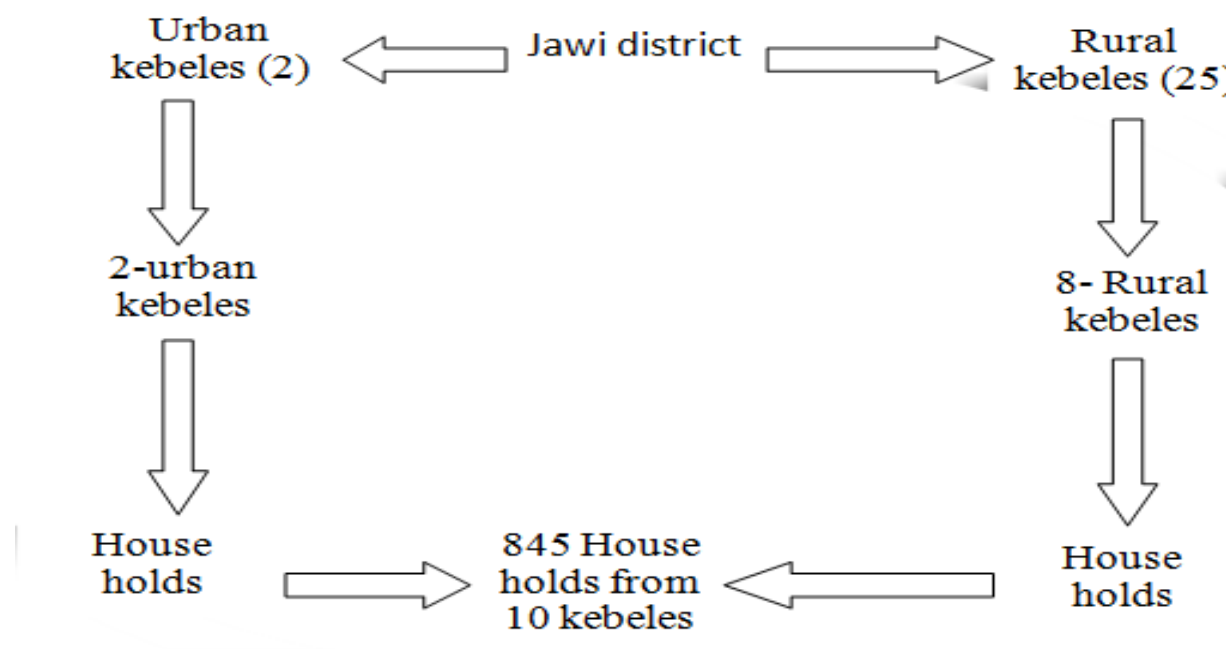


Figure 29: Procedure how the intended households selected from Jawi district population, 2015

Data collection and instrument

Quantitative study

A standardized and structured questionnaire will be developed based on published studies, and adapted to local situation with certain modifications. The questionnaire will be prepared originally in English and then translated in to Amharic language. The questionnaires include information on socio-demographic characteristics, malaria, mosquito net possession and utilization. Then data collectors interviewed heads of households (spouses of heads of households if the head is absent) where there is a marital relationship. If the respondent was not found or failed to show the net, two repeat visits were done.

Qualitative Study

Qualitative assessment will be used to gather information, to explore and understand some aspects of life and their consequences for health. Issues address etiology and extent of malaria, prevention methods, and general beliefs on LLINs and factors that affect possession, continuous use or non-use of LLINs. Focus group discussions will be held within four groups. The principal investigator will conduct the focus group

discussion and the supervisors are also involved as note takers and recruiters of focus group discussants. The size of the groups is 8 to 10 individuals in order to assure that all individuals participate, and that each participant has enough time to speak. A total of four FGDs for women and men will be conducted, two sessions for each sex.

Data quality assurance

Questionnaires will be checked for completeness on daily basis by immediate supervisors. Up on Check up for consistency and completeness, the supervisors' submit the filled questionnaire to the principal investigator. Incorrectly filled or missed ones will be sent back to the respective data collectors for correction. The principal investigators also recheck the complete questionnaires to maintain the quality of data. The principal investigator supervise five percent of the survey households to confirm whether the collectors visit houses not asked twice a day and at what time the first visit carried out.

Data analysis

Data will be entered using Epi-info 7 and analyzed by SPSS version-16. Odds ratio, 95% CI and p-value will be used to measure risk factors associated with ITNs utilization.

Ethical review

Ethical approval will be obtained from the Research Ethical Review Committee of Addis Ababa University/ Amhara Regional Research institute and permission will be obtained from Amhara regional health bureau and from selected district Health office and other concerned bodies in the district and oral consent will be asked from households at start of interviews.

Operational definitions

Possession: Proportion of households, which own at least one ITN the night before survey

Use: Proportion of high-risk groups who slept under ITN the night before survey

High risk groups: Part of the populations, which are highly vulnerable to the disease malaria and identified as children less than 5 years of age and/or pregnant women.

Dissemination/Advocacy

In order to insure the implementation of the recommendations that will be forwarded from the project, findings will be disseminated to the local (district), regional and national program managers (authorities) and policy makers and nongovernmental organizations working on malaria prevention and control, Addis

Ababa University/school of public health, for scientific community and other stakeholders through publications, relevant journals and presentation in scientific conferences.

Plan of action

The study period will be according to AFENET schedule but tentative schedule to be completed within two months duration. The key activities that will be done throughout the project are listed below (Table 29). The implementation of the project will be overseen by the collaboration of the National and Regional Public Health Emergency Management (PHEM) and Ethiopian Field Epidemiology Training Program advisors/coordinators. Final report will be submitted at the end of the project.

Table 29: Work plan for the major activities to be conducted during the project time

Major activities	April, 2015	April, 2015	April, 2015	May, 2015
Proposal submission				
Arranging administrative issues				
Data collection (field work)				
Data entry				
Data analysis and interpretation				
Writing progress report				
Write up				
submitting final report and dissemination of the findings				

Table 30: budget break down

Item description	Quantity/Number	No of days	rate/day (USD)	Total cost(USD)	Remark
Perdiem					
Principal Investigator	1	20	40	800	
Supervisor	2	10	30	600	
Driver	1	20	20	400	
Data collectors	10	10	20	2,000	
Sub total				3,800	
Transportation					
Fuel cost	500			500	Assume 4000kms
Car maintenance	100		1	100	Minor one
Sub total				600	
Stationery					
Writing pad	10		1	10	
Paper(A4size)	5		10	50	
Blank WR-CD	10		1	10	
Printing and photo copying				50	
Sub total				120	
Contingency 5%				226	
Grand total				\$ 4,746	

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Chapter IX – Other Additional Output Reports (If any)

9.1 AFENET training attended in October 2013

9.2 Review meeting attended (Regional and National)

9.3 Ebola preparedness activities at Kurmuk land port of Benishangul gumuz region, including trainings given for health professionals and partners, since August 2014



9.4 International hotels follow up in Addis Ababa

9.5 Training given on outbreak investigation and surveillance of immediately and weekly reportable diseases or conditions :Home land Hotel & Shewa robit (N/Shewa zone)

9.6 Traing attended on malaria epidemiology- Debretabor and on MDSR - Woreta

9.7 Training attended on ArcGIS by EPHA-CDC jointly

9.8 Training attended on malaria and vector borne diseases_ Dubai, UAE (23-27/March/2015)

9.9 Participation in PHEM weekly bulletin preparation: for sample

Annex 1: Measles outbreak investigation form (S/Gondar-Fogera)

Interviewee status Case ☐ Control ☐ Date MM/DD/YYYY ___/___/___/ ID No _____

A. Identification information:

1. Name _____ Region _____ Zone _____

Woreda _____ Kebele _____ Gote _____

B. Socio-demography:

2. Age _____ 3. Sex: ☐ male ☐ female 4. Occupation _____

5. Respondent relation to cases or controls? ☐ other ☐ father ☐ Guardian

6. SES: ☐ monthly income of family _____ ETB/\$

7. Educational status of parents: ☐ Illiterate ☐ Read and write ☐ primary ☐ secondary
☐ Technical/vocational ☐ Higher

C. possible source of infection:

8. Have you travelled to somewhere else in the previous 7 to 18 days before the onset of rash? Yes ☐
 No ☐

9. If yes for No 8, where? _____

10. Contact with confirmed cases in the past 7 to 18 days? ☐ Yes ☐ No

11. If yes for No 10, where and who _____ / _____ respectively?

D. Clinical information:

12. Symptoms and signs: ☐ Fever ☐ Rash ☐ Cough ☐ Coryza ☐ Conjunctivitis

13. MUAC for <5yrs and lactating mothers: ☐ < 11cm ☐ 11-12.5cm ☐ >12.5cm

14. Date of onset of rash? MM / DD/ YYYY ___/___/___/

15. The distance of your house from health facility? ☐ ≤ 10kms ☐ > 10kms

16. Have you visited health facility? ☐ Yes ☐ No

17. If yes for No 16, date seen at health facility ___/___/___/

18. Complication Yes ☐ No ☐

19. If yes for No 18: ☐ Diarrhea ☐ Ear infection ☐ Blindness ☐ Convulsion ☐ Other (specify)

20. Treatment? Yes ☐ No ☐

21. If yes for No 20: ☐ ORS ☐ Antibiotic ☐ Vit.A ☐ Supplementary food ☐ TTC
ointment ☐ ☐ other (specify) ☐ Anti-pyretics

E. Laboratory information:

22. Was sample taken? ☐ Yes ☐ No

23. If, yes, date taken ____/____/____/

24. Laboratory result: ☐ Positive for measles specific IgM ☐ Negative for IgM ☐ pending

F. Vaccination status:

25. Have you vaccinated for measles? ☐ Yes ☐ No

26. If yes, source of information? ☐ History ☐ Vaccination card

27. If yes for 25, last vaccination date ____/____/____/

28. Dosage: ☐ One ☐ two & above ☐ Don't know

29. No of children eligible for vaccination -----& <yrs----- in the house hold?

G. Transmission to others:

30. Have you travelled before and after four days the rash erupts? ☐s ☐o

31. Is there other case in the neighborhood? ☐Yes ☐ No

32. If yes for No 31, distance from your house? _____

33. Is there other case in the household? ☐ Yes ☐ No

34. If yes for No 33, who is he/she? _____

35. Family size _____

36. House diameter/area in m² _____

37. No of rooms _____

38. How many windows have your house? _____

39. Where does the patient socialize? ☐ Market ☐ School ☐ Church ☐ Mosque

Other (specify) _____

40. Are there other similar cases in the social group? ☐Yes ☐No

41. If yes for No 40, where? _____

H. Knowledge:

42. Do you know the transmission of measles virus? ☐ Yes ☐ No

43. If yes for No 42, how: ☐ Through air ☐ food ☐ contact ☐ fecal/oral route ☐ water
☐ Appeal of God

44. Is measles preventable disease? ☐ Yes ☐ No

45. If yes for 44, how? ☐ Vaccinated ☐ Traditional treatment ☐ other (specify)

Thank you for your time!

