Addis Ababa University, College of Health Sciences

School of Public Health

Ethiopia Field Epidemiology Training Program (EFETP) Compiled Body of Works in Field Epidemiology

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Mentors: - Prof. Hagos Ashenafi

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June, 2019

Addis Ababa, Ethiopia

Addis Ababa University, College of Health Sciences
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Ethiopia Field Epidemiology Training Program (EFETP)

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

Mentors: Dr. Alemayehu Bekele
Professor Hagos Ashenafi

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Addis Ababa University Approval by Examining Board

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Examiner

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List of acronym and abbreviation

0C	Degree Celsius
AFB	Acid Fast Bacillus
AFI	Acute Febrile Illness
AFP	Acute Flaccid Paralysis
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
ART	Antiretroviral Treatment
Asl	Above sea level
AURI	Acute Upper Respiratory Infection
AWD	Acute Watery Diarrhea
CDC	Center for Disease Prevention and Control
CL	Confidence Interval
DPPC	Disaster Prevention and Preparedness Coordination Office
EFTP	Ethiopian Field Epidemiology Program
EFY	Ethiopian Fiscal Year
EPHI	Ethiopian Public Health Institute
EPR	Epidemic Preparedness and Response Plan
EPTB	Extra Pulmonary Tuberculosis
FMOH	Federal Minister of Health
GAM	General Acute Malnutrition
GP	General Physician
HDF	Home Delivery Free
HEW	Health Extension Worker
HH	Household

HIV	Human Immune Virus
HMIS	Health Management Information System
IRS	Indoor Residual Spray
ISST	Infection of the Skin and Subcutaneous Tissue
ITN	Insecticide Bed Net
KM	Kilo Meter
LLIN	Long Lasting Insecticide Net
Masl	Meter Above Sea level
MAM	Moderate Malnutrition
MB	Multi-bacillary
MDR	Multi-Drug Resistant
MOTT	Mycobacteria other than tuberculosis
MUAC	Mid-Upper Arm Circumference
NNT	Neonatal Tetanus
OPD	Outpatient Department
OR	Odds Ratio
OTP	Outpatient Therapeutic Feeding Program
PCECV	Purified chick embryo cell vaccine
PEP	Post exposure prophylaxis
PF	Plasmodium Falciparum
PHEM	Public Health Emergency Management
PLW	Pregnant and Lactating Women
PTB	Pulmonary Tuberculosis
PTB-	Smear Negative Pulmonary Tuberculosis
PTB+	Smear Positive Pulmonary Tuberculosis
PUD	Peptic Ulcer Disease
PV	Plasmodium Vivax
RDT	Rapid Diagnostic Test
RHB	Regional Health Bureau

RRT	Rapid Response Team
RUSF	Ready to Use Supplementary Food
SAM	Sever Acute Malnutrition
SC	Stabilizing Center
SGZ	South Gondar Zone
SPH	School of public health
SPSS	Statistical Package for the Social Sciences
TB	Tuberculosis
TSF	Target Supplementary Feeding Program
TT	Tetanus Toxoid
VCT	Voluntary Counseling Test
WASH	Water Hygiene and Sanitation
WHO	World Health Organization

Preface

The Ethiopia Field Epidemiology Training Program (EFETP) is 8 years competency based master's program adapted from the United States Centers for Disease Control and Prevention (CDC) Epidemic Intelligence Service (EIS) Program. The School of Public Health/Addis Ababa University, the Federal Ministry of Health of Ethiopia/Ethiopian Public Health Institute (EPHI), and CDC Ethiopia are running the Program jointly former your years. After all the program extended their coverage to other 8 university to increase field epidemiologist for the country. The field work comprises of 75% of the Program which is called residency; learning by working in public health emergency and other health related priority issues. The Program is designed to assist the Ministry of Health in building or strengthening health systems by recruiting promising health workers and building their competencies through on-the-job mentorship and training.

Ethiopia adopted the Field Epidemiology Training Program to help improve leadership within Public Health Emergency Management. The Ethiopian Field Epidemiology Training Program (EFETP) provides residents a Master of Public Health Degree in Field Epidemiology after they complete two years of supervised work in applied or Field Epidemiology.

This compiled body of works has 10 main sections or chapters accomplished during the residency time of the Program. The first 7 sections are expected outputs during the residency time; comprising of outbreak investigation, surveillance data analysis, evaluation of the surveillance system, health profile description report, writing of finalized scientific manuscript for peer review journals, abstracts submitted to scientific conferences, summary of disaster situation visited/risk assessment and other additional works.

The overall outputs of the two years Field Residency Program will be presented in a summarized way; in the outbreak investigations chapter or section, one unmatched case control outbreak investigation of Pertussis in Sayient Woreda, North west part of Ethiopia, January 2019 was documented.

Health profile description report was done in Fogera district in March 2018 and Surveillance system evaluation was also done in Fogera and Dera Districts, Amhara Region, in March 2018. One finalized scientific manuscript was prepared for peer reviewed journal. A report on need assessment (risk assessment) on prioritized Districts of Amhara Regional State was also conducted with other

team members from food security center, WHO, UNICEF, ADDPS and Other Regional Bureau. Under other additional works/outputs section (last chapter) activities like provision of training for public health emergency management (PHEM) officers working at different levels (regional to health facility level) in the Amhara Regional Health Bureau were also undertaken.

Other activities we developed of Rabies and Anthrax case based and line list and weekly Bulletin, update, summary report of Pertussis outbreak, prepared and present Anthrax outbreak investigation report on Workshops.

Chapter 1 : Outbreak investigation

Pertussis outbreak investigation in Sayient woreda south Wollo Zone Northwestern Ethiopia January/2019

Abstract

Background: Pertussis is a highly contagious respiratory illness caused by *Bordetella pertussis*. Pertussis was one of the most common infectious causes of morbidity and death with an average yearly rate of 150 cases per 100,000 populations. Pertussis is vaccine preventable bacterial infections that affects all susceptible individuals.

Objective: - Investigation was done to verify the existence of an outbreak and to identify factors contributed for the occurrence of pertussis outbreak in Sayient woreda, South Wollo zone North Western Ethiopia, 2019.

Methods: Unmatched community based case control study was conducted with one to two ratio. The study participants were selected by simple random method using the line list. We used structured questionnaire to collect data from cases and controls. The data clearing and filling was done on Epi info 7. The collected data was analyzed by SPSS and presented in table and graph.

Results: A total of 535 cases were identified with an overall attack rate of 3.1 per 1000 population. The median age of 10, ranged from 3 months to 28 years. The more affected groups were females. Lack of awareness on mode of transmission AOR (adjusted odds ratio): 1.614, (95% CI 1.030–9.53) was associated with developing pertussis. Have-not knowledge for prevention and control of pertussis AOR: 4.644 (95% CL 2.194-9.830) which means risk factor for the expansion of pertussis infection.

Conclusions: The pertussis outbreak was occurred in Guameda clusters of Sayient district. The factor that significantly contributes for the occurrence of pertussis outbreak was unknown of mode of transmission and also the presence of affected persons in the house was significantly for the occurrence of pertussis outbreak. Have-not knowledge of prevention and control measures is contribute a risk factor for the expansion of pertussis in Sayient woreda. Strengthen of routine immunization services, surveillance and early treatment of infected patients to control the expansion of pertussis.

Keywords: Pertussis, Outbreak, Sayient, Northwestern Ethiopia, 2019

1.1. Introduction

1.1.1. Background

Pertussis or whooping cough is a highly infectious respiratory illness caused by *Bordetella pertussis* or *Bordetella Para pertussis(1).*

Pertussis is an acute and contagious infection of the respiratory tract caused by Bordetella pertussis or *Bordetella Para pertussis*. Bordetella pertussis is a fastidious gram-negative, toxin-producing bacillus that causes damage to the respiratory tract. It infects only humans and is the most important Bordetella species causing human disease. The disease is transmitted from an infected person to susceptible persons primarily through aerosolized droplets of respiratory secretions. The bacteria can survive for several days on dry surfaces; so it is also possible to get the bacteria by touching surfaces and contaminated nose and mouth. The patient of pertussis starts to be infectious starting from the initiation of symptoms up to 3 weeks of the paroxysmal phase of illness(2).

Pertussis has a worldwide distribution in many countries throughout the world with cyclical and persisted episodes of outbreaks every 3 to 5 years despite widespread immunization. Globally millions of cases and tens of thousands of deaths occur annually even pertussis surveillance is difficult hence disease burden goes largely unrecognized. Pertussis is highly communicable disease with attack rates of 80% to 100% among unimmunized household contacts and 20% within households in well-immunized populations. Neither natural disease nor Vaccination provides complete or lifelong immunity; wanes after 8-15 years.

It is essentially a disease of infancy and early childhood, but at least half of the deaths resulting from pertussis infection occur in the first year of life. Although other agents like *B. parapertussis* and Adenovirus are associated with the etiology of whooping cough, at present the most important cause is *B. pertussis (2).* Infants and young children have remained most susceptible to pertussis-related morbidity and mortality. In recent years infants younger than 6 months who are not old enough to have received three doses of the diphtheria–tetanus–pertussis vaccine and under vaccinated preschool children have been at higher risk for pertussis-associated complications(3). WHO estimated that in 2008, about 16 million cases of pertussis occurred worldwide, 95% of which were in developing countries, and that some 195,000 patients died from this disease (4).

Although thought of as a disease of childhood, pertussis can affect people of all ages and is increasingly being identified as a cause of prolonged coughing illness in adolescents and adults. In

unimmunized populations, pertussis incidence peaks during the preschool years, and well over half of children have the disease before reaching adulthood (5). Recent trends show an increasing incidence of pertussis among adolescents and adults. Severe morbidity and high mortality rates are restricted almost entirely to infants.

Children and adults who have not been vaccinated, infants who have not yet completed the immunization series, and adults and adolescents whose immunity to the disease has diminished are at increased risk for developing whooping cough and also for spreading the disease(6).

In highly immunized populations with at least 95% coverage, the peak incidence is among infants who have not completed the three-dose primary immunization series. Before the institution of widespread immunization programs in the developed world, pertussis was one of the most common infectious causes of morbidity and death with an average yearly rate of 150 cases per 100,000 populations. With universal childhood immunization, the number of reported cases fell by >95%, and mortality rates decreased even more dramatically (7).

Outbreak of pertussis in Sayient woreda with an overall attack rate of 1.3 per 1000 inhabitants, which is less than pertussis outbreak in Papua New Guinea (8).

Complications frequently occur during the paroxysmal stage and are more common among infants than older or adults. Complications can include bacterial infection (Pneumonia), neurological complications, hernia, otitis media, weight loss, dehydrations and other related factor in infected person (4).

1.1.2 Rational of field visit/supportive supervision

Sayient woreda has been affected by pertussis outbreak with 535 cases since Oct 15, 2011 E.C. Although this disease was reported on Dec16/2011E.C by South Wollo zone health department. On Dec 24/2011 the regional investigator teams were deployed for further investigation and supported of the intervention to Sayient woreda. Sayient woreda is map/selected as vulnerable woreda after confirmed of pertussis in Mekedela which is border to Sayient. The vaccination coverage of Sayient woreda 2010 was 123 % but pertussis occurred as an outbreak in Sayient woreda South Wollo Zone. This study is committed to build prevention and control activities of pertussis after all.

2.2. Objectives

2.2.1. Genera objective

- To investigate the pertussis outbreaks and determine risk factors of pertussis in Sayient woreda South Wollo zone Northwestern Ethiopia, 2019

2.2.2. Specific objective

- To verify the existence pertussis outbreak
- To characterize the extent of the outbreak in terms of place, person and time
- To identify potential risk factors of the disease transmission

2.3. Methods and Materials

2.3.1. Study area

Sayient woreda is Sayient district has 1urban and 35 rural villages/ kebeles. According Ethiopian fiscal year national population and housing census, the total population of the district was estimated to be 171927 in 2019. The district has 32 health posts, seven health centers and 1 hospital. Investigation was conducted in Ambasember Kebele of Sayient woreda. Sayient is one of the districts of South Wollo zone of Amhara region. Sayient is bordered by Mehal Sayient in the South, Legambo in Southeast, Mekedela in North and East and Simada in West (Fig.1.1).

2.3.2. Study Design

Unmatched case control study was conducted in Sayient woreda South Wollo zone Northwestern Ethiopia. Fifty cases with one hundred controls that had no previous history of whipping cough and post-tissue vomiting. We used WHO case definition which used to actively search for the cases in the communities and house to house level.

2.3.3. Target population

All populations resident in Sayient woreda

2.3.4. Study population

All population found in affected kebeles of Sayient woreda.

2.3.5 Study Unit

Populations who had whooping cough and neighbors hoods without having cough and pot-tissue vomiting.

2.3.6. Operational definitions

Case definitions of Amhara Regional pertussis guideline

Suspect case of pertussis: In the absence of other apparent causes, a person with cough lasting at least 2 weeks with at least one of the following symptoms:- Paroxysms of coughing/ Inspiratory whoop/Post-tissue vomiting/ Apnea (with or without cyanosis) (for infants under one years) /a case diagnosed as pertussis by a physician.

Confirmed: A case of acute cough illness of any duration with a positive culture for *B. pertussis*, or a case that meets the clinical case definition and is confirmed by PCR, or a case that meets the clinical case definition and is epidemiologically linked directly to a lab-confirmed case.

Epidemic of pertussis: is a situation when two or more cases clustered in time.

Ambasember is the one from thirty six kebeles which found in Sayient woreda when pertussis outbreak were occurred from December 16/2018 up to January 29/2019.

2.3.7. Sample size determination and sampling

Sample size of pertussis outbreak was calculated by Epi Info 7 with AOR= 5.859 (10). There were 139 cases line list in the cluster before started investigation. 50 suspected cases and 100 controls were selected based on simple random methods and conventionally by using line lists.

2.3.8. Data collection and procedure

Cases and controls interviewed using structured questionnaire to collect demographic, Document reviewing of immunization status, Staff discussion and house to house visits were also done to search active cases. All information hypothesized as risk factors for the pertussis outbreak were collected. We verified vaccination status retrospectively by observing the vaccination cards, registration and on history of vaccination. Parents or guardians of the study participant were interviewed for those aged less than 7 years old.

2.3.9. Community-based surveillance

On October 25/2018 in Mekedela which border of Sayient, active surveillance was implemented in the community to identify pertussis cases who have whooping cough with post tissues vomiting illness. On right time, nasopharyngeal swabs were performed by the physicians using swab. Sample was collected and transport to the University of Gondar Hospital laboratory to identify *B. pertussis.*

2.3.10. Laboratory analysis

Nineteen samples were collected from Mekedela and evaluated at University of Gondar laboratory. Among those thirteen were culture and 100% of the culture grows bacteria. PCR was used for laboratory confirmation of pathogens. PCR testing targeted genes coding for an insertion element (IS481) and for pertussis toxin promoter (9).

Furthermore, human specimens were inoculated on Regan-Lowe (Charcoal horse blood) agar plates containing cephalexin. The plates were incubated at 37°C and checked daily for up to 7 days for the presence of typical colonies (9).

2.3.11. Statistical methods

Analysis was performed by SPSS version 22 statistical software package. Frequency and percentage were calculated for the study variables. P value and two tail Fisher's exact test was used to calculate and determine significance. In all statistical tests, the differences were considered to be statistically significant if P value less than 0.05

Dependent variable

- Pertussis case status (respondents' status)

Independent variables include:

- Sociodemographic Characteristics such as:

Age, sex, family size, educational status, occupation, marital status etc.

Variables related to clinical history of diseases such as:-

- Presence of whooping cough, conjunctivitis, edema, ear discharge, pneumonia, hernia etc.

Expected risk factors related variables such as: - vaccination status, number of penta dose received, knowledge of modes of measles transmission, knowledge of prevention of pertussis, contact history with person who have whooping cough, presence of whooping cough in classmate, family and neighbors/relatives etc.

2.3.12. Ethical consideration

A written official letter of cooperation was obtained from Amhara public health institute Public health emergency management directorate to South Wollo zone and Sayient woreda health office and data collection was started after getting permission and provision of a written official letter from the district health office. The purpose and objective of the study for which the data required

were briefly explain the purpose of the study conducted to the each participant of the study prior to interview. The study conducted in align with home case treatment and prevention activities. Verbal informed consent was used in the process of data collecting from the study participants. Confidentiality of responses maintained throughout the process and the study conducted in line with house to house case search and provision of advice on the importance of modern medical treatment for the prevention and control of pertussis outbreak.

2.3.13. Dissemination plan

We will prepared and shared the written documents both hard and soft copies to Sayient district health office, each health centers in the district, South Wollo zone health department and Amhara national regional state. Findings of the investigation will be presented and submitted to Department of Epidemiology at Addis Ababa University.

2.4. Result

2.4.1. History of pertussis in surrounding area

Outbreak of pertussis was started in Mekedela woreda on September 15/2018 with attack rate of 5.8 per 1000 persons. During the time being of outbreak Sayient woreda which is near to Mekedela was mapping as high risk area of pertussis. This cases was confirmed at University of Gondar through cell culture and PCR. From a total of 19 samples 100% of the cases were positive Bordetella pertussis with culture and PCR. Pertussis outbreak occurred from December 16/12/2018 to January 22/1/2019 in Sayient woreda with a total of 535 cases with complications of hernia, edema, otitis media, pneumonia and conjunctivitis were identified. All pertussis cases were reported in Guameda cluster Ambasember (12) Kebele.

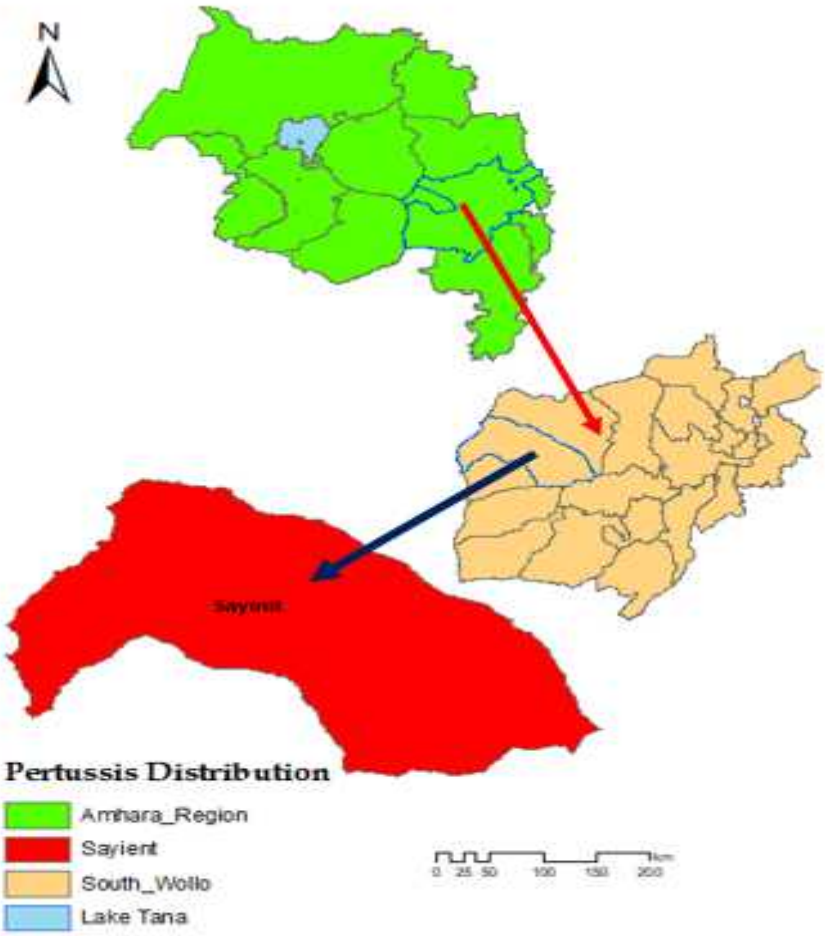

Figure 1.1: Map of pertussis outbreak affected area

Among the total cases 85 (56.6%) of them were females. In case control study, the age of the cases were ranged from 3 months to 28 years with (median age =10, IQR_1=.7 & IQR_3=12). Of the total study participants 19 (38%) of them were 10-14 aged cases and 57(57%) 10-14 aged controls. In the health post there weren't any EPI (Expanded programme on Immunization) registration documents and data. Whereas based on the checklist, among 89(59.3%) vaccinated status of study participants 4 (4.5%), 3 (3.4%), 58(65.2%) and 24 (26.9%) were vaccinated for one dose, two dose, three dose and full dose respectively, while the remaining 26(17.3%) and 35(23.3%) were unvacci nated and unknown respectively (Fig. 1.6). Study participants were respond the number of doses received but there wasn't vaccination card in their home as evidence.

2.4.2. Vaccination coverage

Affected villages/kebeles health posts didn't have vaccination data and refrigerators, as result in these villages/kebeles there was no routine immunization service starting from October 2018. As

the community said, when they got immunization service in this Kebele irregular period came from Guameda health center and Gult gots which is difficult topography have not got immunization access on time. Immunization card was not given for vaccinated children. There was not immunization monitoring charts/growth monitoring in Ambasember health post. This health post had not showed pertussis vaccination coverage of affected kebeles.

2.4.3. Pertussis outbreak situation

Pertussis outbreak was reported as an outbreak since Dec 25/2018 E.C. but the cough was started in Oct 25/2018 as the study participants respond and information's gathered from Wogdi general primary school teachers. As school director said, due to school absenteeism of three students reported the cough on Nov 4/2018 to Health extension worker who work in Ambasember health post. The cough was started on 28 age group male in communities after came back festivals on Oct 1/2018 from Mekedela. 139 number of cases were reported before intervention begins on Dec 27/2018 and a total of 396 cases were trussed by active cases search/house to house/case treatment and campaign. Then after a week the cases were transmitted to Tenta woreda with a total of 109 pertussis cases. The epi curve of pertussis outbreak displayed in the next graph (Fig 1.2)

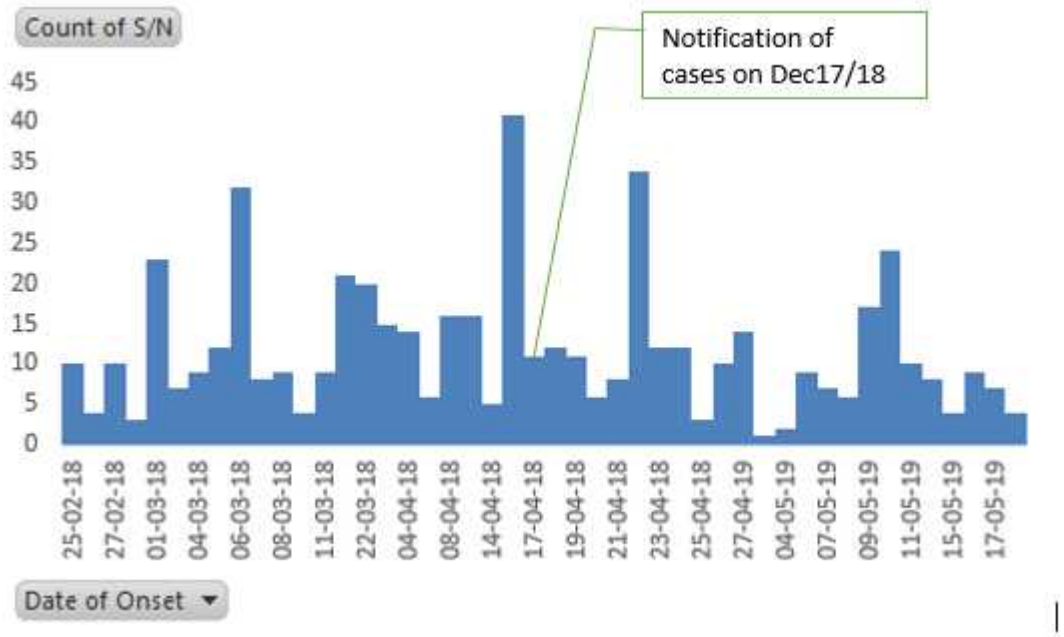

Figure 1.2: Epi curve of pertussis cases by date of onset of cough in Guameda cluster Sayient district South Wollo zoneNorthwestern Ethiopia, from Oct 25/2019 to January 22/2019

2.4.4. Sociodemographic Sayient

Sayient woreda held 171927 total population with 73241 under fifteen age groups. From the 35 rural kebeles 7 of them were hard to reach area. The social behavior of population were closely interactive and had population movement for daily laborer to adjusted woredas and other zones. The residency have mixed farming system behavior.

2.4.5 Age category of study participants

76(50.6 %) of study participants were 10-14 age group and 10(6.7%) greater or equal to fifteen age groups. During our investigation the index case reported with age group of greater than fifteen. The study participants of age category displayed in the below graph (Fig.3).

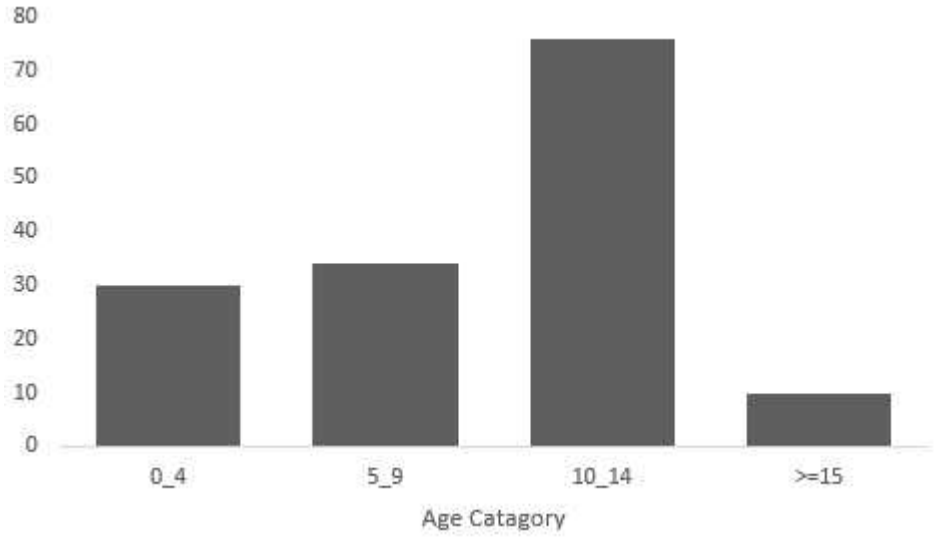

Figure 1.3: Age category of study participants in Sayient woreda South Wollo zone Northwestern Ethiopia, 2018/19

2.4.6. Pertussis case with contacts relations

From the 50 case 29(58%) of the case have a family contact. All study participants exposed to a person with inspiratory whooping cough, post-tissue vomiting. The exposures of cases with classmate, family and relatives were showed below the graph (Fig.4)

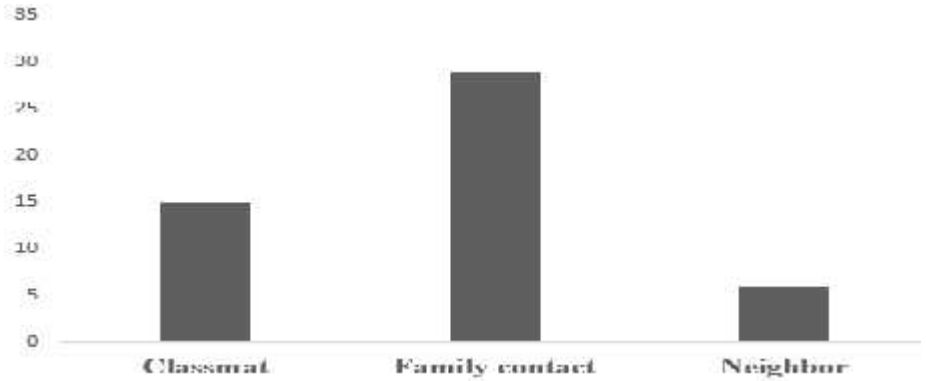

Figure 1.4: Contact relation of cases in Sayient woreda, South Wollo zone, Northwestern Ethiopia, 2018/19

2.4.7. Mode of transmission and prevention of pertussis

Among the study participants 86(57.3%) have known for the mode of transmission of pertussis from person to person via (sneezing, coughing, and sleeping) together face to face and 90(60%) of the participants unknown for a method of prevention and control of pertussis. Mode of transmission and methods of prevention and control of pertussis participant's response displayed in below graph (fig. 5).