Investigator _____ Position _____ Sign. _____

Co-investigator _____ position _____ sign. _____

Annex-2: Measles outbreak investigation forms (Chewaka)

Interviewee status: ☐ Case ☐ Control Date MM/DD/YYYY ____/____/____/ ID No _____

A. Identification information:

1. Name _____ Region _____ Zone _____

Woreda _____ Kebele _____ Gote _____

B. Socio-demography:

2. Age _____ 3. Sex ☐ male ☐ female 4. Occupation _____

5. Respondent relation to cases or controls? ☐ Other ☐ Father ☐ Guardian

6. SES: ☐ monthly income of family _____ ETB/\$

7. Educational status of parents: ☐ Illiterate ☐ Read and write ☐ primary ☐ secondary
Technical/vocational Higher ☐ ☐

C. possible source of infection:

8. Have you travelled to somewhere else in the previous 7 to 18 days before the onset of rash? Yes
No ☐ ☐

9. If yes for No 8, where? _____

10. Contact with confirmed cases in the past 7 to 18 days? ☐ Yes ☐ No

11. If yes for No 10, where and who _____/_____ respectively?

D. Clinical information:

12. Symptoms and signs: ☐ Fever ☐ Rash ☐ Cough ☐ Coryza ☐ Conjunctivitis

13. MUAC for <5yrs and lactating mothers: ☐ < 11cm ☐ 11-12.5cm ☐ >12.5cm

14. Date of onset of rash? MM / DD/ YYYY ____/____/____/
15. The distance of your house from health facility? ☐ < 10kms ☐ > 10kms
16. Have you visited health facility? ☐ Yes ☐ No
17. If yes for No 16, date seen at health facility ____/____/____/
18. Complication Yes ☐ No ☐
19. If yes for No 18: ☐ Diarrhea ☐ Ear infection ☐ Blindness ☐ Convulsion ☐ Other (specify)
20. Treatment? Yes ☐ No ☐
21. If yes for No 20: ☐ ORS ☐ Antibiotic ☐ Vit.A ☐ Supplementary food ☐ TTC
ointment ☐ other (specify) Anti-pyretics

E. Laboratory information:

22. Was sample taken? ☐ Yes ☐ No
23. If, yes, date taken ____/____/____/
24. Laboratory result: ☐ Positive for measles specific IgM ☐ Negative for IgM ☐ pending

F. Vaccination status:

25. Have you vaccinated for measles? ☐ Yes ☐ No
26. If yes, source of information? ☐ History ☐ Vaccination card
27. If yes for 25, last vaccination date ____/____/____/
28. Dosage: ☐ One ☐ two & above ☐ Don't know
29. No of children eligible for vaccination -----& <yrs----- in the house hold?

G. Transmission to others:

30. Have you travelled before and after four days the rash erupts? ☐s ☐o
31. Is there other case in the neighborhood? ☐Yes ☐ No
32. If yes for No 31, distance from your house? _____
33. Is there other case in the household? ☐ Yes ☐ No
34. If yes for No 33, who is he/she? _____
35. Family size _____
36. House diameter/area in m² _____
37. No of rooms _____
38. How many windows have your house? _____

39. Where does the patient socialize? ☐ Market ☐ School ☐ Church ☐ Mosque

Other (specify) _____

40. Are there other similar cases in the social group? ☐ Yes ☐ No

41. If yes for No 40, where? _____

H. Knowledge:

42. Do you know the transmission of measles virus? ☐ Yes ☐ No

43. If yes for No 42, how: ☐ Through air ☐ food ☐ contact ☐ fecal/oral route ☐ water
Appeal ☐ God ☐

44. Is measles preventable disease? ☐ Yes ☐ No

45. If yes for 44, how? ☐ Vaccinated ☐ Traditional treatment ☐ other (specify)

Thank you for your time!

Investigator _____ Position _____ Sign. _____

Co-investigator _____ position _____ sign. _____

Annex-3: Questionnaire of Malaria and Measles surveillance system evaluation in Jawi district, Awi Zone, Amhara region, June 2014

Woreda Health Office

Background:

Date-----Assessment team name: _____

Interviewer name: _____

Respondent name & position: _____

Surveillance System: _____

Catchment population _____

Address: Office no _____ Cell phone no _____ e-mail _____

PART ONE:

A. Communication and reporting system assessment

1. Which communication material did you have? ☐ Email ☐ wired phone ☐ mobile ☐ radio ☐ fax
☐ other-----

2. Did you have address of Health Center PHEM officers? ☐ ☐ Yes ☐ ☐ No
3. How frequently you communicate with the Health center PHEM officers 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 zonal PHEM unit? ☐ ☐ Monday ☐ ☐ Tuesday ☐ ☐ Wednesday ☐ ☐ Thursday ☐ ☐ Friday ☐ ☐ Saturday ☐ ☐ Sunday
5. When are you expected to receive weekly report from HCs? ☐ ☐ Monday ☐ ☐ Tuesday ☐ ☐ Wednesday ☐ ☐ Thursday ☐ ☐ Friday ☐ ☐ Saturday ☐ ☐ Sunday
6. How is the zonal PHEM communicating the woreda PHEM officers in case of immediately reportable diseases? ☐ ☐ by email ☐ ☐ by phone ☐ ☐ by fax ☐ ☐ regular weekly report ☐ ☐ others
7. 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
8. If answer for Q7 is yes to whom did you send? -----

B. Assessment of availability of Surveillance Documentation, Registers, and Forms

1. Is there a national manual for malaria and Measles surveillance? ☐ ☐ Yes ☐ ☐ No ☐ NA
2. Did you have National Guide line for PHEM? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable
3. Did you have standard case definition for all country priority diseases? (Measles, Malaria) ☐ ☐ Yes ☐ ☐ No ☐ ☐ NA
4. Was the case definition posted? ☐ ☐ Yes ☐ ☐ No
5. If answer for Q4 is No, for which disease(s) did you lack the case definition?
6. Did you have case based reporting formats for out breaks? ☐ ☐ Yes ☐ ☐ No ☐ ☐ NA
7. Was there guide line for specimen collection, handling and transportation to the next level? ☐ ☐ Yes ☐ ☐ No ☐ ☐ NA
8. Did you have line list for reporting outbreaks? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable

C. Data analysis, Computer skill and training assessment

1. Had you trained on surveillance system? ☐ ☐ Yes ☐ ☐ No
2. If answer for Q1 is yes a) when-----? b) Topic-----? c) For how long? -----

3. Did you give any onsite orientation about surveillance system for HC and HP PHEM focal persons?
☐ Yes ☐ No
 4. Was data compiled? ☐ Yes ☐ No
 5. Did you have computer? ☐ Yes ☐ No
 6. Is it functional)? ☐ Yes ☐ No
 7. How the data entry and compilation is accomplished? ☐ Manual ☐ Computer ☐ other----
 8. Did you have computer skill on ☐ Msword ☐ Msexcel ☐ MS power point ☐ Info?
 9. Did you analyze data of the surveillance system? ☐ Yes ☐ No
 10. If answer for Q9 is yes, did you describe data by time, place, and person: ☐ Yes ☐ No
 11. Did you have denominators for data analysis? ☐ total pop ☐ male ☐ female ☐ <5yrs
 12. Please indicate the frequency of your data analysis. ☐ weekly ☐ every two week ☐ Monthly
☐ quarterly ☐ every 6 month ☐ annually ☐ No regular time
 13. Did you notify the results of your analysis to the higher level PHEM? ☐ Yes ☐ No
 14. Did you notify the results of your analysis to the lower level PHEM? ☐ Yes ☐ No
- D. Epidemic response and preparedness assessment**
1. Did you have plan for epidemic response and preparedness? ☐ Yes ☐ No
 2. Did you have emergency stocks of drugs and supplies? ☐ Yes ☐ No
 3. If answer for Q2 is No, how did you control epidemics? -----
 4. Had you experienced shortage of drugs, vaccines and supplies in 2006 EFY? ☐ Yes ☐ No
 5. Was an epidemic management committee built in your office? ☐ Yes ☐ No ☐ Not Applicable
 6. Did the epidemic management committee have regularly scheduled meeting time? ☐ Yes ☐ No
 7. Was Rapid response team (RRT) built in your office? ☐ Yes ☐ No ☐ Not Applicable
 8. Did the RRT have regularly scheduled meeting time during epidemics? ☐ Yes ☐ No
 9. Did you have case management protocol for epidemic prone diseases? ☐ Yes ☐ No ☐ Not Applicable

10. Did your PHEM have multi sectoral emergency preparedness and response task force? ☐ ☐ Yes ☐ ☐ No
☐ ☐ Not Applicable

11. Were partners working together with your office on emergencies? ☐ ☐ Yes ☐ ☐ No

12. If answer for Q11 is yes, what type of supports did they give to your office?

13. Was there a budget for epidemic response? ☐ ☐ Yes ☐ ☐ No

14. Who had the authority to mobilize the emergency finance? ☐ Health Bureau head ☐ ☐ PHEM case team leader ☐ ☐ PHEM officer ☐ ☐ other-----

15. Had you a vehicle assigned for emergencies (PHEM)? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not applicable

16. If answer for Q15 is No, how did you address emergencies?

E. Outbreak investigation and case confirmation assessment

1. Had you investigated any outbreak in 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 ☐ ☐ Health Bureau staffs ☐ ☐ experts organized randomly ☐ ☐ health facility staffs ☐ ☐ other-----

6. Had you faced any challenge in outbreak investigation in 2006 EFY? ☐ ☐ Yes ☐ ☐ No

7. If answer for Q6 is yes,

a) List the challenges -----

b) List the alternatives that you take to tackle the challenges -----

F. Supervision and feedback assessment

1. Did you have supervision plan in 2006 EFY? ☐ ☐ Yes ☐ ☐ No

2. If answer for Q1 is No, how did you supervise? -----

3. If for Q1 is yes, did you supervise the HCs and HPs according to your plan in 2006 EFY? ☐ ☐ Yes
☐ ☐ No
4. If answer for Q3 is No, what is the reason? -----
5. If answer for Q3 is yes, how many times did you supervise each HC and HP in 2006 EFY? _____
6. Had you reviewed about surveillance practice by higher level supervision? ☐ ☐ Yes ☐ ☐ No
7. Did you have regular supervision checklist? ☐ ☐ Yes ☐ ☐ No
8. If answer for Q7 is No, how did you supervise the health facilities & Health posts? -----
9. Were you supervised by higher level officers in 2006 EFY? ☐ ☐ Yes ☐ ☐ No
10. If answer for Q9 is yes how many times in 2006 EFY? -----
11. Did you send feedback of your supervision to the health centers (HCS) and health posts (HPs) commenting/indicating their strong and weak sides? ☐ ☐ Yes ☐ ☐ No
12. If answer for Q11 is No, why? -----
13. If answer for Q11 is yes, for how many HCs and HPs did you send a feedback in 2006 EFY _____
14. Had you received feedback from higher level supervisors in 2006 EFY? ☐ ☐ Yes ☐ ☐ No
15. If answer for Q14 is yes how many feedbacks did you received in 2006 EFY? -----
16. Had you faced any challenge on supervision and feedback in 2006EFY? ☐ ☐ Yes ☐ ☐ No

PART-TWO

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

Describe Each System Attributes:

I. 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 to 15 min ☐ ☐ >15 min
7. How long does it take to have laboratory confirmation? -----

II. 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
6. Is the system easy to add new information technology? ☐ ☐ Yes ☐ ☐ No

III. Data quality

1. Are all reported forms Complete? ☐ ☐ Yes ☐ ☐ No
2. If answer for Q1 is No, how many unfilled spaces are in your 2006 EFY report? -----
3. Percentage of unknown or blank responses to variables from the total reports of 2006 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 2006 EFY report? -

7. Percent of records which are difficult to read/ understand. -----

IV. Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? ☐ ☐ Yes
☐ ☐ No
2. If yes, how many are active participants (of the expected)? -----
3. 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: -----
4. Were all participants using the standard case definition to identify cases? ☐ ☐ Yes ☐ ☐ No
5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? ☐ ☐ Yes ☐ ☐ No
6. Were all the health professionals aware about the surveillance system? ☐ ☐ Yes ☐ ☐ No
7. Was all PHEM officers send report on time? ☐ ☐ Yes ☐ ☐ No

V. 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?

VI. Timeliness

1. Are all reporting sites reporting on time? ☐ ☐ Yes ☐ ☐ No
2. Percent of reporting sites that report on time. -----

VII. Completeness

1. Are all reporting sites reporting? ☐ ☐ Yes ☐ ☐ No
2. Percent of Health centers & Health posts that send report of each week in 2006 EFY. -----

VIII. 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? -----

QUESTIONNAIRE FOR THE HEALTH CENTER

BACKGROUND:

Town/woreda _____
Health center _____
Catchment population _____
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? ☐ ☐ Email ☐ ☐ wired phone ☐ ☐ mobile ☐ ☐ radio ☐ ☐ fax
☐ ☐ other-----
2. Did you have address of Health Bureau/zonal/woreda PHEM officers? ☐ ☐ Yes ☐ ☐ No
3. How frequently you communicate with the Health Bureau/zonal PHEM officers on emergencies and other daily activities? ☐ ☐ Daily ☐ ☐ weekly ☐ ☐ every 2 week ☐ ☐ monthly ☐ ☐ quarterly ☐ ☐ every 6 month
☐ ☐ yearly ☐ ☐ others-----
4. Did you have address of HP HEWs? ☐ ☐ Yes ☐ ☐ No

5. How frequently you communicate with the HP HEWs on emergencies and other daily activities?

☐ daily ☐ weekly ☐ every 2 week ☐ monthly ☐ quarterly ☐ every 6 month ☐ yearly ☐ others

6. When are you expected to send weekly report to the woreda PHEM Unit? ☐ Monday ☐ Tuesday

☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday

7. When are you expected to receive weekly report from HPs? ☐ Monday ☐ Tuesday ☐ Wednesday

☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday

8. How is the Health Center communicating the HPs HEWs in case of immediately reportable diseases?

☐ by email ☐ by phone ☐ by fax ☐ regular weekly report ☐ others

9. 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

10. If answer for Q9 is yes to whom did you send? -----

B .Assessment of availability of Surveillance Documentation, Registers, and Forms

1. Did you have National Guide line for PHEM? ☐ Yes ☐ No ☐ Not Applicable

2. Did you have standard case definition for all country priority diseases? ☐ Yes ☐ No ☐ NA

3. Was the case definition posted? ☐ Yes ☐ No

4. If answer for Q10 is No, for which disease(s) did you lack the case definition?

5. Did you have case based reporting formats for out breaks? ☐ Yes ☐ No ☐ NA

6. Was there national manual for surveillance? ☐ Yes ☐ No ☐ NA

7. Was there guide line for specimen collection, handling and transportation to the next level? ☐ Yes
☐ No ☐ NA

8. Did you have line list for reporting outbreaks? ☐ Yes ☐ No ☐ Not Applicable

C .Data analysis, Computer skill and training assessment

1. Had you trained on surveillance system? ☐ Yes ☐ No

2. If answer for Q1 is yes a) when-----? b) Topic-----? c) For how long? -----

3. Did you give any onsite orientation about surveillance system for HC and HP PHEM focal persons?

☐ ☐ Yes ☐ ☐ No

4. Was data compiled? ☐ ☐ Yes ☐ ☐ No

5. Did you have computer? ☐ ☐ Yes ☐ ☐ No

6. Is it functional)? ☐ ☐ Yes ☐ ☐ No

7. How the data entry and compilation is accomplished? ☐ ☐ Manual ☐ ☐ Computer ☐ ☐ other

8. Did you have computer skill on ☐ ☐ Ms word ☐ ☐ Ms excel ☐ ☐ MS power point ☐ ☐ Info

9. Did you analyze data of the surveillance system? ☐ ☐ Yes ☐ ☐ No

10. If answer for Q9 is yes, did you describe data by time, place and person: ☐ Yes ☐ No

11. Did you have denominators for data analysis? ☐ total pop ☐ male ☐ female ☐ ☐ <5

12. Please indicate the frequency of your data analysis. ☐ ☐ weekly ☐ ☐ every two wk ☐ ☐ Monthly

☐ ☐ quarterly ☐ every 6 month ☐ ☐ annually ☐ ☐ No regular time

13. Did you notify the results of your analysis to the higher level PHEM? ☐ ☐ Yes ☐ ☐ No

14. Did you notify the results of your analysis to the lower level PHEM? ☐ ☐ Yes ☐ ☐ No

D .Epidemic response and preparedness assessment

1. Did you have plan for epidemic response and preparedness? ☐ ☐ Yes ☐ ☐ No

2. Did you have emergency stocks of drugs and supplies? ☐ ☐ Yes ☐ ☐ No

3. If answer for Q2 is No, how did you control epidemics? -----

4. Had you experienced shortage of drugs, vaccines and supplies in 2006 EFY? ☐ ☐ Yes ☐ ☐ No

5. Was an epidemic management committee built in your office? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable

6. Did the epidemic management committee have regularly scheduled meeting time? ☐ ☐ Yes ☐ ☐ No

7. Was Rapid response team (RRT) built in your office? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable

8. Did the RRT have regularly scheduled meeting time during epidemics? ☐ ☐ Yes ☐ ☐ No

9. Did you have case management protocol for epidemic prone diseases? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable

10. Did your PHEM have multi sectoral emergency preparedness and response task force? ☐ ☐ Yes ☐ ☐ No
☐ ☐ Not Applicable
11. Were partners working together with your office on emergencies? ☐ ☐ Yes ☐ ☐ No
12. If answer for Q11 is yes, what type of supports did they give to your office?
-

13. Was there a budget for epidemic response? ☐ ☐ Yes ☐ ☐ No
14. Who had the authority to mobilize the emergency finance? ☐ Health center head ☐ ☐ experts ☐ other-----

15. Had you a car assigned for emergencies (PHEM)? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not applicable
16. If answer for Q15 is NO, how did you address emergencies?
-

E .Outbreak investigation and case confirmation assessment

1. Had you investigated any outbreak in 2004 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 Health Bureau ☐ ☐ experts organized randomly ☐ ☐ health facility staffs ☐ ☐ hot-----

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 take to tackle the challenges -----

F. Supervision and feedback assessment

1. Did you have supervision plan in 2006 EFY? ☐ ☐ Yes ☐ ☐ No
2. If answer for Q1 is No, how did you supervise? -----
3. If for Q1 is yes, did you supervise the HPs according to your plan in 2006 EFY? ☐ ☐ Yes ☐ ☐ No
4. If answer for Q3 is No, what is the reason? -----
5. If answer for Q3 is yes, how many times did you supervise each HP in 2006 EFY? _____