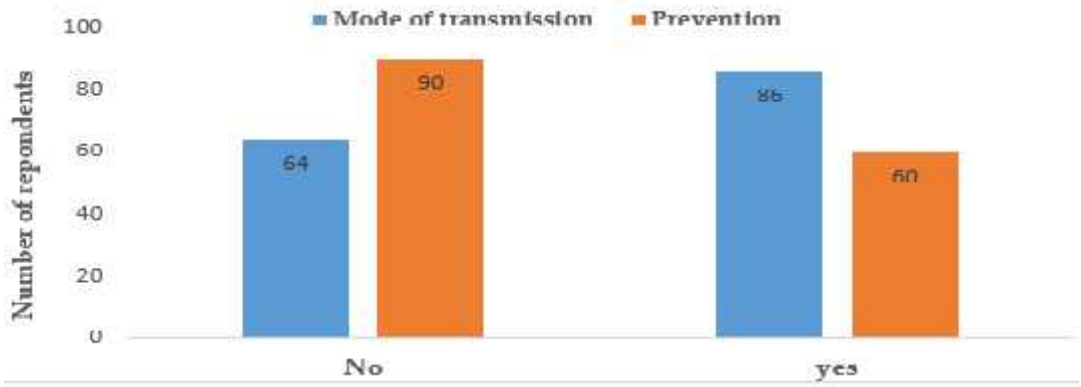

Figure 1.5: Knowledge of study participant's response in mode of transmission and prevention of pertussis cases in Sayient woreda South Wollo Northwestern Ethiopia, 2018/19

2.4.8. Vaccination status of cases

Among the study participants 95(63.3%), 41(27.3%) and 14(9.3) of the study participants were vaccinated, unknown and unvaccinated respectively. 41.3 % among the vaccinated participants took three dose. The vaccination status of participants with disaggregation dose displayed in graph (fig.6).

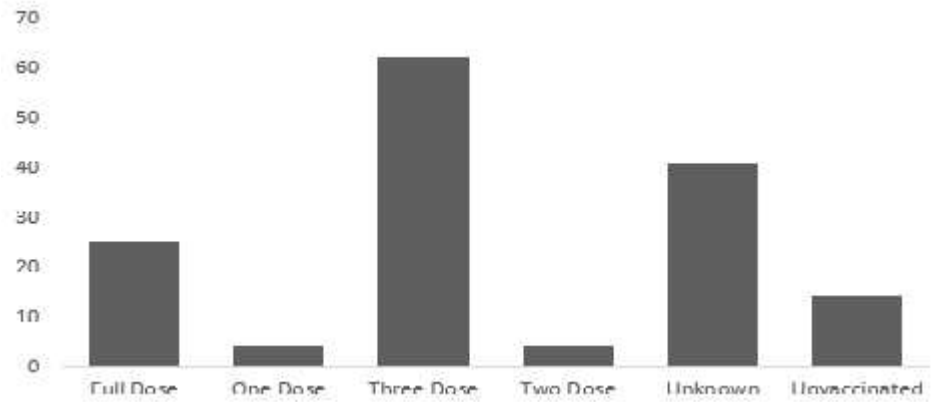

Figure 1.6: Vaccination of status with dose of study participants in Sayient woreda, South Wollo zone Northwestern Ethiopia, 2018/19

2.4.9. History of pertussis in study participants

67(44.7%) of participants haven't a history of sick in pertussis in their life and 16(10.7%) were sick in pertussis. The history of pertussis cases in study participants showed in below graph (F.g.7).

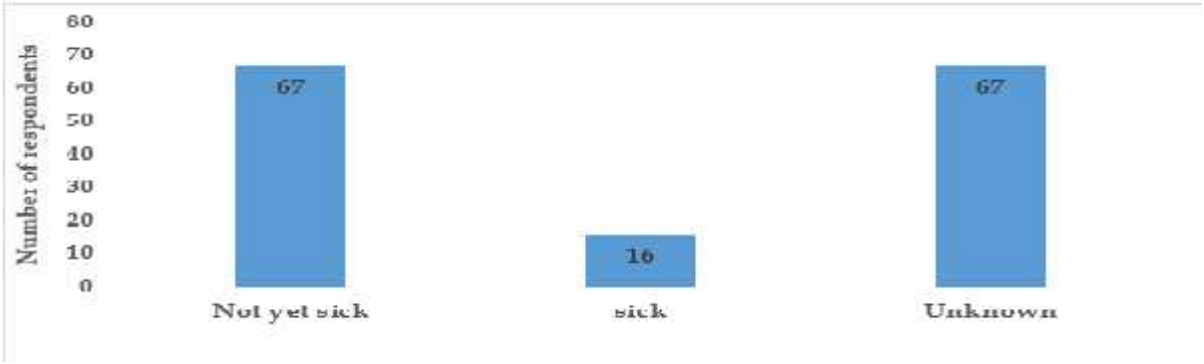

Figure 1.7: Study participants in pertussis history in Sayient woreda, South Wollo zone Northwestern Ethiopia, 2018/19

2.4.10. Determinates of pertussis

In this investigation a total of 50 cases and 100 controls who resided in affected kebeles were selected for case control study, with a ratio of one case to two controls. Among the total 50 interviewed cases 27(54%) of them were females and among the total 100 controls 58 (58%) of them were females. Among the cases 19(38%) were in age category of 10-14.

Variable in bivariate analysis were indicated in the next table of each variables in different table.

Respondents who have not history of vaccination OR=9.375(2.659-33.057) and having contact case history in family OR=0.000(2.006-56.348) as showed below table.

Table 1.1: Bivariate analysis of independent variables with dependent variables association

Variable	**Category**		**Cases (50)**	**Control (100)**	**OR, 95%, CL**	**P-Value**
Did you have vaccinated?	Yes		20(40%)	69(69%)	9.375(2.659-33.057)	.000
	No		10(20%)	16(16%)		
	Unknown		20(40%)	15(15%)	3.571(1.627-7.840)	.002
Do you know Prevention measures of pertussis	yes	Ventilation	18(36%)	37(37%)	At least one 2.10(.685-6.436)	.194
		Isolation	19(38%)	30(30%)		
		Vaccination	18(36%)	32(32%)		
	No		21(42%)	53(53%)	2.524(1.199-5.311)	0.015
Do you know Mode of Transmission	Yes		35(70)	51(51%)	2.242(1.09-4.609)	0.028
	No		15(30%	49(49%)		
From where did you have contact cases?	Classmate		15(30%)	54(54%)	2.037(0.729-5.689)	0.175
	Family		29(58%)	2(2%)	10.633(2.006-56.348)	0.000
	Relatives		6(12%)	44(44%)		
Age category	0-4		9(18%)	21(21%)	0.381(.136-1.068)	0.067
	5-9		18(36)	16(16%)		
	10-14		18(36)	57(57%)	0.296(0.127-.693)	0.05
	>=15		4(8%)	6(6%)	0.593(0.141-2.484)	.474

Independent determinant factors of unknown mode of transmission and haven't knowledge for prevention control measure of pertussis in the communities with OR= 2.242 (95% Cl 1.09- 4.609) and OR=2.524(1.199-5.311) respectively.

The result of multivariate logistic analysis of different variables which showed in significance in bivariate analysis. The multivariate analysis of relation of contact, mode of transmission and knowledge of prevention and control methods of pertussis descripted in the next table.

Table 1.2: Multivariate analysis of variables which have significant association in bivariate analysis.

Variables	**category**	**Cases =50**	**Controls =100**	**AOR, 95%, CL**	**P-value**
Contact relation	Classmate	15(30%)	54(54%)	6.987(1.186-41.151)	.000
	Family	29(58%)	2(2%)		
	Neighbors	6(12%)	44(44%)		
Do you know mode of transmission(sneezing, Coughing, sleeping)	Yes	35(70)	51(51%)	1.614(1.333-9.535)	.029
	No	15(30%	49(49%)		
Do you have prevention and control for pertussis (ventilation, isolation, vaccination)	Yes	29(66%)	47(47%)	4.644(2.194-9.830	.001
	No	21(42%)	53(53%)		
Did you vaccinated	yes	20(40%)	69(69%)	3.621(0.971-13.501)	.055
	No	10(20%)	16(16%)		
	unknown	20(40%)	15(15%)	1.773(1.955-16.08	.011

2.4.11. Public health measures taken

Pertussis outbreak occurred in three Kebele/gots of Guameda cluster of Sayient woreda. One of pertussis affected Kebele/gots was hard to reach area and inaccessible for transport. Intervention measures were taken in three phases. The first phase was took on Dec 27/2018 by Sayient woreda health office to conducted case management and health education.

The second phase was conducted by woreda health office on January 1/2019 on Guameda health center case managements and orientation of Kebele leaders and community focal for the status of pertussis cases (locally ”TIKTIK’). The third phases was on January 9/2019 with integrally Regional, Zonal, Woreda and cluster teams. Logistics were delivered in affected clusters and

social mobilization activities on communities. House to house case search, health education, orientation of schools, campaign on school and Kebele. Kebele leaders, Community focal and teachers were involved for active cases searches and health educations. Routine vaccination was started on hard to reach areas and activation of information flows from communities to health facilities, Kebele leaders and school directors.

1.5. Discussion

The presence of pertussis outbreak were checked after arrived in Ambasember kebele of Guamada cluster Sayient woreda. The signs and symptoms of the cases were leads to pertussis based on standard case definitions of the regional draft guideline. The index case was a 28 year male who had traveling history in Mekedela woreda celebrating a ceremony in his relatives.

Over the period of outbreak, the overall attack rate of the outbreak was 3.1 per 1000 persons, which is less than pertussis outbreak in Papua New Guinea (4%) and greater than pertussis outbreak in Mekedela(1.3%)(9, 10). This might be recovering of cases before case detected and under reporting of cases or weak surveillance activities.

Females were more affected than males. The outbreak affected age ranges from 3 months to 28 years which is the same result with studies of Alemaw in medikeda. Most of pertussis complication were occurred under 4 age groups which developed to umbilicus hernia, otitis media, edema, pneumonia and one cases kidney failure. This complication were occurred due to delayed seen at health facility by different reasons like poor seeking behavior of communities, heard to reach area, interruption of routine immunization and susceptible age category.

This investigation identified respondent's unknown mode of transmission AOR=1.614(1.333-9.535), P=0.29. Respondent's unknown mode of transmission is 1.614 times risk for pertussis infection compared to having knowledge of mode of transmission in Sayient district, South Wollo zone.

The present of infected persons in the family had OR =6.986 (95% CL 1.186-41.151) with significantly independent risk factor for pertussis outbreak. This might be due to haven't knowledge of prevention and mode of transmission of pertussis from persons to person. This study is similar with the study of Alemaw in Mekedela (10).

This investigation identified respondent's haven't knowledge for prevention and control of pertussis had OR= 4.644(95% Cl 2.194-9.830) which is associated risk factor for the occurrence of

pertussis outbreak in Sayient district, South Wollo zone. This might be due to lack of knowledge of prevention measurement like ventilation, isolation and vaccination in the presence of infected persons in their corresponding period.

The likelihood contributing factorsof complication were pertussis related malnutrition, post tissue vomiting, distance of health facility and poor seeking behavior of people. The most affected age group was 10-14 years 375 (70 %) with the attack rate of 2.2 per 1000 population which lower than the study of Alemaw(5, 10). This might be due to poor data quality and collected of data after recovery.

Strength of the study

This investigations clearly indicated the distribution of pertussis, preparedness and planning, risk mapping and risk communication. This finding were presented at each level of health sectors and the regional health bureau used it as a basement for resource mobilization and evaluation of immunization activities.

Limitation of the study

Absence of vaccination card was difficult to determine the vaccination status, dose received, exact date of vaccination and other relevant information which could cause information bias. Recall bias on the date of onset by the cases and their mothers since the investigation was conducted lately after 339 cases were occurred. Absence of vaccination data in affected Kebele was one the problems.

1.6. Conclusion

Pertussis outbreak had occurred in remote villages/kebeles of Sayient district south Wollo zone. There was no vaccination data in the cluster at health post level to associate vaccination coverage with occurrence of pertussis outbreak. The outbreak was reporting after 3 months of the occurrence of more complicated and problems on peace administrative. In this outbreak the overall attack rate was 3.1 per 1000 population. All complicated cases were occurred under 4 age category. The presence of infected persons in the family, unknown mode of transmission, lack of knowledge for pertussis prevention and controlwere significantly contributes factor for the expansion of pertussis.