6. Had you reviewed about surveillance practice by higher level supervision? ☐ ☐ Yes ☐ ☐ No
7. Did you have regular supervision checklist? ☐ ☐ Yes ☐ ☐ No
8. If answer for Q7 is No, how did you supervise the HPs? -----
9. Were you supervised by higher level officers in 2006 EFY? ☐ ☐ Yes ☐ ☐ No
10. If answer for Q9 is yes how many times in 2006 EFY? -----
11. Did you send feedback of your supervision to the health posts commenting/indicating their strong and weak sides? ☐ ☐ Yes ☐ ☐ No
12. If answer for Q11 is No, why? -----
13. If answer for Q11 is yes, for how many HPs did you send a feedback in 2006 EFY _____
14. Had you received feedback from higher level supervisors in 2006 EFY? ☐ ☐ Yes ☐ ☐ No
15. If answer for Q14 is yes how many feedbacks did you received in 2006 EFY? -----
16. Had you faced any challenge on supervision and feedback in 2006 EFY? ☐ ☐ Yes ☐ ☐ No

PART-TWO

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

Describe Each System Attributes:

1. 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? -----

2. 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
6. Is the system easy to add new information technology? ☐ ☐ Yes ☐ ☐ No

3. Data quality

1. Are all reported forms Complete? ☐ ☐ Yes ☐ ☐ No
2. If answer for Q1 is No, how many unfilled spaces are in your 2006 EFY report? -----
3. Percentage of unknown or blank responses to variables from the total reports of 2006 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 2006 EFY report? -
7. Percent of records which are difficult to read/ understand. -----

4. Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? ☐ ☐ Yes
☐ ☐ No
2. If yes, how many are active participants (of the expected)? -----
3. 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: -----

4. Were all participants using the standard case definition to identify cases? ☐ ☐ Yes ☐ ☐ No
5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? ☐ ☐ Yes ☐ ☐ No
6. Were all the health professionals aware about the surveillance system? ☐ ☐ Yes ☐ ☐ No
7. Was all PHEM officers send report on time? ☐ ☐ Yes ☐ ☐ No

5. 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?

6. Timeliness

1. Are all reporting sites reporting on time? ☐ ☐ Yes ☐ ☐ No
2. Percent of reporting sites that report on time. -----

7. Completeness

1. Are all reporting sites reporting? ☐ ☐ Yes ☐ ☐ No
2. Percent of HPs that send report of each week in 2006 EFY. -----

8. 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? -----

QUESTIONNAIRE FOR THE HEALTH POST

BACKGROUND:

Town/kebele _____

Health Post _____

Catchment population _____

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? ☐ ☐ Email ☐ ☐ wired phone ☐ ☐ mobile ☐ ☐ radio ☐ ☐ fax ☐ ☐ other-----
2. Did you have address of Health center PHEM officers? ☐ ☐ Yes ☐ ☐ No
3. How frequently you communicate with the Health center PHEM officers 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 Health center PHEM unit? ☐ ☐ Monday ☐ ☐ Tuesday ☐ ☐ Wednesday ☐ ☐ Thursday ☐ ☐ Friday ☐ ☐ Saturday ☐ ☐ Sunday
5. How is the Health post communicating the HCs PHEM officers in case of immediately reportable diseases? ☐ ☐ by email ☐ ☐ by phone ☐ ☐ by fax ☐ ☐ regular weekly report ☐ ☐ others
6. 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
7. If answer for Q6 is yes to whom did you send? -----

B .Assessment of availability of Surveillance Documentation, Registers, and Forms

1. Did you have National Guide line for PHEM? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable
2. Did you have standard case definition for all country priority diseases? ☐ ☐ Yes ☐ ☐ No ☐ ☐ NA
3. Was the case definition posted? ☐ ☐ Yes ☐ ☐ No

4. If answer for Q2 is No, for which disease(s) did you lack the case definition?
5. Did you have case based reporting formats for out breaks? ☐ ☐ Yes ☐ ☐ No ☐ ☐ NA
6. Was there national manual for surveillance? ☐ ☐ Yes ☐ ☐ No ☐ ☐ NA
7. Was there guide line for specimen collection, handling and transportation to the next level? ☐ ☐ Yes
☐ ☐ No ☐ ☐ NA
8. Did you have line list for reporting outbreaks? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable

C. Training assessment

1. Had you trained on surveillance system? ☐ ☐ Yes ☐ ☐ No
2. If answer for Q1 is yes a) when-----? b) Topic-----? c) For how long?

D. Epidemic response and preparedness assessment

1. Did you have plan for epidemic response and preparedness? ☐ ☐ Yes ☐ ☐ No
2. Did you have emergency stocks of drugs and supplies? ☐ ☐ Yes ☐ ☐ No
3. If answer for Q2 is No, how did you control epidemics? -----
4. Had you experienced shortage of drugs, vaccines and supplies in 2006 EFY? ☐ ☐ Yes ☐ ☐ No
5. Was an epidemic management committee built in your office? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable
6. Did the epidemic management committee have regularly scheduled meeting time? ☐ ☐ Yes ☐ ☐ No
7. Was Rapid response team (RRT) built in your office? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable
8. Did the RRT have regularly scheduled meeting time during epidemics? ☐ ☐ Yes ☐ ☐ No
9. Did you have case management protocol for epidemic prone diseases? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not Applicable
10. Was there a budget for epidemic response? ☐ ☐ Yes ☐ ☐ No
11. Who had the authority to mobilize the emergency finance? ☐ Health post staffs ☐ ☐ Health center staffs
☐ ☐ other-----
12. Had you a car assigned for emergencies (PHEM)? ☐ ☐ Yes ☐ ☐ No ☐ ☐ Not applicable
13. If answer for Q12 is No, how did you address emergencies?

E .Outbreak investigation and case confirmation assessment

1. Had you investigated any outbreak in 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 health bureau
☐ experts organized randomly ☐ health center staffs ☐ other-----

6. Had you faced any challenge in outbreak investigation in 2006 EFY? ☐ Yes ☐ No

7. If answer for Q6 is yes,

a) List the challenges -----

Field Supervision and feedback assessment

1. Were you supervised by higher level officers in 2006 EFY? ☐ Yes ☐ No

2. If answer for Q1 is yes how many times in 2006 EFY? -----

3. Had you received feedback from higher level supervisors in 2006 EFY? ☐ Yes ☐ No

4. If answer for Q3 is yes how many feedbacks did you received in 2006 EFY? -----

5. Had you faced any challenge on supervision and feedback in 2006 EFY? ☐ Yes ☐ No

a) what? _____

PART-TWO

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

Describe Each System Attributes:

1. 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

b) List the alternatives that you take to tackle the challenges -----

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 to 15 min ☐ >15 min
7. How long does it take to have laboratory confirmation? -----

2. 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
6. Is the system easy to add new information technology? ☐ Yes ☐ No

3. Data quality

1. Are all reported forms Complete? ☐ Yes ☐ No
2. If answer for Q1 is No, how many unfilled spaces are in your 2006 EFY report? -----
3. Percentage of unknown or blank responses to variables from the total reports of 2006 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/difficult to understand in 2006 EFY report? -

7. Percent of records which are difficult to read/ understand. -----

4. Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? ☐ ☐ Yes
☐ ☐ No

2. If yes Q1, how many are active participants (of the expected)? -----

3. If No Q1, 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: -----

4. Were all participants using the standard case definition to identify cases? ☐ ☐ Yes ☐ ☐ No

5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? ☐ ☐ Yes ☐ ☐ No

6. Were all the HEWs& health professionals aware about the surveillance system? ☐ ☐ Yes ☐ ☐ No

7. Was HEWs send report on time? ☐ ☐ Yes ☐ ☐ No

5. 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?

6. Timeliness

1. Are HEWs reporting on time? ☐ ☐ Yes ☐ ☐

7. Completeness

1. Are all reporting sites reporting? ☐ ☐ Yes ☐ ☐ No

2. Percent of HPs that send report of each week in 2006 EFY. -----

8. 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? -----

Annex-4: Health profile assessment Questionnaire

Region _____ Zone _____ Woreda _____ Respondant _____ Interviewer _____

1. Historical back ground of the area

- Woreda Name _____
- How & why the name given _____
- How and when the woreda was formed/founded? _____
- Any other historical aspect _____

2. Geography and Climate (including map, altitudes, agro ecological zones etc)

- Woreda map _____
- Location(distance) _____ Direction _____
- Altitude _____
- Surface Area _____ (_____ % from the zone)
- Town _____ rural _____ (land)
- Geographical coordinate
 - ✓ Latitude _____
 - ✓ Longitude _____
 - ✓ Annual rain fall(average) _____
 - ✓ Annual temp(average) _____
 - ✓ Climatic zones _____ (%) _____ (%) _____ (%)
- Woreda boundaries
 - North _____ South _____
 - East _____ West _____

3. Political and Administrative Organization

- Total no. of kebeles:
 - rural _____
 - Urban _____

4. Population and Population structures

A. Demographic data

- Total Population _____ Male _____ Female _____ sex ratio _____
- Urban Total _____ Male _____ Female _____
- Rural Total _____ Male _____ Female _____
- Population under 1 yrs _____
- Population under five yrs _____
- Population < 15 years _____
- Population >64 years _____
- Women 15_49 years of age _____
- Total population by kebele(each kebele pop) _____
- Population enumerated by woreda/H.E.Ws _____

(Population pyramid)

Population data by age and sex								
Male	<1	1-5	6-14	15-24	25-34	35-49	50-64	>65
Female	<1	1-5	6-14	15-24	25-34	35-49	50-64	>65

B. Ethnic/language

_____ (%) _____ (%) _____ (%)

C. Religion

- Orthodox _____ (_____%), Muslim _____ (_____%),
- Protestant _____ (_____%), Other _____ (_____%)

5. Economy (mainstay of the economy, average income levels etc)

- Main income sources

- ✓ Agriculture
 - Cultivated area _____
 - Grazing area _____
 - Cropping seasons _____
 - Land density _____

- ✓ Livestock
- ✓ Truism
- ✓ Trade
- ✓ Other business

- **House hold income source**

- ✓ Agriculture _____ (No.)
- ✓ Government Employer _____ (No.)
- ✓ Private Employer _____ (No.)
- ✓ Daily Laborer _____ (No.)
- ✓ Different business _____ (No.)
- ✓ Jobless _____ (No.)

- **Average Income** _____

6. Education and school Health

- **Number of educational institution**

- ✓ K.G. _____
- ✓ Primarily School _____
- ✓ Secondary _____
- ✓ Preparatory _____
- ✓ College/ University _____
- ✓ TVET _____

- **Total School Age Children (target)** _____

- ✓ Total Enrolment _____ Male _____ Female _____
- ✓ School dropout in year 2013 _____
- ✓ How many? _____
- ✓ If there is school dropout why _____

- **Educational status of the community**

- ✓ Total Educated people _____
 - Male _____
 - Female _____
 - level of education
 - Illiterate _____
 - Read and write _____
 - 12 completed _____
 - Diploma _____
 - Degree & above _____
- School health activities:
 - Number of schools with water supply _____
 - Toilets:
 - Schools with functional latrines (male & female) _____
- Schools with HIV/other Health clubs _____

7. Facilities

A. Transport

- Accessibility (main roads) _____
- Type of road _____
- How many kebeles have access to transportation _____
- Flow of transportation per day _____

B. Telecommunication

- How many people have access to fixed telephone? _____
- How many people have access to mobile phone? (coverage) _____
- How many kebeles have access to fixed telephone? _____
- How many kebeles have access to mobile phone? (coverage) _____

C. Post Office _____ (No)

D. Bank _____ (No)

E. Power supply

- How many house hold get power supply _____ ?

F. Water

- Total safe water coverage _____ (___ %)
- Safe water supply coverage by kebele _____
- Main source of water supply _____
- Kebeles getting safe water _____ (___ %)
- Population getting safe water _____ (___ %)
- Daily water consumption per day per person _____

8. 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. Social situation

Number of libraries _____

Number of NGO working on public health _____

Number of youth clubs _____

10. Health service institutions and infrastructure

S.N O	Type of health institution		No of institutions
1	Number of Hospitals	with sustainable/ 24 hour /electric power	
		without sustainable/ 24 hour /electric power	
		with telephone service(cable based/mobile)	
		without telephone service (cable based/mobile)	
		with piped water supply	
		Without piped water supply	
2	Number of Health Centers	with sustainable/ 24 hour /electric power	
		without sustainable/ 24 hour /electric power	
		with telephone service (cable based/mobile)	
		without telephone service (cable based/mobile)	
		with piped water supply	
		Without piped water supply	
3	Number of Hospitals		
4	Number of Health centers		
5	Number of Health post		
6	Number of private clinics	Lower	
		Medium	

		Higher	
7	Number of Drug vendors		
8	Number of Drug stores		
9	Number of Pharmacies		
10	Number of Diagnostic laboratories		
11	Hospital to population ratio		
12	Health center to population ratio		
13	Health posts to population ratio		
14	Physical health service coverage		

Health budget allocation

- **Government**

- ✓ Total budget allocated for the district _____
- ✓ Total budget allocated for health _____ (____%)
- ✓ Total budget allocated for emergency _____

- **Funds from NGO**

- ✓ Total _____ (purpose/programs) _____

Community Health Services

- Status of services provided by community health workers namely

- ✓ No. of TBAs/TTBA _____ and their responsibility _____
- ✓ No. of HDA _____ and their responsibility _____
- ✓ Responsibility of HEWs

- ✓ Others _____

11. Top 10 diseases of morbidity and mortality

Morbidity cases in adult OPD			Pediatrics/ <5 year		
Rank	Diseases	%	Rank	Disease	%
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		

Top ten of admissions

Adult			Pediatrics/ <5 year	
	Morbidity	Mortality	Morbidity	Mortality
1				
2				
3				
4				
5				
6				
7				
8				
9				

10				
----	--	--	--	--

12. Child Health

A. Health centers providing IMNCI service_____

C. Live births weighing < 2500gm_____

B. Moderate malnutrition in < 3yrs_____

D. Severe malnutrition in < 3yrs_____

13. Health staff to population ratio

Physicians (GP+ specialist)_____

Health officers_____

All Nurses_____ Mid-wife Nurses_____

Medical lab_____ Pharmacy_____, Env'tal _____ Health education_____

Health extension workers_____

Other_____

Expected No of health staff based on BPR and the gap.

Cause of the gap

No of Health posts full filled HEW

No of health posts access with telephone

14. Vital statistics and health indicators

S. No	Indicator	Rural	Urban	Total
1	Total population			
2	Male			
3	Female			
4	Under 1 years old			
5	Under 5 years old			
6	Under 15 years old			
7	Productive age female (15-49 years)			
8	Pregnant women			
9	Live births			
10	Total fertility rate			
11	Crude birth rate			
12	Crude death rate			

13	maternal mortality rate			
14	Child mortality			
15	Under 5 mortality rate			
16	Infant mortality rate			
17	Dependency ratio			
18	Average household size			

15. Immunization

1. Penta3 coverage _____
2. Measles coverage _____
3. Full Immunization Coverage _____
4. Measles dropout rate _____
5. Penta3 dropout rate _____
6. PAB _____

16. Maternal health coverage

S.No	Type of service	Coverage (%)
1	Antenatal care (ANC) Coverage at least 1 visit (%) Antenatal care (ANC) Coverage at least 4 visit (%)	
2	Contraceptive acceptance rate (CAR (%))	
3	Contraceptive prevalence rate (CPR (%))	
4	Post natal care (PNC) Coverage	
5	Proportion of delivery attended by skilled personnel	

17. Environmental Health & sanitation.

- ✓ Latrine coverage _____ & utilization rate _____
 - ✓ Solid waste management _____
 - ✓ Liquid waste management _____
 - ✓ others _____
 - Health Education (what, when, where, how and who conducted health education)
- _____
- _____
- _____

18. Endemic disease

A) Tuberculosis and Leprosy

S. No	Cases	Number		
		male	female	total
1.	TB case detection rate			
2.	TB treatment success rate			
3.	TB treatment cure rate			
4.	Defaulters			
5.	No of Leprosy cases			

B) MALARIA

S. No	Malaria cases		Adult		Under 5		Preg.	Total		M + F	
			M	F	M	F		M	F		
1	Confirmed malaria cases	Pf									
		Pv									
		Mixed									
2	Admission cases due to malaria										
3	IRs coverage	Urban									
		Rural									
		Total									
4	Coverage of LLITN (1 LLITN/1.8 person)	Urban									
		Rural									
		Total									
5	LLITN utilization coverage	Urban									
		Rural									
		Total									

C) HIV/AIDS

HIV prevalence_____

HIV Incidence_____

VCT_____

PMTCT_____

PITC_____

Mothers who received NVP from those tested positive_____

Persons Ever Enrolled in HIV Care_____

Persons Ever Started on ART_____

Persons Currently on ART_____

19. Nutrition and foods

Nutrition (malnutrition related OTPs, SC,TSF,CBN and PSNP activities)/HO & Early warning

- ✓ Total 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_____
- ✓ General food security condition_____

Essential drugs (shortage):-

20 .No of factory, Mechanism to control industrial wastes and the impact to health

21. Discussion of the highlights and the main findings of the health profile assessment and description

22. Problem Identification and Priority Setting – set priority health problems based on the public health importance, magnitude, seriousness, community concern, feasibility

23. Conclusions made about the health status of the Woreda based on the findings

24. Action plan and recommendations- on how to address the problems identified clearly depicting responsibilities, required resource and timeline

Annex-5: Rapid Meher assessment-Health Sector. Region/Zone check list

Interviewer name _____	Institution: _____
Interview Date: (dd) ____/(mm) ____/2014	Region: _____

		Zone: _____		
Main contact at this location:	Name: _____	Position: _____	Tel: _____	
1. COORDINATION				
A. Is there a functional multisectoral coordination forum for the health sector?		Yes ☐	No ☐	
B. Are all relevant government, NGOs and UN agencies represented?		Yes ☐	No ☐	
C. Frequency of regular meeting? (Weekly, Every 2 weeks, monthly.....)				
2. Outbreak? Yes ☐ No ☐				
Was there any outbreak in the last 3 months? YES _____ NO _____				
If yes, specify the type of disease Type of outbreak _____ Number of cases _____ Deaths _____ (specify the time period) _____				
If yes, specify the type of disease _____, _____, _____				
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) _____				
3. Mention anticipated epidemics _____, If yes please indicate Zone/Woreda at risk and risk population per anticipated risk: <i>(Use the back side)</i>				
4. Public Health emergency Management				
A. Is there a Public Health Emergency Preparedness and Response plan?		Yes ☐	No ☐	
		If yes, is the plan budgeted/ funded? Yes ☐ No ☐		
B. Is there a trained staff on PHEM (Regional/Zonal/Woreda/HFs)		Yes ☐	No ☐	
If yes specify number of trained personnel _____				
C. Is there a Regional trained Rapid Response team (RRT)?		Yes ☐	No ☐	
D. Is there stock of:	Drugs and medical supplies	Total requirement	Available	Gap
	i. Meningitis vaccine			

(Use the Stock estimation matrix to estimate the amount of stock for each drug/supply for 6 months)	ii. Drug s:	Coartem			
		Oily CAF			
		Doxycycline			
		Ringer lactate			
		ORS			
		Amoxil suspension			
		Cotrimoxazole suspension			
		Tetracycline Ointment			
		Vit A.			
	iii. Lab supplies	RDT (Malaria)			
		Pastorex (Meningitis)			
		LP set			
		TI bottle			
	CTC Kit (AWD)				
	Medical Supplies	Gloves,			
		Syringe			
		PPE			
	Others(specify)				

Summary: Requirements/Needs/ 2014

Region/Zone	Type of Health emergency	Total estimated Beneficiaries	Required finance

--	--	--	--

Region	Zone	Woreda at Risk	Type of Risk	At risk Population

Comments: _____

Rapid Meher assessment - Health Sector: Woreda level Questionnaire 2014

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 multi sectoral 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 (2013-2014 GC)					
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 Sene 2006 EC to Tikimt 2007 EC (June–Oct 2014)					
Mon	AWD	Malaria	Measles	Meningitis	Other

th									(specify)
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Death	
June 2014									
July 2014									
Aug 2014									
Sept 2014									
Oct 2014									
2.4. Outbreak?									
Was there any outbreak in the last 3 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?									
Ringer Lactate (to treat AWD cases)						Yes ☐ No ☐			
ORS (to treat AWD cases):						Yes ☐ No ☐			
Doxacycline (to treat AWD cases):						Yes ☐ No ☐			