1.7. Recommendation

Prevention and control of pertussis outbreak in the South Wollo zone forwarded this action points

- Health workers at each level should be strengthen health education activities for prevention and the mode of transmission of pertussis (TIKTIK) from one person to others.
- Sayient woreda health offices have to strength active case search surveillance for early notification of the diseases/events occur.
- Strength of coordination at Kebele level including school directors, Kebele leaders, health development army and religious leaders for early notification diseases and events.
- Guameda cluster health center should have to establish and implement routine EPI service in affected Kebele/villages/kebeles
- Sayient woreda health office alerted health facilities when there is a rumor of cases/event in adjustment woredas and regions.

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2. Anthrax outbreak investigation

Anthrax outbreak investigation in Farta woreda, South Gondar in Northwestern Ethiopia, March 2019

Abstract

Background: Anthrax is a zoonotic bacterial disease caused by *Bacillus anthracis*, which primarily affects livestock. Anthrax is an endemic disease in Ethiopia occurring before and after the rainy season. Conducting an outbreak investigation for anthrax is important for the strength of the surveillance system and strongly promoting a one health approach.

Objective: - The study was done to verify the existence of outbreak and determine risk factors of anthrax in Farta woreda South Gondar zone Northwestern Ethiopia, 2019

Methods: An unmatched, community based, case control study was conducted from March 25-April 1/2019. We used a structured questionnaire to collect data, reviewing of documents and discussion with live stoke and health office staffs. The collected data were analyzed by SPSS and presented in tables and graphs.

Results: A total of 20 human anthrax cases with attack rate of 2.5 per 1000 population in affected Kebele. The median age was 37.5, ranging from 1 month to 65 years. The cases were 66.7% male and 77.8% were 15 and above years. Woreda health offices and livestock office hadn't joint plan for the prevention of zoonotic disease. People who had unvaccinated animals were positively associated with anthrax; AOR = 8.113 (95% CI 1.685-39.056). People who had heard about anthrax disease were negatively associated with anthrax; AOR = 0.114 (95% Cl 0.025-0.524).

Conclusions: An anthrax outbreak occurred in Wawa Mengera kebele of Farta woreda. The presence of unvaccinated animals in a household had risk factor for the occurrence of anthrax cases. Whereas a person who had heard anthrax prior outbreak was protective factor for Anthrax. Farta woreda health and livestock offices should be initiate one health approach for prevention of zoonotic diseases. Strengthening health education on vaccination of animals, mode of transmission and disposal of dead animals is essential for prevention of anthrax cases.

Keywords: Anthrax, Outbreak, Farta, Northwestern Ethiopia, 2019

2.1. Background

Introduction

Anthrax is an acute disease of warm blooded animals including human beings caused by a spore forming gram-positive, non-motile bacillus anthracis (1). The name of the bacterium is derived from “anthrakis”, the Greek word for coal, because anthrax in humans causes black, coal-like lesions on the skin at the site of inoculation (2).

Anthrax is a zoonotic bacterial disease caused by *Bacillus anthracis*, which primarily affects herbivorous wildlife and livestock and is usually fatal among these animals. Zoonoses are diseases transmissible between animals (domestic and wildlife) and humans. It has been estimated that 60% of all human diseases and around 75% of emerging infectious diseases are zoonotic among which anthrax is a serious disease that can affect most mammals and several species of birds (3).

Human infections can result in a high mortality rate if not diagnosed and treated promptly. Humans contract cutaneous anthrax through direct contact of skin or mucosal membranes with *B. anthracis* via infected animals as they are slaughtered or butchered or by handling by-products (*1–3*). In most countries, human anthrax occurs infrequently and sporadically, mainly as an occupational hazard among veterinarians, agricultural workers and workers who process hides, hair/wool and bone products(4). Human-to-human transmission has not been documented. In humans, cutaneous, gastrointestinal and inhalational are the three forms of anthrax. The incubation period in humans is usually 1 to 7 days, but varies with the form of the disease (5).

Anthrax is a globally distributed disease, reported from all continents that are populated heavily with animals and humans. Animal anthrax outbreaks have been recorded in nearly 200 countries by the World Anthrax Data Site, a World Health Organization Collaborating Center for Remote Sensing and Geographic Information Systems for Public Health in 1996-1997(6).The anthrax status of a given country may be classified into one of the six categories: hyper endemic/epidemic, endemic, sporadic, probably free, free and unknown. The countries with hyper endemic/epidemic status are frequently in Africa, like Zimbabwe, where there was an epidemic of anthrax caused the infection of nearly 10,000 humans with 151 deaths. Examples of regions with unknown anthrax status are the polar extremes, the arctic and the Antarctic (2,7).

Anthrax is an endemic disease in Ethiopia occurring before and after the rainy season. Most commonly anthrax cases are reported in areas with high levels of salt soil area. Although suspected

cases of anthrax in livestock are reported from Farta woreda, few are officially confirmed via Polymers chain reaction (PCR) (8). The previous studies in Ethiopia indicate that the disease is well recognized by rural communities but little is known about its prevalence, epidemiology and public health significance (9, 10).

In the Ethiopian, from 2016/17 to January 30/2019 according to Ethiopian Public Health Institute, Public Health Emergency Management (PHEM) surveillance data, a total of 1,188 suspected human anthrax cases and 15 deaths, with a case fatality rate (CFR) of 1.3%, were reported from four regions (Tigray, Amhara, Oromia, and South Nation nationalities of people (SNNPR). The highest number of cases were reported from Amhara (816), followed by Tigray (250), SNNPR (89), and Oromia (32) while the highest number of deaths (10) were reported in Amhara (67% of the total deaths), with Oromia and Tigray 2 deaths each (13.3 %) and SNNPR one death (6.7%) (11). The number of anthrax cases increased from 2009 to 2010 by 139 (31.8 %). The number of deaths due to anthrax also increased by 50% from four in 2009 to eight in 2010. In Epi week 28/2018 up to Epi week 3/2019 in Ethiopia, 175 anthrax cases (121 in Amhara, 33 Tigray, 20 Oromia and one SNNPR) with three deaths (two Oromia and one Tigray) were reported.

In Amhara region from 2016/17 to 2019, 816 anthrax cases were reported. The top five zones that reported anthrax cases were Wag Hemira (513), North Gondar (96), South Wollo (82), South Gondar (41) and East Gojjam (36). In South Gondar, 41 anthrax cases were reported from Epi week 28 2016/17 to Epi week 3/2019. Ebinat, Tach Gayent and Simada woredas reported anthrax cases in South Gondar zone. Despite the fact that in Farta woreda there were local hide processors, even though starting from Epi week 28/2016 up to Epi week 3/2019 there were no anthrax cases reported in Farta woreda.

2.1.1. Justification of the study

On March 23/2019, suspected human anthrax cases and deaths of animals were captured from social media (Facebook) scanning.To verify this rumor, the Amhara Public Health Institute communicated with the South Gondar zone health department officers and confirmed that two suspect cases of human anthrax were admitted to Debre Tabor General Hospital and an additional two animal deaths were reported from the Farta district. On March 25/2019, teams from Farta Woreda health office and Regional Public health emergency management (PHEM) conducted site visits, communicated with Wawa Mengera communities/Kebele leaders, visited Wawa Mengera livestock clinics and communicated with veterinarians.

At the same time, we communicated with the Ethiopian Public Health Institute for further confirmation of cases through the testing of clinical specimens. They collected blood and tissue scrapings from suspected anthrax human cases.

Outbreak investigations for anthrax are important for the strength of the surveillance system, clarifying gaps, identifying anthrax cases early, and strongly promoting a one health approach. So, this study aims to address the root cases for anthrax outbreak and to identify anthrax for implementation of prevention and control activities in South Gondar zone, prioritizing anthrax as a public health threat in the time being.

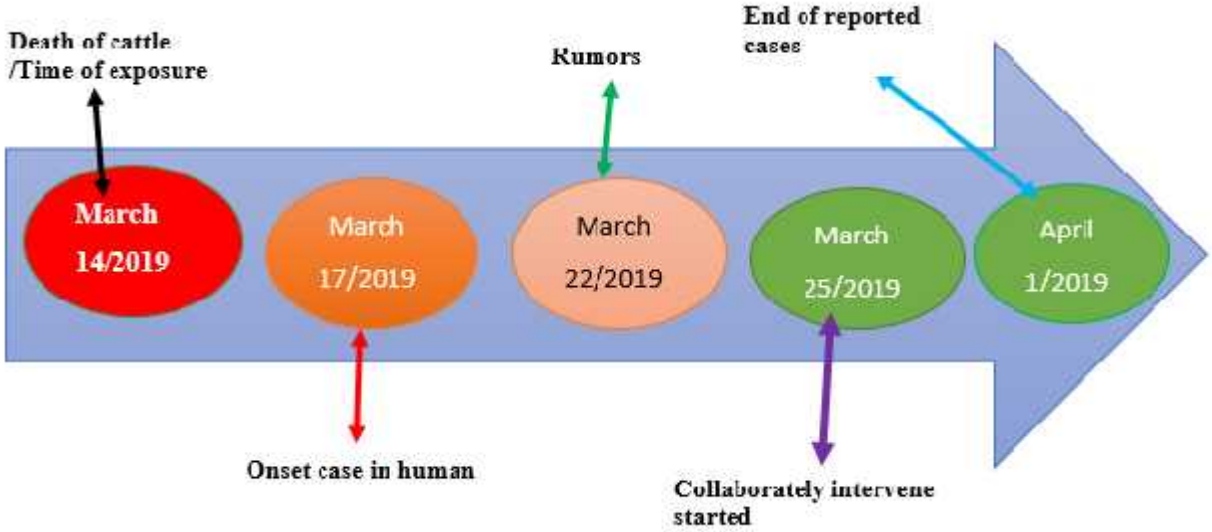

Figure 1.8: Flow of Anthrax situation from time of exposure/death of cattle to end of cases reported in Farta woreda South Gondar zone Northwestern Ethiopia, 2019.

2.2. Objective

2.2.1. General objective

This study was done to verify the existence of outbreaks and identify risk factors of anthrax in Farta woreda South Gondar zone, Amhara region, March 2019

2.2.2. Specific objective

- To verify the existence of an outbreak
- To characterize the extent of the outbreak in terms of place, person and time
- To identify potential risk factors of the disease transmission

2.3. Methods and materials

2.3.1. Study area

Farta is one of the 18 woredas in the South Gondar zone, which has a distance of 104 kilometers from the center of the Amhara region and is 665 Km from the capital, Addis Ababa, Ethiopia. The woreda has a total population of 264,102 within 32 kebeles and 45 health facilities. Among the total kebeles Wawa Mengera was affected by anthrax on March 14/2019. Borders of Farta woreda is Ebinat in the East, Lay Gayent in the South, Estea in the West, and Fogera in the North.

2.3.2. Study Design

Unmatched case control investigation was conducted in Farta woreda of South Gondar zone, Northwestern Ethiopia.

2.3.3. Study period

Anthrax outbreak investigation was conduct from March 25-April 1/2019

2.3.4. Target population

All people who lived in Farta woreda South Gondar zone, Northwestern Ethiopia.

2.3.5. Study population

All people who resident in Wawa Mengera Kebele of Farta woreda

2.3.6. Study unit

People who had skin lesion with a history of direct/indirect contact with dead animals in Wawa Mengera Kebele.

2.3.7. Sample size determination

The sample size was determined by using Epi Info™ 7 statistical tools, but due to small number of human anthrax cases in Wawa Mengera Kebele, all 20 human anthrax cases were included. Controls were selected by neighbor hoods approach from human anthrax cases with the same exposure status.

2.3.8. Variables

Dependent variable

- Cases and controls of study participants.

Independent variables

- Ages of study participants
- Sexes of study participants

- Presence of unvaccinated cattle in the household

2.3.9. Operational definition

Forms of Anthrax in human

Localized form

Cutaneous: skin lesion evolving over 1 to 12 days from a papule, to a vesicule, to a depressed black eschar, invariably accompanied by edema that may be mild to extensive.

2. 3.10. Inclusion and Exclusion criteria.

Inclusion criteria from cases

- All human anthrax cases in Wawa Mengera Kebele of Farta woreda South Gondar zone Northwestern Ethiopia from March 25- April 1/2019.

Exclusion criteria from cases

- People who have mechanical injured
- Wart leading wounds in their body part.
- People who participated during slaughter of dead cow and sheep

- People who have cutaneous anthrax came in other woredas.

2.3.11. Data collection procedure and tool

Cases were reported up to April 1/2016 which became high number occurred on March 20/2019 based on our investigation/interview there. Public health intervention strategies were started on March 23/2019, there was a decreased in the number of cases after burnt and burier of dry meats and properly disposed of slaughter areas on their home.

We collected data from cases and controls by moving house to house in the exposed villages from March 25-30, 2019. Participants were interviewed using structured questionnaires (annex 9.2) and primary data was collected from respondents by the investigator. The cases were identified by using case definition. If an identified case patient was unable to respond to the questionnaire, then an attendant in the household provided the data. A total of 20 cases and 40 controls were interviewed to assess their exposure status, sociodemographic and other variables.

Cases: persons who had lesions in their body part whether they were participated in slaughtering or not but only presented in this affected Kebele/village.

Controls: persons who participated during slaughter of dead animals but not presented anthrax infected persons in their house and not showed signs and symptoms of cutaneous anthrax. Interviewed of controls were based on unmatched neighborhood approach.