Consumables : Syringes, Gloves (<i>for AWD management</i>):		Yes ☐	No ☐	
Amox 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 A WD)		Yes ☐	No ☐	
Main shortage (if any): Specify				
Is budget allocated for emergency Rapid response by the woreda?				
SECTION III: RISK FACTORS				
Diseases	Risk factors for epidemics to occur	Yes	No	
Malaria	Malaria endemic area			
	Presence of malaria breeding site			
	Interrupted or potentially interrupting rivers			
	Unprotected irrigation in the area			
	LLINs coverage <80%			
	Indicate the coverage of IRS 2014			
	Depleted prevention and control activities			
	Number of malarious kebeles and total population in these Kebeles	Kebele _____ — pop _____ —		

Meningitis	Was there Meningitis epidemic in the last 3 years (If yes specify date)		
	Has vaccination been conducted in the past 3 years		
	If yes : Indicate the date and number of people vaccinated	date	No
AWD	Was there AWD epidemic in the last three years (If yes specify date)		
	Latrine coverage		
	Latrine utilization		
	Safe water coverage		
Measles	Is there ongoing measles outbreak		
	What is the measles vaccination coverage of 2006 EC, less than one year		
	Has SIA been conducted in 2006 EFY		
	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 May to October 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 Y/N (for the next -- mo)			Children Discharged from TFP referred to SFP Y/N
						RUTF	F100	F75	
June									
July									
Aug									
Sept									
Oct									

SFP= supplementary feeding prog., RUTF= ready to use therapeutic prog.

Any comment -----

Annex-6: Dummy tables, consent form and Questionnaires

Table 31: Socio demographic characteristics of the respondents in Jawi woreda, Amhara, North West Ethiopia, May 2015 (n=845)

Characteristics	Frequency	Percent (%)
Age (year)		
18-24		
25-44		
45-64		
64+		
Sex		
Male		
Female		
Educational status		
Illiterate		
Read and write		
1-8 Grade		
9-12 Grade		
12+		
Occupation		
Gov't employee		
Merchant		
Daily laborer		
House wife		
Others		
Religion		
Orthodox		
Islam		
Protestant		
Others		
Monthly income		
<500 birr		
501-1000		
>1000 birr		
Number of families		
<3		
>3		
Residency		
Urban		
Rural		

Table 32: Availability, status of ITNs and knowledge of respondents in Jawi, Amhara, North West Ethiopia, may 2015 (n=845)

Characteristics	Frequency	Percent (%)
Knowledge about malaria and ITNs		
sufficient knowledge		
insufficient knowledge		
Source of information		
Health professionals		
Media		
Community		
Availability of ITNs		
one		
Two		
Three		
Source of ITNs		
Buying		
Free (GO/NGOs)		
Sleep under ITNs prior to survey day		
All families		
<5 children		
Pregnant		
Reasons not having ITNs		
Nets too expensive		
Not know source of nets		
Nets have no use		
Others		

Table 33: Variables might will be associated with ITNs utilization in Jawi woreda, Amhara, North West Ethiopia, May 2015 (n=845)

Variables(n=845)	ITNs utilization		COR(95%CI)	AOR(95%CI)
	Yes	No		
Knowledge status				
Knowledgeable				
Not knowledgeable				
Educational status				
Not formal				
Formal education				
Occupational status				
Non employees				
Employees				
Monthly income				
<500 birr				
501-1000				
>1000				
Number of families				
<3				
>3				
Age				
<45				
>45				
Sex				
Male				
Female				
Source of ITNs				
Buying				
Free(GO/NGOs)				
Altitude				
<2000 masl				
>2000 masl				
Residence				
Urban				
Rural				

Information sheet and consent form

Amhara Regional State Health Bureau, PHEM core process

Survey questionnaire: Assessment of long lasting Insecticide Treated Nets utilization among high-risk groups for Malaria Control in Jawi District, Amhara: Altitude versus utilization

I. Study Information Sheet

Greeting: Good morning/afternoon!

Hello! My name is _____ I am working on behalf of research team (project), which is conducted by Addis Ababa University. I would like to ask few questions which may take around 15-20 minutes about LLIN bed net utilization among risk groups, and knowledge, Attitude and practice of bed net utilization. The information you will give contributes to aspects that will be taken to control malaria. Any information you provide will be confidential. You have the right to not participate in the study. Are you willing to participate in this study?

1. No (Say Thank you) 2. Yes → continue your interview

Signature of the interviewer certifying that the informed consent has been accepted by the participant

_____ Date _____

Date of interview (in **Ethiopian calendar**) ____/____/____

Result of interview: 1. Completed 2. Respondent not available

3. Refused. 4. Partially completed

Checked by supervisor, name _____ Signature _____ Date ____/____/____

Record GPS location of household-LAT _____ LONG _____

Questionnaire English version
Part 1: General information

Date of data collection ____ / ____ / ____			
S. n o	QUESTIONS AND FILTERS	CODING CATEGORIES	skip
101	Sex	Male-----1 Female-----2	
102	Age	Months ____ Year ____	
103	Family size	-----	
104	Religion	Orthodox-----1 Protestant-----3 Muslim-----2 other/specify-----4	
105	Educational status	Illiterate-----1 Primary (1-8)-----2 Secondary (9-12)-----4 Higher (Tertiary)-----5	
106	Residence	Urban-----1 Rural-----2	
107	Occupation	Government employee-----1 Farmer-----2 Merchant-----3 Daily laborer-----4 Others (Specify)-----5	
108	Marital status	Married-----1 Single-----2 Divorced-----3 Widowed-----4	
109	Average monthly family income	_____ETB/USD	
110	Do you or anyone in your household own a functioning radio?	Yes-----1 No-----2	
111	Do you or anyone in your household own a functioning TV?	Yes-----1 No-----2	

Part 2: Malaria

S. no	QUESTIONS	CODING CATEGORIES	
201	Have you heard of malaria?	Yes-----1 No-----2	
202	If yes for Ques. No 201 Can you tell me the cause of malaria? DO NOT PROMPT (circle all possible answers)	From being bitten by mosquito-----1 From being in the rain-----2 From getting cold-----3 From drinking dirty water-----4 From another person with malaria-----5 Working in the sun-----6 Being hungry-----7 Other (Specify)-----8	
203	Can you tell me the main symptoms of Malaria? DO NOT PROMPT (circle all possible answers)	Fever-----1 Feeling cold-----2 Headache-----3 Vomiting-----4 Diarrhea-----5 Weakness-----6 Loss of appetite-----7 Body pain/joint pain-----8 Do not know-----9	
204	Which age group is most affected by Malaria? DO NOT PROMPT (circle all possible answers)	Adults-----1 Children under 5-----2 Elderly-----3 Pregnant Women-----4 Any person-----5 Other (Specify)-----6	
205	What are the ways you prevent yourself from getting malaria?	Sleeping under ITNs-----1 Avoiding mosquitoes bite-----2 Prophylaxis-----3 Spraying chemical-----4 Avoiding getting cold-----5 Keep the surrounding clean-----6 Use repellents-----7 Do not know-----8	
206	Have you seen or heard any education messages pertaining to malaria from any source	Yes-----1 No-----2	

207	If yes where did you see or hear these education messages from? (Multiple responses possible)	Radio-----1 TV-----2 News paper/magazine-----3 Posters/notices-----4 Friends-----5 Parents-----6 Health workers-----7 Government officials-----8 Church/mosque-----9 School-----10 Other (specify)-----11	
208	What type of messages heard about malaria? (Multiple responses possible, probe to see if there are others)	1-----Use a bed net 2-----Take tablets 3-----Use insecticide sprays 4-----Close doors and windows at night 5-----Not plaster wall of sprayed house 6-----Keep house and surrounding clean 7-----Other (specify)	

Part 3: Mosquitoes Bed Net

s.n o	Questionnaire	CODING CATEGORIES	
301	Does the household has LLINs	Yes-----1 No-----2	
302	If yes How many separate sleeping spaces are there in your household? Include number of sleeping spaces, if more than one.	-----	
303	How many mosquito nets does your household have?	-----	
204	Ask respondents to show the net in the house hold	Show-----1 not show-----2	
305	How many mosquito net hanged over it	-----	
306	How long ago did your household obtain the mosquito net?	-----Month -----year and -----month	
30	Where did you obtain the net?		

7		1-----Government Clinic/Hospital 2-----Neighborhood 3-----Health Extension Workers 4-----Retail Shop 5-----Pharmacy 6-----Other (specify)_____	
30 8	How did you obtain your nets?	Paid-----1 Free-----2	
30 9	How many people sleep under this mosquito net last night?	_____	
31 0	If no, Why did no-one sleep under this mosquito net last night?	☐ No malaria ☐ No Insects ☐ No Space for Net ☐ Irritation ☐ Suffocation ☐ Other (specify)	
11 1	Last night pregnant women slept under mosquito nets indoor and outdoor?	_____	
31 2	Last night children under 5years of age slept under mosquito nets indoor and outdoor	_____	
31 3	When did go to sleeping place under five children	_____	
31 4	When did go to sleeping place of pregnant mother	_____	
31 5	What are the advantages of sleeping under a net? DO NOT PROMPT (circle all possible answers)	Do not have any advantage.....1 Do not get malaria.....2 Do not get bother insects.....3 Sleep better.....4 I do not know.....5	
31 6	What are the disadvantages of sleeping Under a net? DO NOT PROMPT (circle all possible answers)	It is too hot.....1 It is difficult to get up in the night.....2 It takes time to tuck the net each night.....3 There is no enough air.....4 No disadvantage.....5 Skin irritation.....6 Other (Specify).....7	

317	Can someone have malarial attack while sleeping under a net?	Yes.....1 No.....2 I don't know.....3	
318	If yes how common are such episodes?	Less than the non user-----1 Equal to the non user-----2. More than the non user-----3 I don't know-----4	
319	How often do you wash your net(s)? DO NOT READ THE RESPONSE OPTIONS	When it gets dirty-----1 1 time a year-----2 2 – 3 times a year-----3 4 – 5 times a year-----4 6 or more times a year-----5 No wash at all-----6	
320	Do you think you live in a high altitude area?	Yes-----1 No-----2 Don't know-----3	

Part 4: perceived risk

401	What time of day are you most likely to get malaria?	Morning1 Afternoon.....2 Evening3 Sleeping4 Don't know5	
401	How likely do you think that you will get malaria?	Extremely unlikely1 Unlikely2 Neutral3 Likely.....4 Extremely likely.....5	
402	What do you think the risk of getting malaria is in your town?	Extremely unlikely1 Unlikely2 Neutral3 Likely.....4 Extremely likely.....5	
403	How long have you lived in your current house?	Less than one year More than one year, less than two years More than two years, less than five years Between 5- 10 years More than ten years	Stop here if have live

			d mor e than two year s in hou se
40 4	If lived in house less than two years, where were you living before?	_____ city _____ kebele _____ woreda	
40 5	Do you feel like you were more likely or less likely to get malaria at your old house?	Yes-----1 No-----2	
40 6	For Either Answer, Why?		