2.3.12. Data processing and analysis

The data were cleaned, entered and analyzed by using Excel Office 2013**.** Descriptive statistics were used to create a profile of sociodemographic characteristics, history of the area for anthrax, and boundaries of endemic for both human and animal anthrax cases. Finally, the results were presented with tables, graphs and figures.

2.3.13.Ethics approval and consent to participate

The study was conducted in accordance with the national policies on ethics. Ethical approval was obtained from Amhara public health institute public health emergency management and a letter was written to the Farta woreda Health Office and we obtained oral consent for all study participants and their parents prior to data collection. Participants were fully informed about the nature of the study and had an opportunity to withdraw if they did not want to participate. Consent was implied by filling out the questionnaire. Confidentiality was assured and personal details were not collected.

2.4. Result

2.4.1. Socio demography of Farta woreda

Farta woreda is one of the woredas of South Gondar zone. The community was comprised of a mixed farm system (rearing of livestock and cultivation). The woreda contains traditional hide/skin processors, which are found in Wawa Mengera Kebele. Around the traditional hide processors there is one river which flows down to the east and has a history of anthrax cases around the site.

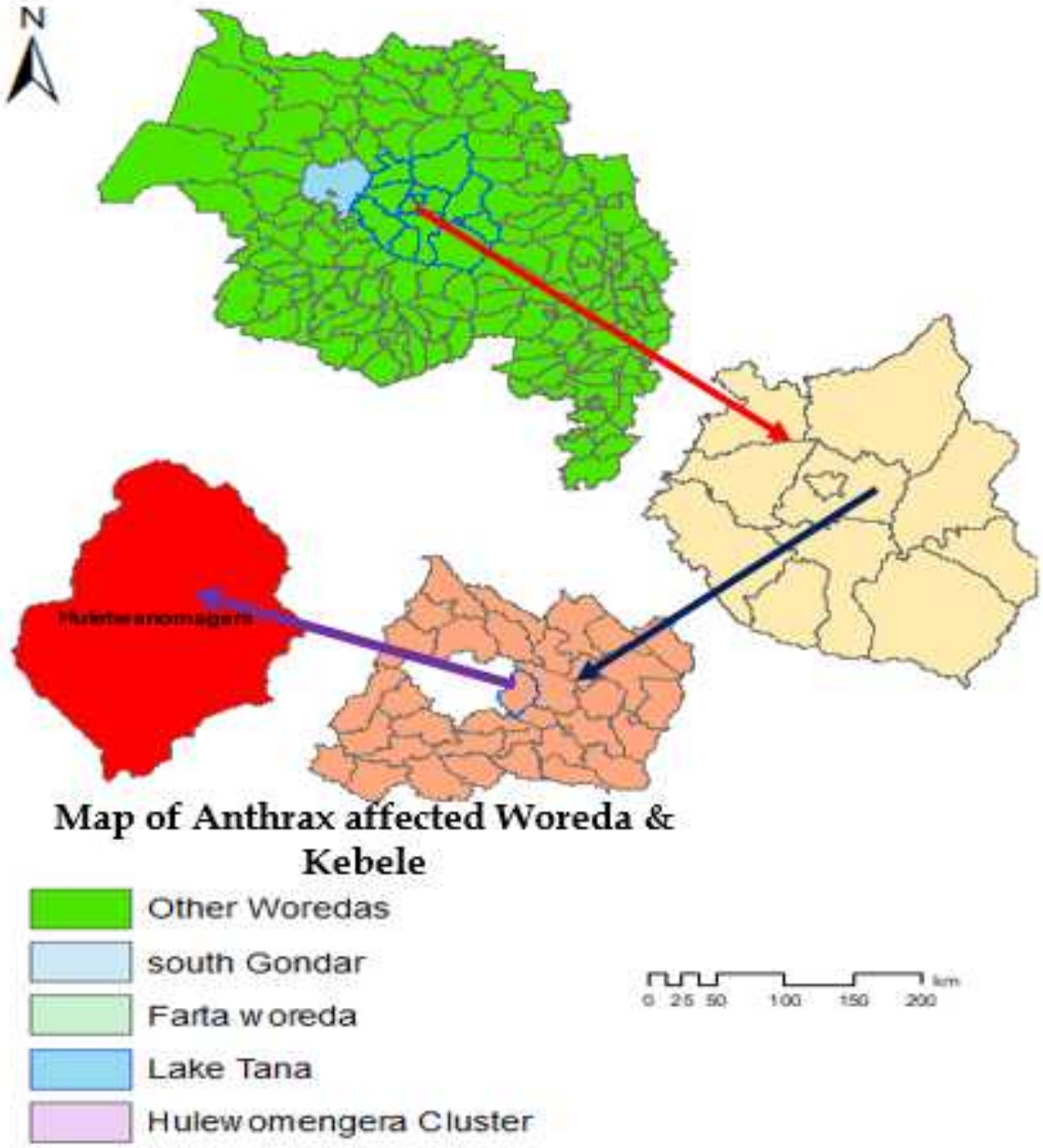

Figure 1.9: Map of affected cluster in Farta woreda South Gondar zone Northwestern Ethiopia, 2019.

2.4.2. Demographic characteristics of cases and controls

Fourthy controls and 20 cases were enrolled into the study. The median age for case was 37.5(Q1=16; Q3=50). From study participants 14 (23.3 %) male cases and 27(67.5%) male controls were interviewed. Thirteen (21.7 %) of the study participants were married cases and 25 (41.7%) married controls from the total participants. 16(26.7%) of study participants were greater

than or equal to 15 age groups of cases and 32(53.3%) of controls. 13(21.7 %) of the study participants were case farmers and 25(41.7 %) of them were students. Fourteen (70%) of the total cases hadn't heard about anthrax.

Table 1.3: Demographic data of Anthrax outbreak study participants

Variable		Cases N=20	Controls N=40
Gender	M	14	27
	F	6	13
Marital status	Married	13	25
	Single	4	9
	Illegible	3	6
Age category/group	0-4 age	2	3
	5-14 age	2	5
	≥15 age	16	32
Occupation	Farmers	13	25
	Students	5	11
	Not able to	2	4

2.4.3. Description of the outbreak by person

A total of 20 cases were found until finalized this investigation. The most affected age group was greater than or equal to 15 age category (77.8%) while the least affected was the 0-4 age category (9.3%) of the total study participants. All of the case patients presented with cutaneous lesions on the hand or upper neck. Of these, all cases aged 0-14 (22.2%) were affected on the upper neck only.

2.4.4. Description of the outbreak by place

The index exposure/common source of the cases was a cow that died from anthrax in Wawa Megerakebele which confirmed case of anthrax from meat sample that had positive test result. The raw meat of dead cow were distributed in three gots/villages. Human anthrax cases were distributed throughout multiple gots, including in Mendera (9/50%), Lemo (3/16.7%) and the rest from different gots. Only one got was identified with animals affected by anthrax. The locations of the affected gots are all near to the local hide processor villages and there is down water stream source for animal feed purposes.

2.4.5. Description of the outbreak by time

The first human case in Mendera gots occurred on the 17th of March/2019 after three animals dead in Wawa Mengera Kebele/Mendera got. A total of four animals' deaths occurred; only test positive anthrax raw meat from the first dead cow was distributed in the different villages.

The sequences of events of the outbreak from the beginning to the end are illustrated by the Epi Curve in figure 3.

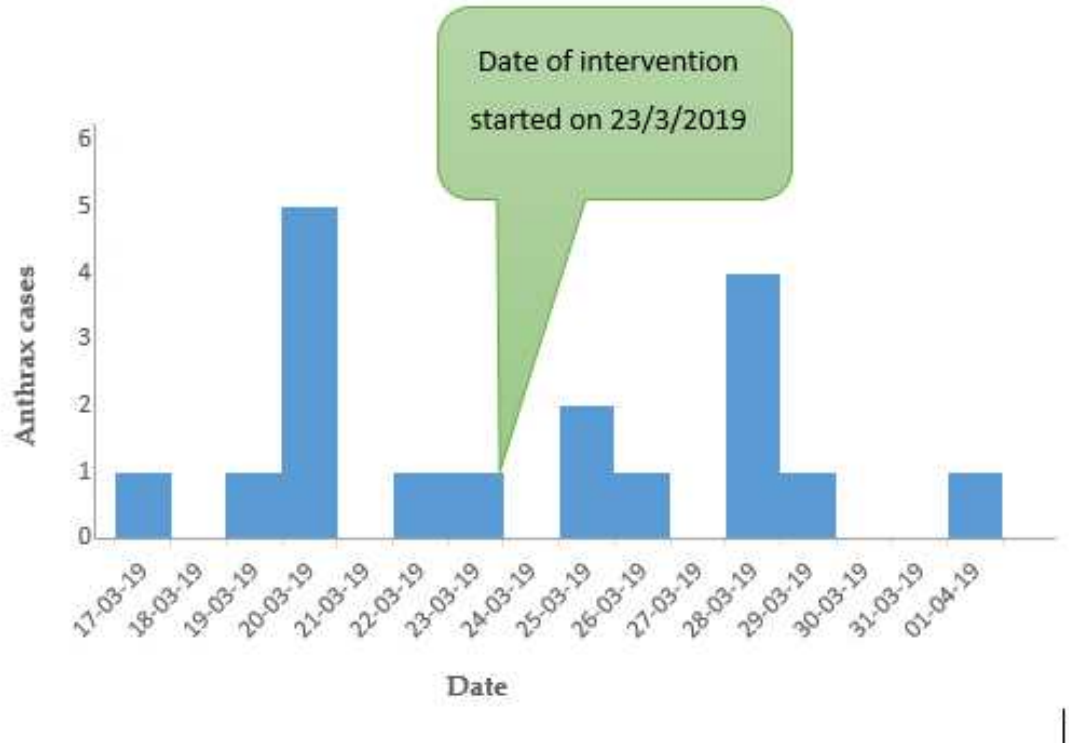

Figure 1.10: Epi curve of anthrax outbreak in Farta woreda South Gondar zone in Northwestern Ethiopia, 2019.

2.4.6. Risk factors for contracting anthrax

All cases who participated in the study directly or indirectly had a contact for carcasses of dead cows or their product during at different activities of processing the meat and hide. Only 11 persons were involved in Butchering and preparing of hides for further processes, 247 people (60 households) preparing for food/contact of raw meats and no one ate the raw meats (12).

2.4.7 Bivariate analysis

A person who had heard about anthrax disease was a risk factor OR = 5.909 (95% CI 1.69-20.659), people who have unvaccinated of cattle's during the campaign was also a risk factor OR

=6.79 (95% CI 1.911-23.908). A person who wasn't participating during slaughtering of dead cow but took meat in their house OR=0.246 (95% CL (-2.027) - 0.343). (See Table 3).

Table 1.4: The result bivariate analysis of variable in human anthrax cases

Variables	Category	Cases	Control	AOR, 95% CL	P-value
Bivariate analysis					
Have you heard about anthrax disease	yes	7(35%)	9(22.5)	5.909(0.1.690-20.659)	.005
	No	13(65%)	31(77.5%)		
Having unvaccinated domestic animals	yes	9(45%)	27(67.5%)	6.760(1.911-23.908)	.003
	No	13(55%)	13(32.5%)		

2.4.8. Multivariate analysis

People who have unvaccinated of domestic animals during campaign and routine immunization program (AOR= 8.113 (95% CI 1.685-39.056) were independent risk factors for anthrax in Wawa Mengera Kebele, Farta woreda. Whereas study participants who had heard about anthrax disease (AOR=0.114 (95% CI .025-.524) (Table 1.5).

Table 1.5: The result of multivariate analysis of human anthrax cases in significantly associated factors of in univariate analysis

Variables	Category	Cases	Control	AOR, 95% CL	P-value
Multivariate analysis					
Have you heard about anthrax disease	yes	7(35%)	9(22.5)	.114(0.025-0.524)	.005
	No	13(65%)	31(77.5%)		
Having unvaccinated domestic animals	yes	9(45%)	27(67.5%)	8.113(1.685-39.056)	.009
	No	13(55%)	13(32.5%)		

2.4.9. Knowledge of Signs and Symptoms of Anthrax in Humans

From the total control study participants, 25 (69.4%) had heard about anthrax prior to the outbreak. With regard to signs and symptoms, all cases showed typical anthrax skin lesions and six cases hospitalized from 7 to 14 days in Debre Tabor Genera hospital.

2.4.10. Symptoms experienced and the treatment seeking behaviors of respondents

The majority of the cases, 12 (66.7%) got health care services in government health facilities, both inpatient and outpatient conditions the rest on private health facility. The majority, 15 (83.3 %) of cases took ciprofloxacillin treatment, whereas the rest treated by clindamycin from private health facilities. Respondents who had any lesion in their hand and upper neck part before contact to infected animals and meats were showed 3-6 incubation period as compared to having intact body parts.

2.4.11. Attitude and practices regarding disposal of dead animals

Two dead animals were buried before opening and two test positive was opened. But there were no major statistical differences between cases and controls with regards to attitudes and practices for opened and burial of animals that died due to suspected anthrax disease.

2.4.12. Laboratory results

Both human slid touching and scraping at the infection site samples and Animal meat were positive in molecular test. Animal meat were test at National animal health diagnosis and investigation center by polymerase chain reaction and human samples were test at Ethiopia public health institute.