በአማራ ብሔራዊ ክልላዊ መንግስት፣ የህብ /ጤና /አደ/መከ/መቆ/ ዋና የስራ ሂደት

አማርኛ ቃለ-መጠይቅ

ሠላም! እንደ ምን አለ? እኔ----- እባላለሁ፡፡ እኔ የምሰራው በአማራ ብሔራዊ ክልላዊ መንግስት ጤና ቢሮ የወባ በሽታ ቅኝት፣ መከላከል እና መቆጣጠር ነው፡፡ ጥናቱን የሚያካሂዱት የአማራ ብሔራዊ ክልላዊ መንግስት የወባ ስርጭት ክትትልና ቁጥጥር ባለሙያዎች እና አዲስ አበባ ዩኒቨርሲቲ ነው፡፡ ከዚህ ጥናት የሚገኘው ውጤት የአልጋ አጎበር መጠቀም ለወባ መከላከል ያለውን ከፍተኛ አስተዋጾ/ጠቀሜታ ለማወቅ ያስችላል፡፡

እኔ እርስዎን ለጥናቱ ጠቃሚ መረጃዎችን እንደሚሰጡኝ በማመን ለዚህ ጥናት ተሳታፊ እንዲሆኑ መርጨዎታለሁ፡፡ ለዚህ ደግሞ ፈቃደኛ ከሆኑ የተወሰኑ ጥያቄዎችን እጠይቃለሁ፡፡ እርስዎ የሚሰጡን ማንኛውም መረጃ ምስጢራዊነቱ ሙሉ በሙሉ የተጠበቀ ነው፡፡

ዓላማው ገብቶኝ በጥናቱ ለመሳተፍ፡

☐ ፍቃደኛ ከሆኑ ቃለ መጠይቁን ይቀጥሉ

☐ ፍቃደኛ ካልሆኑ መጠይቁን ያቁሙ፡፡

መረጃውን የሰበሰበው ሰው ስም----- ፊርማ-----

የመረጃውን ጥራት የተቆጣጠረው ሰው ስም----- ፊርማ-----

የቤቱን ከፍታ (የጅፒኤስ መሳሪያ) ይመዝግቡ-----

ክፍል 1. አጠቃላይ መረጃዎች

	የቃለ መጠይቁ መለያ	መረጃዉ የተሰበሰበበት ቀን-----	
ተ. ቁ.	ጥያቄዎች	አማራጭ መልሶች	
10 1	የአባወራው ጾታ	ወንድ-----1 ሴት-----2	
10 2	የአባወራው ዕድሜ	-----አመት	
10 3	የቤተሰብ ብዛት	-----	
10 4	ሀይማኖት	ኦርቶዶክስ-----1 ፕሮቴስታንት-----3 እስላም-----2 ሌላ፣ይጠቀስ-----4	
10 5	የትምህርት ሁኔታ	ማንበብና መጻፍ የማይችል-----1 የመጀመሪያ ደረጃ ትምህርት ያጠናቀቀ (1-8)-----2 ሁለተኛ ደረጃና ከዚያ በላይ(9-12)-----3 ከሁለተኛ ደረጃ በላይ-----4	
10 6	መኖሪያ ቦታ	ከተማ-----1 ገጠር-----2	
10 7	የስራ ሁኔታ	የመንግሥት ሠራተኛ-----1 የግል ድርጅት ሠራተኛ-----2 የቀን ሠራተኛ-----3 አርሶ አደር -----4 ነጋዴ-----5 ተማሪ-----6 ሌላ፣ ይጠቀስ-----7	
10 8	የጋብቻ ሁኔታ	እስካሁን ያላገባ/ች-----1 ያገባ/ች -----2 ከሚስቱ የተፋታ/ ከባሏ የተፋታች-----3 ሚስቱ የሞተችበት/ባሏ የሞተባት -----4	
10 9	አማካኝ የወር ገቢ	-----	
11 0	በቤትዎ የሚሰራ ሬዲዮ አለወት?	አዎ-----1 የለም-----2	
11 1	በቤትዎ የሚሰራ ቴሌቪዥን አለወት?	አዎ-----1 የለም-----2	

ክፍል ሁለት፡ ወባ

ተ.ቁ	ጥያቄዎች	አማራጭ መልሶች	
201	ሰለወባ በሽታ ሰምተዎ ያውቃሉ?	አዎ-----1 የለም-----2	
202	ተ.ቁ 201 መልስ አዎ ከሆነ ወባ መንስኤው ምንድን ነው? (ከአንድ በላይ መልስ መስጠት ይቻላል)፡፡	የወባ ትንኝ ንክሻ/ፕላስቶዲየም በተባለ የወባ ተህዋሲያን ዝሪያ-----1 ለጋ ሽንኩራ አገዳ በመብላት-----2 የበቆሎ እሽት በመብላት-----3 የበቆሎ አበባ በማሸተት-----4 በርሃብ-----5 የተበላሽ ምግብ በመመገብ-----6 ቆሻሻ ውሃ በመጠጣት-----7 በዝናብ በመበስበስ-----8 በቅዝቃዜ-----9 በጠንቋይ-----10 ሌላ ካለ ይግለፁ-----11 አላውቅም-----12	
203	ወባ የሚተላለፈው እንዴት ነው? (ከአንድ በላይ መልስ መስጠት ይቻላል፡፡)	በወባ ትንኝ ንክሻ ከበሽተኛው ወደ ጤነኛ ሰው----- ---1 ለጋ ሽንኩራ አገዳ በመብላት----- -----2 የበቆሎ እሽት በመብላት----- -----3 የበቆሎ አበባ በማሸተት----- -----4 በርሃብ----- -----5 ሌላ----- -----6 አላውቅም----- -----7	
204	የወባ ዋና ዋና ስሜቶችና ምልክቶችን ጥቀስልኝ?(ከአንድ በላይ መልስ መስጠት ይቻላል፡፡)	ትኩሳት-----1 ብርድ-ብርድ-----2 ራስምታት-----3 ማቅለሽለሽና ማስታወክ-----4 ተቅማጥ-----5 የምግብ ፍላጎት ማጣት-----6 የመገጣጠሚያ ህመም-----7 ዓይን መገርጣት-----8 ማላብ-----9 የሰውነት መድከም-----10 ለመብላትና ለመጠጣት አለመቻል-----11 ሌላ- ካለ ይግለፁ-----12	

		አላውቅም-----13	
205	ራሰህን ከወባ ለመከላከል ምን ምን ዘዴዎችን ትጠቀማለህ? (ከአንድ በላይ መልስ ይቻላል::)	አጎበር ውስጥ መተኛት-----1 በትንኝ አለመነደፍ-----2 መከላከያ መውሰድ-----3 ርጭት-----4 ብርድ መከላከል-----5 የአካባቢ ንፅህና-----6 መከላከያ ቅባት-----7 አላውቅም-----8	
206	የወባ በሽታ መከላከል የሚቻለው እንዴት ነው? (ከአንድ በላይ መልስ መስጠት ይቻላል::)	የአልጋ አጎበር ስር በመተኛት-----1 የወባ ቅባት በመጠቀም-----2 የመከላከያ መድሃኒት በመውሰድ-----3 በርጭት-----4 የወባ ኮይል በመጠቀም-----5 የአካባቢ ንጽህና በመጠበቅ-----6 ቅጠል በማቃጠል-----7 ቆሻሻ ምግብ ባለመመገብ-----8 የወባ መከላከያ መጋረጃ በመጠቀም-----9 ዝንጅብል በመብላት-----10 አልኮል በመጠጣት-----11 በዝናብ አለመበስበስ-----12 አላውቅም-----13	
207	ስለ ወባ በሽታ መልእክት (ትምህርት) ሰምተው ያውቃሉ?	አዎ-----1 የለም-----2	
208	አዎ ካሉ መልእክቱን ከየት አገኙት? (ከአንድ በላይ መልስ መስጠት ይቻላል::)	☐ መንግስት ሆስፒታል/ጤና ጣቢያ ☐ የጤና ልማት ሠራዊት ☐ የጤና ኤክስቴንሽን ሠራተኛ ☐ ቀበሌ ጤና ተጠሪ ☐ ንደኛ/ቤተሰብ ☐ የሥራ ቦታ ☐ ሌላ ካለ ይገለፁ----- ☐ አላውቅም	

209	ያዳመጡት ወይም ያገኙት የወባ መልእክት ምን ዓይነት ነው? (ከአንድ በላይ መልስ ይቻላል)	☐ አጎበር ውስጥ መተኛት ☐ ትኩሳትን ማከም ☐ ትኩሳት በ24 ሰዓት ማከም ☐ ርጭት ☐ የቤት ውስጥ ግድግዳ አለመለቅለቅ ☐ የአካባቢ ንጽህና ☐ አላውቅም	
210	ያዳመጡት ወይም ያገኙት የወባ መልእክት ከየት አገኙት? (ከአንድ በላይ መልስ ይቻላል)	ሬዲዮ-----1 ቴሌቪዥን-----2 ጋዜጣ-----3 ማስታወቂያ-----4 ጓደኛ-----5 ቤተሰብ-----6 ጤና ባለሙያ-----7 መንግስት አካላት-----8 ቤ/ክርስቲያን-----9 መስጅድ-----10 ት/ቤት-----11 ሌላ (ይገለፅ)-----	