2.4.13. Public health measure

After scanning for anthrax cases in social media, the South Gondar zonal health department, the Farta woreda health office, the South Gondar zonal livestock department and the Farta woreda livestock officer discussed and re-established rapid response teams (RRTs). RRTs were deployed to the affected Kebele for further investigation and conducted house to house active searches. The RRTs took quick measures regarding community health education, social mobilization of the Kebele and religious leaders and community delegates, collected distributed dead animal's meat and hide, properly disposed of the collected meats and buried it. Three days later, the RRTs conducted a mass vaccination campaign of cattle in the affected and bordering kebeles. Kebele RRT was also established with a member of health extension workers, Wawa Mengera/affected Kebele animal clinicians, Kebele leaders and traditional healers as a members.

Messages were sent to private clinics and traditional healers for referral of suspected anthrax cases to Debre Tabor General Hospital. All anthrax cases were admitted on isolation area. All Farta woreda human and animal health workers were trained for surveillance of anthrax, risk mapping and communication, joint planning and information sharing over the course of three days.

2.5. Discussion

The Intervention measures included cattle vaccination, treatment of cases, health education to the Community, burning and burying of infected meat and carcasses among others.

On multivariate analysis risk factors were the presence of unvaccinated of cattle in their house OR=8.113 (95% CI 1.685-39.056). This is might be due to incision of animal when they showed sign and symptoms before took veterinary clinics. Among interviewedcase respondents 8 infected persons were incised their animals during time of outbreak when the animal showed clinical sign of any swelling before visited veterinary clinics.

The position of the majority of anthrax lesions was on hands for case patients older than 10 years and on the head for case patients younger than 10 years. This is consistent with Gombe et al.'s findings from a study in Zimbabwe [14]. This may be because hands are actively involved in handling the infected meat and may have a higher risk of having cuts or open wounds, which increases the likelihood of infection in that part of the body.

No case fatalities was recorded in this outbreak. This is consistent with findings of Gombe et al. in Zimbabwe(3). A person who has heard of what anthrax is prior to outbreak had an AOR=0.114 (95% Cl 0.025-0524) which means a protective factor for anthrax case as compared haven't heard for anthrax cases. This might be because they restricted themselves or properly handling of infected animals from contact of infected animals and animal products during the outbreak period.

Having cuts or open wound during processing in areas likely to come into contact with infected material increased the risk of anthrax. This was also because of these areas were unobstructed routes of entry for large numbers of bacteria compared with an intact skin. This was consistent with what Gombe et al. found out in an anthrax outbreak in Zimbabwe (3).

Although the woreda managed to control the outbreak, quality and timeliness of detection, notification and responding to the outbreak. The woreda Health office in conjunction with stakeholders particularly the Veterinary Department werecommunicated anthrax awareness campaigns targeting the population at risk.

Strengths

This investigation increased the interaction/information sharing between veterinarians and human health workers. Immediately after the investigation, we had conducted a workshop on zoonotic diseases, including anthrax and rabies, with participants from the environment, forest and wildlife authority, animal health workers and human health workers. There were development of joint plans and action points with timeframe. This investigation was an initiative of a one health approach in the Amhara region. Having positive laboratory results for animal samples.

Limitations

This investigation only focused on human anthrax cases and absence of cattle vaccination data on each species. Small sample size of cases, limited timeframe of the investigation.

2.6. Conclusion and recommendation

Unvaccinated history of dead animals were the source of human anthrax in Wawa Mengera Kebele of Farta woreda. The overall attack rate was 2.5 per 1000 population in affected Kebele. Complicated human anthrax cases were occurred due to lately visited of health facility. People who have unvaccinated animals are risk factor for the occurrence of anthrax cases. Whereas person had heard anthrax prior outbreak are protective factor for anthrax outbreak due to restricted themselves contacts of dead animals and their product.

Based on the conclusion the following recommendation forwarded

- All people in Farta woreda having animals have to vaccinated timely
- Both Farta woreda health and livestock office strengthen health education how Anthrax is transmitted from livestock to human
- All individuals exposed to *B. anthracis* should be received a full dose as PEP antimicrobial drugs(antibiotics)
- Both Farta woreda health and livestock office Advocate avoiding properly disposed dead animals, skinning and used of hides
- Zonal health department and zonal livestock department strength one health approach to intervene zoonotic disease early
- Private health facilities who live in Debre tabor town have to be treated cases according to standard treatment guideline

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Chapter 2 : Data analysis of Tuberculosis

Data Analysis Report on Tuberculosis from (2014-2017) in South Gondar Zone, Northwest Ethiopia, 2018

Abstract

Background: Worldwide, more humans die as a result of tuberculosis each year than from any other infectious disease. Ethiopia is among the 22 High TB Burden Countries and among the 27 high MDR TB burden countries in the world. Compounded with HIV/AIDS, TB has become a formidable threat to the country. There is not well documented on the distribution of TB in South Gondar Zone.

Objective: To estimate the case and death of tuberculosis and treatment outcome of enrolled in different types of TB cases.

Methods: A cross sectional study was used to analyze a four years data of Tuberculosis. The sample sizes that used all TB cases reported during July1/2014-Jun30/2017. The collected data from SGZ health department were checked by Microsoft Excel.

Result: Atotal of 10756 TB cases were included in the analysis at South Gondar Zone during the analysis period of which 5841(54%) were males. Among total TB cases reported 87.9 %(9454) were 15-65 age groups and all form TB was 50% and smear positive pulmonary TB 22%. The proportion of TB was EPTB (49%); PTB- (31%) and PTB+ (20%) and all form TB cases with related of age were 89%, 9% and 2% for ≥15, 5-14 and 0-4 years old respectively. The highest death rate was 8.5% by PTB+ in 2014 and the lowest 2.5% by EPTB in 2017 were observed.

Conclusion: The highest amounts were extra pulmonary tuberculosis whereas the lowest amounts were PTB^{+} patients. Based on the above conclusion the following Recommendation is forward**.** District health office and health facilities encourage health professionals finding of cases via screening all HIV patients toreduce the expansion of tuberculosis.

Keywords: - *Tuberculosis, South Gondar Zone, Ethiopia, 2018*

2.1. INTRODUCTION

2.1.1. Background

Tuberculosis is a term that encompasses various diseases caused by bacteria of the Mycobacterium tuberculosis complex, including *M. tuberculosis, M. bovis, M. africanum,* and other mycobacteriu m species (1). Tuberculosis is an infectious disease with distinctive clinical and pathological features. Tuberculosis occurs in humans and many animal species including species of animals used for production of food (milk or meat) for human consumption (cattle, sheep, goats and deer) (2). Whereas M tuberculosis infection is largely spread from human to human, *M bovis* infection has been identified as a zoonotic disease with most cases of human infection attributable to animal sources. The mycobacteria other than tuberculosis complex (MOTT), which includes *M aviumsubsppavium*and *M avium*subspp intracellular isolated from animals(1), has been isolated from immune compromised humans (i.e., those with human immunodeficiency virus [HIV] infection), but seldom from immunocompetent humans(3). Recently, there has been increased interest among public health officials in drug-resistant strains of M tuberculosis, *M bovis*, and *M avium* because several have been isolated from HIV infected and nonimmune compromised humans (4).

Mycobacterium tuberculosis is the cause of most of the cases of tuberculosis in humans. Worldwide, more humans die as a result of tuberculosis each year than from any other infectious disease (4). At present, more than a third of the world's population is infected with tubercle bacilli and more people are dying as a result of tuberculosis than ever in history. Ninety-five percent of the tuberculosis cases are reported in developing countries, and it has been estimated that the disease results in the deaths of 2 to 3 million people each year. Infection with *M bovis* has been reported in humans (5), and causes pulmonary and extra pulmonary disease. In the United States and other developed countries, extra pulmonary *M bovis* infections in humans have been almost eliminated following the introduction of food-production procedures such as pasteurization of milk and routine carcass inspection (6, 7).

However, *M bovis* infection commonly occurs in less-developed countries and in specific demographic groups within developed countries in which consumption of unpasteurized dairy products is practiced. Although there is no active surveillance program for human cases of *M bovis*

infection in the United States, most of the reported cases appear localized to states with large immigrant populations from countries with recognized *M. bovis* infections in livestock (5). For example, 7% of mycobacterial isolates from 1,931 cases of tuberculosis in San Diego were identified as *M. bovis*. These infections were associated with ingestion of raw dairy products; 53% of these patients had extra pulmonary disease and 33% of isolates obtained from children were *M. bovis*. Contact with infected animals is another source of *M. bovis* infection for humans and is a recognized hazard for abattoir workers, veterinarians, and livestock handlers (5, 8). Among such workers who developed the disease, aerosol transmission was considered the most likely route of infection, but there are many occasions on which infection had been spread via cuts and abrasions (eg, butcher's wart)(6, 9).

Although many of the primary no aerosol sources of *M.bovis* infection in humans have been removed in industrialized countries, there has been an increase in the number of cases of pulmonary infection with *M.bovis*, which may be due to several factors: the lung is the usual site of post primary *M.bovis* infection, regardless of the site of the primary lesion; cases of pulmonary *M.bovis* infection may be the result of reactivation of previously quiescent (i.e., nonclinical) primary lesions; and infection may be the result of human-to human aerosol transmission. Finally, aerosol transmission of *M. tuberculosis* from humans to animals has been reported (10). The disease has been reported in elephants, nonhuman primates, and several other species (11). The reemergence of *M.bovis* infection in captive and free-ranging wild animals, with subsequent transmission of infection to domestic animals, is of concern to livestock producers and regulatory officials in the United States and in several other countries of the world (12).

In Ethiopia, tuberculosis is also a major cause of morbidity and mortality. Ethiopia is among the 22 High TB Burden Countries and among the 27 high MDR TB burden countries in the world. Compounded with HIV/AIDS, TB has become a formidable threat to the country (11-13). And Ethiopia stands 10thin the list of High Burden Countries for TB (14). According to the 2005/2013health and health related indicators of the FMoH, 130,614 new TB cases were detected nationally, case detection rate, TB treatment success rate and cure rate was58.9%, 91% and 70% respectively. And TB mortality was estimated to be 32 per 100,000 populations in 2013(2). According to WHO report of 2014 on TB program in Ethiopia; TB remains one of the leading causes of mortality in the country(12) . Likewise in EFY 2007/2015, a total of 135,831 TB cases

(all forms) were reported with a TB case notification rate of 1.51per 100,000 population; this performance was higher than in EFY 2006/2014 (1.33 per 100,000 population). Out of the 135,831 cases reported in EFY 2007/2015, 35.1% were smear positive pulmonary TB, 32.4% were smear negative pulmonary TB, 29.8% were extra pulmonary TB and 2.7% were previously treated TB cases. In 2007/2015 the TB case detection rate reached 67.3%, which was more than in 2006/2014 year (53.7%) but below the target set for the year (83.0%). TB treatment success rate (TSR) in EFY 2007/2015 showed the same performance as EFY 2006 (92.1%). TB cure rate increased from 69.1% to 77.9% (15).

Analysis of any data is the back bone in interpretation of public health's; and as being in the public domain TB data is also in need to be interpret as of other data as well since it is one of the public health concerns. So, there is no formal and regular data analysis trend on TB data in terms of place, person and time in the area so far.

Therefore, Tuberculosis is still among the major communicable diseases with high public health significance. Detecting and curing tuberculosis are among the key health interventions. As a result the major goal of TB surveillance analysis in South Gondar Zone is to make public measure of new TB cases and TB deaths that occur each year, and able to assess trends over time for better Management and to seek base line information to identified problem and further investigation/research for TB prevention and control.

Rationale of the analysis

Regular TB data analysis is important for unexpected increases or decreases cases and death, monitoring TB case trends over time, identify more affected age groups and evaluating the effectiveness of TB control programs and policies. This information is strongly important to alter the professionals and community in order to intervene, precautions and to determine the most appropriate and efficient allocation of public health resources, personnel and activate public health action. This data analysis also helps to facilitates further information in order to improve TB program performance, TB management, targeting of TB control in the zone.

2.2. Objectives

2.2.1 General objective

The aim of this study was to estimate the case and death of tuberculosis between July1/2014 and June 30/2017 in South Gondar Zonenorthwestern Ethiopia, 2018.

2.2.2. Specific objectives

- To describe tuberculosis cases and deaths by Person place and time.
- To determine different types of tuberculosis.
- To describe treatment outcome of enrolled TB cases.

2.3. Methods and materials

2.3.1. Study area

South Gondar zone is one of 13th zones of Amhara Regional state. It is located at a distance of 665 KM western part from Addis Ababa and 104 KM from the regional state center. Debre Tabor town is the capital city of the zone. South Gondar is bordered on the south by East Gojjam, on the southwest by West Gojjam and Bahir Dar, on the west by Lake Tana, on the north by North Gondar, on the northeast by Waghimera, on the east by North Wollo, and on the southeast by South Wollo; the Abay River separates South Gondar from the two Gojjam Zones. The catchment area of the zone is 142987 square kilometers with the projected total population of South Gondar zone in 2010 EFY is 2,526,813(males 1,205,294 and females 1,321,519) of whom 1,077180 are under 15 year population. The main ethnic group reported in South Gondar was Amhara which account 99.7% and all other ethnic groups made up 0.3% of the population. Amharic was spoken as a first language by 99.7% and the remaining 0.3% spoke all other primary languages reported. 96.14% accomplished Orthodox Christianity and 3.68% of the population was Muslim. Administrative structure of the zone is divided into 03 town administrations, 18 districts, 31urban Kebeles and 335 rural Kebeles. Average rain fall 1100 milliliter with range of Temperature 6^0c-32^0c and high from 1500-4131above see level. With the highest point in South Gondar is Mount Guna (4,231 meters).

Regarding health facilities distribution in South Gondar zone, there are six regular hospitals and one General hospital, 93 functional health centers and 378 functional health posts. Zonal health post and health center coverage is 93% and 86% respectively.

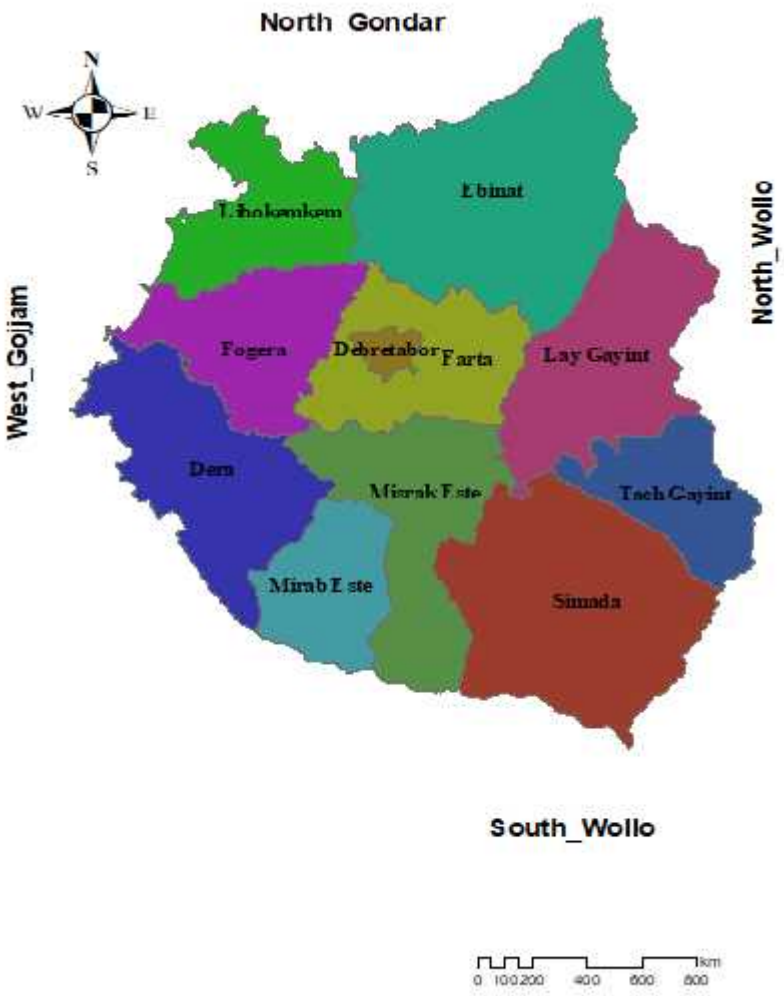

Figure 2.1: Map of South Gondar Zone Northwestern Ethiopia, 2018

2.3.2. Study period: Four years (July1/2014-Jun30/2017) Tuberculosis data was collected from South Gondar zonal health department from March 20-30/2018.

2.3.3. Study design: Descriptive studyof secondary data was used to analyze four years data of Tuberculosis in South Gondar zone.

A Case of tuberculosis: A definite case of TB (defined below) or one in which a health worker has diagnosed TB and has decided to treat the patient with a full course of TB treatment.

2.3.4. Definitions of TB Cases Classification

Pulmonary tuberculosis (PTB): refers to a case of TB involving the lung parenchyma. Tuberculous intrathoracic lymphadenopathy (mediastinal and/or hilar) or tuberculous pleural effusion, without radiographic abnormalities in the lungs, constitutes a case of extra pulmonary

TB. A patient with both pulmonary and extra pulmonary TB should be classified as a case of pulmonary TB (12).

Smear-positive pulmonary TB (PTB+): A patient with at least two initial sputum smear examinations positive for AFB by direct microscopy, **or** A patient with one initial smear examination positive for AFB by direct microscopy and culture positive**, or** A patient with one initial smear examination positive for AFB by direct microscope and radiographic abnormalities consistent with active TB as determined by a clinician.

Smear-negative pulmonary TB (PTB-): A patient having symptoms suggestive of TB with at least 3 initial smear examinations negative for AFB by direct microscopy, And No response to a course of broad-spectrum antibiotics, and Again three negative smear examinations by direct microscopy, and Radiological abnormalities consistent with pulmonary tuberculosis, and Decision by a clinician to treat with a full course of anti- tuberculosis, or A patient whose diagnosis is based on culture positive for M. tuberculosis but three initial smear examinations negative by direct microscopy(14).

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 a biopsy, Or TB based on strong clinical evidence consistent with active EPTB and the decision by a physician to treat with a full course of anti-TB therapy(16).

2.3.5. Definitions of Key Indicators in TB cases

Cured: initially smear-positive patient after treatment who became sputum smear-negative.

Defaulter: A patient who has been on treatment for at least 4 weeks and whose treatment was interrupted for 8 or more consecutive weeks.

Died: A patients who died by any reason during the course of TB treatment.

Relapse (R): A patient declared cured or treatment completed of any form of TB in the past, but who reports back to the health service and is now found to be AFB smear-positive or culture positive.

TB treatment success rate: percentage of a cohort of new smear positive TB cases registered in a specified period that successfully completed treatment. Successful completion entails clinical success with or without bacteriological evidence of cure.

Treatment completed: A patient who completed treatment but for whom smear results are not available at 7^{th} month or one month prior to the completion of treatment.

Treatment failure: A patient who remains or becomes again smear-positive at the end of 5 "month" or later during treatment. PTB negative patient at the beginning and come back smear-positive at the end of the intensive phase is called treatment failure.

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

2.3.6. Data source: Data was obtained from SGZ health department TB office &HMIS unit.

2.3.7. Sample size: All TB cases reported during July1/2014-Jun30/2017 from all districts of South Gondar Zone.

2.3.7. Study subject: All TB cases registered on HMIS data base of all districts of South Gondar Zone.

2.3.8. Data processing and analysis: AfterFour years TB data was collected, checked for its completeness and cleaned Microsoft Excel was used to organize and analyze.

2.3.9. Ethical issues: official letter was written from APHI to south Gondar zonal health department for field base training attachment. Verbal consent was obtained from South Gondar zonal health department to collect data from South Gondar Zone health department TB office and HMIS unit.

2.4. Result

The socio-demographic of the population who were lived in south Gondar zone 85% depends on farming mixed with rearing system. 3 districts from a zone dependent of food security due to frequently drought situations occurred in there. Contradict 3 districts from a zone were wealthy they produce twice a year by irrigation system. Agro ecologically, South Gondar zone was 10%, 51%, 36% and 3% is Kola, Weinadega, Dega and Wurch respectively. A total of 10756 different forms of TB cases were reported in the study period (July1/2014-Jun30/2017), from which5841 (54%) males. From all TB cases reported 9455(87.9%) were above 15 years age. The average case detection rate for all form TB was 50% whereas smear positive pulmonary TB was 22%. The proportion of TB from July1/2014-Jun30/2017 was found to be 49%, 31% and 20% for EPTB, PTB- and PTB+ respectively. The highest death rate was 8.5% by PTB+ and the lowest 2.5% by EPTB were observed in 2014 and in 2017 respectively. Average number of cases was high in Dera 1384 andMisraq Estie 1291 and the low in Tach Gayint 377 (Figure: 2.2).

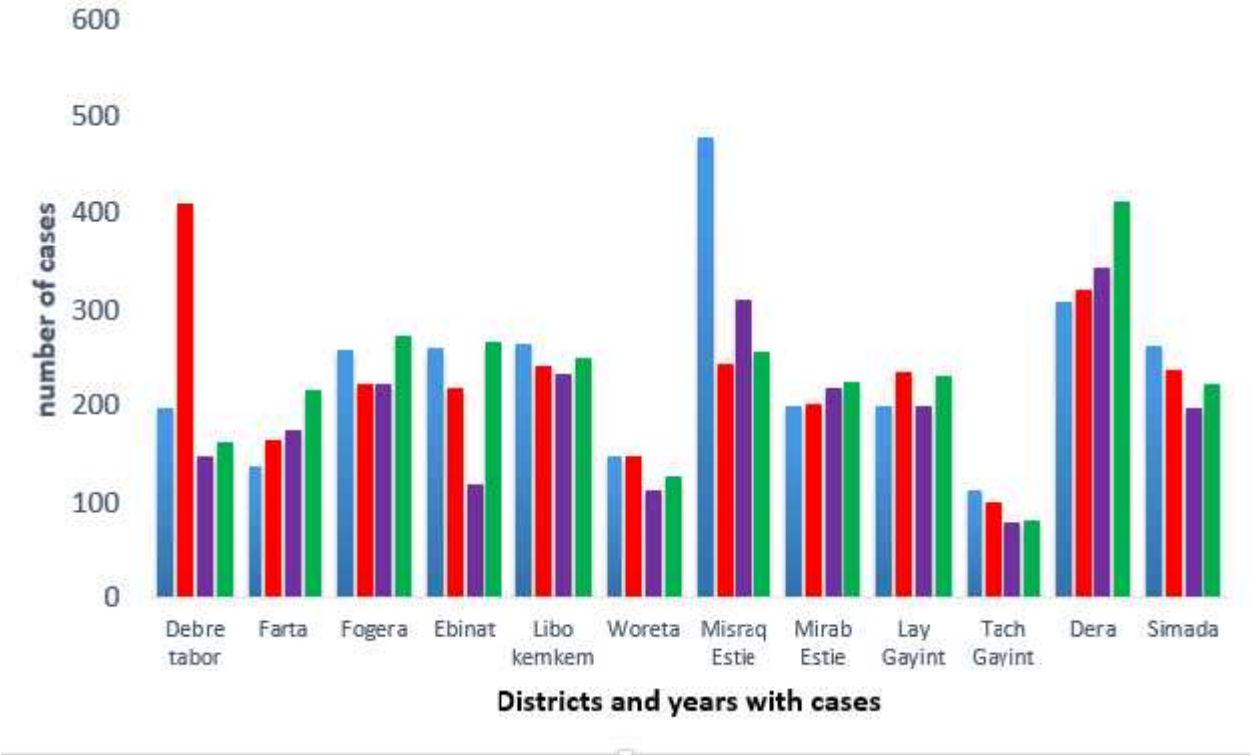

Figure 2.2: Distribution of TB cases by woreda South Gondar zoneNorthwestern Ethiopia, July1/2014-Jun30/2017

The proportion of Tuberculosis in different age category

In the four consecutive years the proportion of tuberculosis were high in greater than or equal to 15 age category and low in 0-4 age category.

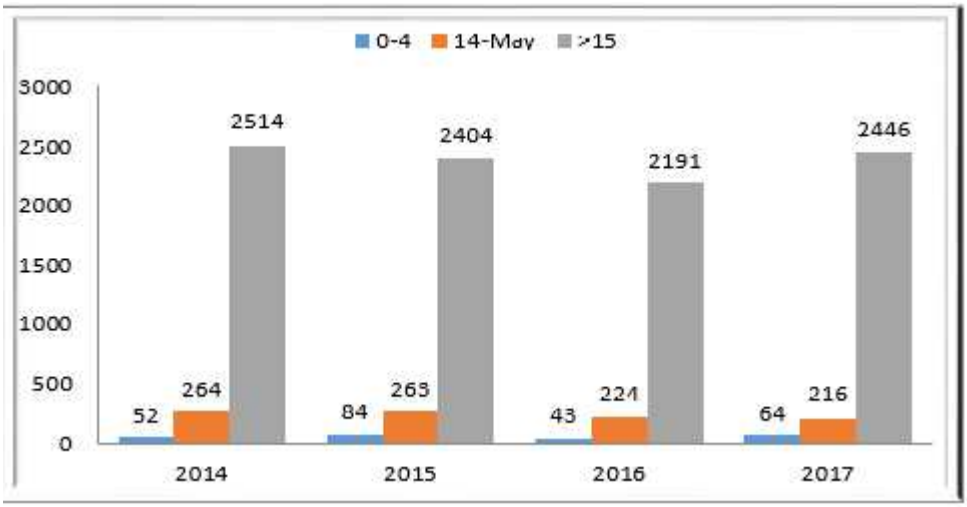

Figure 2.3: The proportion of TB cases in different age groups by Bar graph in South Gondar zone Northwestern Ethiopia, 2018

The burden of tuberculosis in age category and sex

The number of tuberculosis in male was 5841(54%) from the four consecutive years

The burden of TB cases from four consecutive years by different age groups and sex show here below in the table.

Table 2.1: The total Number of all forms of TB cases by Age and Sex category in South Gondar zone Northwestern Ethiopia, 2018

Age	Sex	Year				Total
		2014	2015	2016	2017	
0-4	M	30	47	20	38	135
	F	22	37	23	26	108
5-14	M	117	140	109	104	470
	F	147	123	115	112	497
≥15	M	1366	1282	1224	1364	5236
	F	1148	1122	967	1082	4319

Distribution of TB forms in each year were 22% PTB+ in 2015, 34%PTB- in 2015 and 49% EPTB in 2014 presented below in the table.

Table 2.2: Distribution of TB Cases in each consecutive year South Gondar Zone Northwestern Ethiopia, 2018.

Year	PTB+ [N (%)]	PTB- [N (%)]	EPTB [N (%)]	Total [N (%)]
2014	593(21%)	847(30%)	1390(49%)	2830(26.3)
2015	604(22%)	938(34%)	1209(44%)	2751(25.6)
2016	464(18.9%)	808(32.9%)	1186(48.2%)	2458(22.8)
2017	454(16.7%)	750(27.5%)	1522(55.8%)	2726(25.3)
Total	2115(20%)	3343(31%)	5307(49%)	10765

The proportion of TB forms with different age category in south Gondar zone was showed below in the table. The number of different TB cases in different age group in each year's describes here below.