ክፍል 3: የአልጋ አጎበር

ተ. ቁ	ጥያቄዎች	አማራጭ መልሶች	
301	በቤትዎ የወባ ትንኝ መከላከያ ዛንዚራ/የአልጋ አጎበር አለዎት?	☐ አዎ ☐ የለም	
302	ተ.ቁ 301 መልስ አዎ ካሉ ስንት አለዎት?	-----	
303	ተ.ቁ 301 መልስ አዎ ካሉ በቤትዎ ውስጥ ምን ያህል የመኝታ ቦታዎች አሉ? ሁሉንም የመኝታ ቦታዎች ይጨምሩ::	-----	
304	ቤተሰቡ ስንት የወባ ትንኝ መከላከያ ዛንዚራ/የአልጋ አጎበር አለው?	-----	
305	እባክዎ የአልጋ አጎበርዎን ያሳዩኝ?	☐ ታይቷል ☐ አልታየም	
306	የተሰቀሉ የአልጋ አጎበር ብዛት ስንት ናቸው?	-----	
307	ቤተሰቡ የወባ ትንኝ መከላከያ አጎበር ካገኙ ምን ያህል ጊዜ ሆኗል?	ከ ----- ወር በፊት የታደለ ☐ ከሦስት ዓመት በላይ	
308	የትንኝ መከላከያ አጎበሩን ያገኙት ከየት ነው?	☐ ጤና ጣቢያ/ሆስፒታል ☐ የመንግሥት ጤና ኤክስቴንሽን ሠራተኞች ☐ መንግሥታዊ ያልሆኑ ☐ ጎረቤት የጤና ኮሚቴ ☐ ቀበሌ ጤና ተጠሪ ☐ ፋርማሲ ☐ ሱቅ ☐ የሥራ ቦታ ☐ ሌላ ካለ - ይገለፅ	
309	አጎበሩን እንዴት አገኙት?	በነፃ-----1 በክፍያ-----2	
310	ባለፈው ሌሊት በወባ ትንኝ መከላከያ አጎበር ስር ያደሩ ሰዎች ከቤት ውስጥ ና ውጭ ነበሩ?	☐ አዎ ☐ የለም	
311	ተ.ቁ 310 የለም ካሉ ለምን?	☐ ወባ ስለሌለ ☐ የሚረብሽ ድምፅ ወይም ነፍሳት ስለሌለ ☐ በቂ ቦታ ስለሌለ ☐ የማቃጠል/የመለብለብ ባህሪ ስላለው ☐ ስለሚያፍን ☐ አጎበር ቅረፁ ለማንጠልጠል ስለማይመች ☐ አጎበር ከቤት ስለሌለ ☐ ሌላ ካለ - ይገለፅ	

312	ባለፈው ሌሊት በወባ ትንኝ መከላከያ አጎበር ስር ያደሩ ነፈሰጡር እናቶች ከቤት ውስጥ ና ውጭ ነበሩ?	-----	
313	ባለፈው ሌሊት በወባ ትንኝ መከላከያ አጎበር ስር ያደሩ እድሜያቸው ከ 5 በታች የሆኑ ህፃናት ከቤት ውስጥ ና ውጭ ነበሩ?	-----	
314	በስንት ሰአት ነው ነፈሰጡር እናቶች ወደ መኝታ ቦታቸው የሚሂዱት?	-----	
315	በስንት ሰአት ነው እድሜያቸው ከ 5 ዓመት በታች የሆኑ ህፃናት ወደ መኝታ ቦታቸው የሚሂዱት?	-----	
316	በአልጋ አጎበር ወሰጥ መተኛት ጥቅሙ ምንድነው?	ምንም-----1 ወባ መከላከል-----2 ነፍሳትን መከላከል-----3 ጥሩ እንቅልፍ-----4 አላውቅም-----5	
317	በአልጋ አጎበር ወሰጥ መተኛት ጉዳቱ ምንድነው?	ይሞቃል----- 1 መዘርጋቱ ይከብዳል-----2 ያፍናል----- 3 ጉዳት የለውም-----4 የቆዳ መቆጣት----- 5 ሌላ (ይገለፅ-----	
318	አጎበር ውስጥ እየተኙ ወባ የታመማሉ ብለው ያምናሉ?	አዎ-----1 አይ----- 2 አላውቅም-----3	
319	አዎ ካሉ ምን ያህል ይሆናል	ከማይለብሱት ያነሰ-----1 ከማይለብሱት እኩል-----2 ከማይለብሱት የበለጠ-----3 አላውቅም-----4	
320	የሚኖሩበት አካባቢ ከፍታማ ነው ብለው ያስባሉ	አዎ-----1 አይደለም-----2 አላውቅም-----3	

ክፍል 4: ለወባ በሽታ የሚያስጉ የሚመስሉ ነገሮች (risk factor)

40 1	ወባ በአብዛኛው የሚይዘን በምን ስዓት ነው	ጥዋት/ነጋት1 ከስዓት በኋላ.....2 ምሽት3 ስንተኛ4 አላውቅም5	
40 2	ወባ በቀበሌዎ ምን አይነት ተፅዕኖ አምጥተዋል በለው ያስባሉ	በጣም ትንሽ1 ትንሽ2 አላውቅም3 መካከለኛ ችግር.....4 በጣም ችግር5	
40 3	ለምን ያህል ጊዜ ነው ከዚህ ቤት የኖሩት?	ከአንድ አመት ያነሰ----- -----1 ከአንድ አመት በላይ, ከሁለት አመት በታች-----2 ከሁለት አመት በላይ, ከአምስት አመት በታች---3 ከአምስት እስከ አስር አመት----- -----4 ከአስር አመት በላይ----- -----5	የሚቀጥሉት ጥያቄ ከሁለት አመት በላይ ከሆነ አትጠይቁ
40 4	የኖሩት ከሁለት አመት በታች ከሆነ ከዚያ በፊት የትኑው የኖሩት?	_____ከተማ _____ቀበሌ _____ወረዳ	
40 5	የአሁኑ መኖሪያ ቤትዎ ወባማ ነው ብለው ያስባሉ ከድሮ ቤትዎ	አዎ-----1 የለም-----2	
40 6	አዎ ፤ የለም ካሉ ለምን?		

የማጠቃለያ ጥያቄ ጉብኝት ያካሂዱበት ቤት ውስጥ

ነፍሰጡረ እናት	ዕድሜ-----		
	ሥራ -----		
ከ አምስት አመት በታች የሆኑ ህፃናት	ብዛት-----	ከሁለት በላይ ከሆኑ የእያንዳንዱ ዕድሜ ይግለጹ	
	ዕድሜ-----	ዕድሜ-----	ዕድሜ-----
	ባለፈው ሌሊት በአልጋ አጎበር ስር ያደሩ ህፃናት ብዛት ----- --		

Interviewer agreement

‘I certify that I have filled this questionnaire in accordance with the training I was given and Instructions stated in it. I have confirmed that the information in it is correct.’

Signed _____ Date ____/____/____

Curriculum Vitae (CV)

1. PERSONAL INFORMATION

Name-----Getachew Abebe Solleny

Age-----27

Sex-----Male

Marital Status-----Single

Nationality-----Ethiopian

Health-----Excellent

Address-----Bahir Dar/Addis Ababa/Benishangul Gumuz

Mobile-----0910438939/0942863853

Email-----abebegetachew338@gmail.com

2. EDUCATIONAL BACKGROUND

Description	Year Attended	Field of Study	Type of Certificate
Addis Ababa University	2006-2007 E.C.	Field Epidemiology	MPH in Field Epidemiology
Jimma University	1998-2000E.C.	Medical Laboratory Technology	BSC
Bullen Senior Secondary & Preparatory(9-12)	1994-1997E.C	Secondary school Attended	EGSEC/EHEE
Junior school(7-8)	1992-1993EC	Junior secondary school attended	PEEC
Primary school (1-6)	1986-1989EC	Primary Education	Class promotion

3. Language	Good	V.good	Excellent
English		✓	
Amharic			✓
Shinashigna			✓
Oromigna			✓
Gumuzigna		✓	

4. WORK EXPERIENCE

From July, 2000 E.C up to Oct. 2006 E.C worked as Senior Medical Laboratory Technologist at Pawe General Hospital (about 6 years).

Trainings taken and given so far

Theoretical and practical comprehensive laboratory training in TB, HIV and Malaria, February 12-17, 2008 by JHU/TSEHAI

Basic Computer skill diploma on introduction, Ms-Windows, MS-Word, MS-Excel, MS-Access and Internet explorer, March 1-May 30, 2009

Specimen management and referral system training of trainers (TOT), November 28-December 3, 2011

Teaching experience in microbiology and parasitology in Pawe Health Science College in 2012

Theoretical and practical training in strengthening laboratory management towards accreditation (SLMTA 1 OF 3), Aug. 29-September 1, 2012 by JHU/TSEHAI

Training of trainers on malaria laboratory diagnosis and quality assessment by ICAP and PMI/USAID, September 18-22, 2012

Theoretical and practical training in strengthening laboratory management towards accreditation (SLMTA 2 OF 3), February 2-5, 2013 by JHU/TSEHAI

Training given on malaria as per the TOT taken

Training given on sample referral system

Training given on Provider initiated counseling and test (PICT) for Hospital staffs

Ebola surveillance at Kurmuk land port Benishangul Gumuz, August-September, 2014

Outbreak investigation and rapid response team training, January 3-4 AmRHB, Bahir Dar (Homeland)

Outbreak investigation and rapid response team training, February 17-18, North Shewa (Shewa Robit)

5. REFERENCES

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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 suitably acknowledged.

Name: Getachew Abebe

Signature: _____

Place: Addis Ababa, Ethiopia

Date of Submission: 6/12/2015

The thesis has been submitted for examination with my approval as a university advisor.

Name of advisors: Dr. Jemal Haeider

Mr. Teklehymanot Gebrehiwot

Signature: _____

Date: _____