Table 2.3: Incidence of PTB+, PTB- and EPTB cases per total population /year by age category in South Gondar zone Northwestern Ethiopia, 2018

Year	0-4			5-14			≥15		
	PTB+	PTB-	EPTB	PTB+	PTB-	EPTB	PTB+	PTB-	EPTB
2014	2	8	7	58	87	227	400	556	881
2015	1	13	12	38	139	189	412	572	742
2016	2	5	6	26	85	195	309	516	722
2017	2	9	11	4	6	22	30	48	94

The actual number of all Type of TB cases in both sex burdens in each year's presented by Bar graph below.

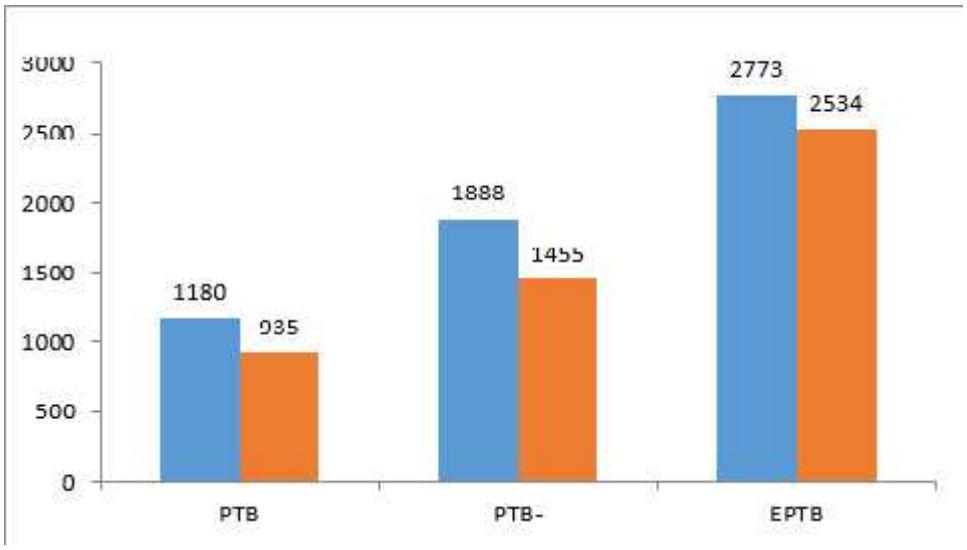

Figure 2.4: Type of TB cases by sex South Gondar Zone Northwestern Ethiopia, 2018

The total numbers of tuberculosis cases were detected during each four consecutive years's proportionate by sex.

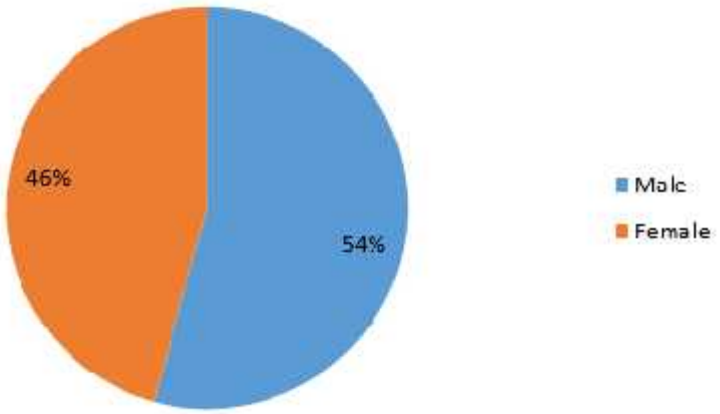

Figure 2.5: Proportion of all form TB cases by sex in South Gondar zone Northwestern Ethiopia 2018

The proportion of TB forms in the four consecutive years were 49% Extra-pulmonary tuberculosis.

The total four year proportion of EPTB, PTB-, and PTB+ cases detected and sum up from each consecutive year presented below here in pi-chart.

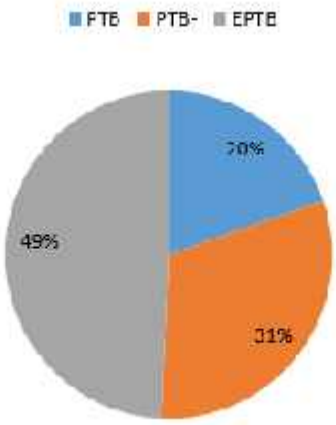

Figure 2.6: Percentages of each type of TB cases in sum of each four years in South Gondar zone Northwestern Ethiopia 2018

The trends of Pulmonary tuberculosis smear positive (PTB^{+}) comparison with other all forms of TB cases were presented below here from each consecutive fours(2014- 2107).

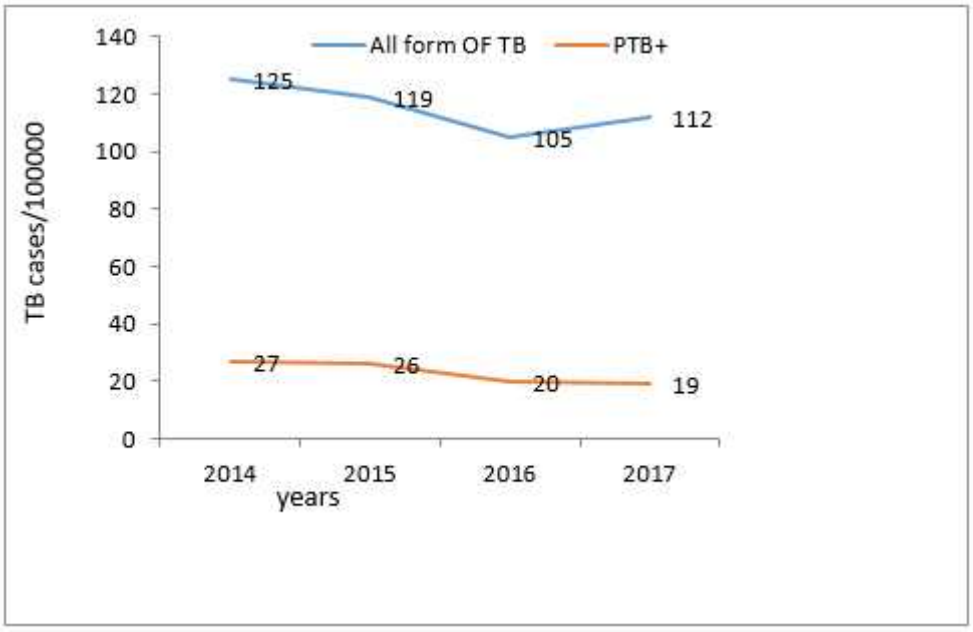

Figure 2.7: The comparisons of PTB+ with all form TB cases per year in South Gondar zone Northwestern Ethiopia, 2018

Trend analysis of TB data treatment success rate and curative rate from 2014-2017 were describes below in the graph (Figure 9).

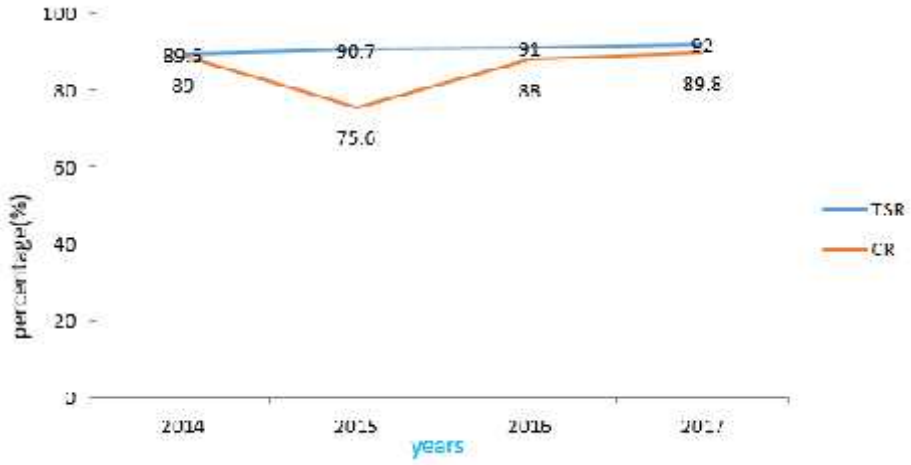

Figure 2.8: Smear positive pulmonary TB treatment successes and cure rates by year in South Gondar zone Northwestern Ethiopia, 2018

From the total number of re-treatment tuberculosis cases relapse, treatment failure and defaulters in the four consecutive years were explained by line graph below here (Figure2.9).

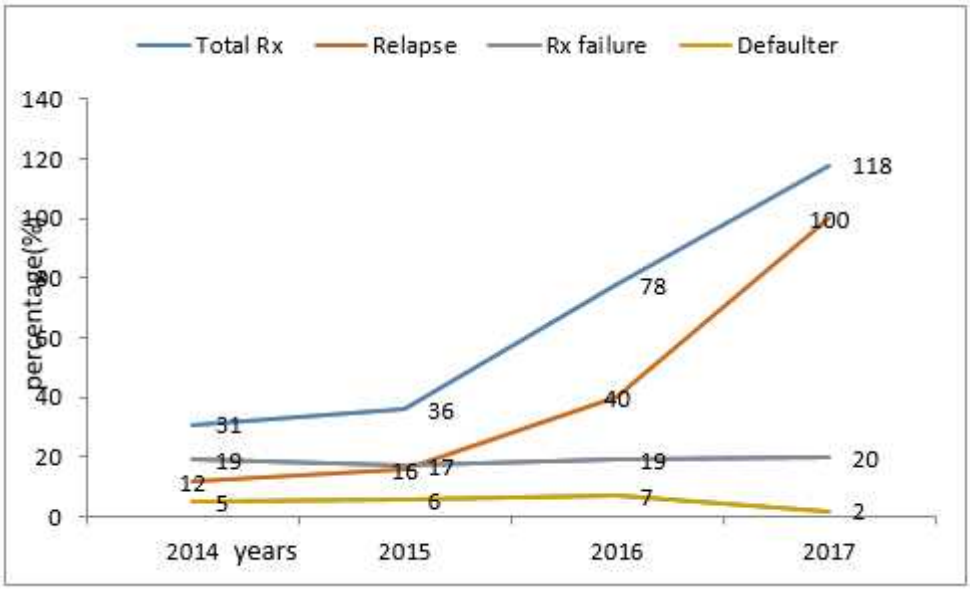

Figure 2.9: Total Number of re-treatment cases of tuberculosis and its output in South Gondar zone Ethiopia, 2018

The death rate of all forms of TB cases(PTB+, PTB- and EPTB) in each four consecutive years were descript in the graph below(Figure 2.10).

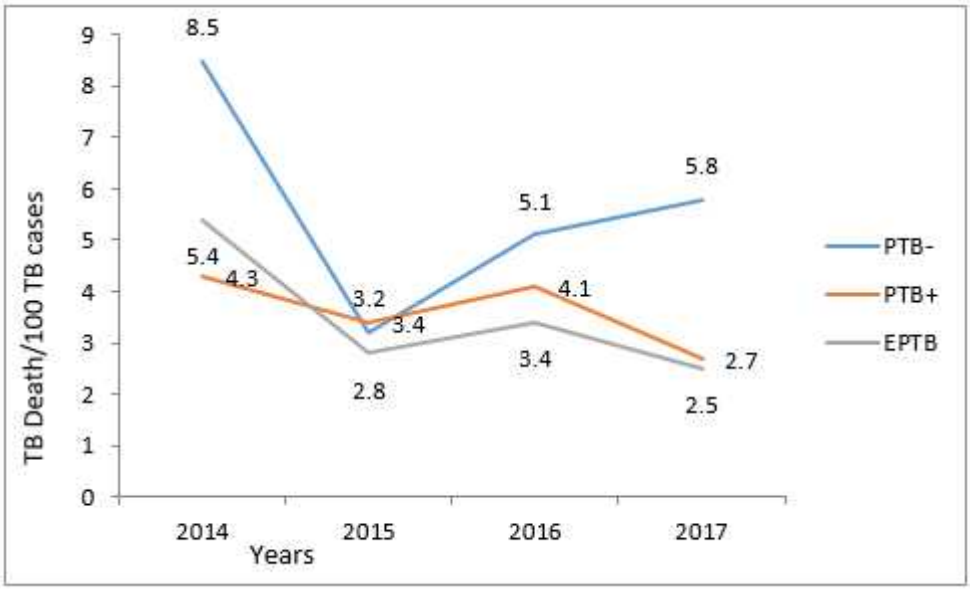

Figure 2.10: Number of death/100 TB cases of diseased PTB+, PTB- and EPTB cases in South Gondar zone Northwestern Ethiopia, 2018

2.5. Discussion

Data analysis was conducted to assess the distribution of TB in South Gondar zone. The proportion of all form TB were 2%, 9% and 89% for 0-4, 5-14 and ≥15year's old age group respectively. This is consistent with finding from TB survey done in Debre Berhan Hospital, Northern Ethiopia, 2009-2013, one in ten finding was less than 15 age groups and seven in ten ≥15 age groups (17).

The number of pulmonary tuberculosis positive cases were also high ≥ 15 age groups and low 0-4 and 5-14 age groups during four years period which is similar to Debre Berhan Hospital, Northern Ethiopia 2009-2013. This might be due to related with the prevalence of HIV/AIDs which is high in the adult population. The proportion of TB cases data analysis in south Gondar from 2014 up to 2017 were 49%, 31% and 20% for EPTB, PTB- PTB+ and respectively. It is different from FMOH annual performance report 2014/15(2, 15) and Debre Berhan Hospital, Northern Ethiopia(2). This difference might be missed diagnosis and false reporting system at each level of health facilities and it needs serious examination and revised of the report to look for the existence of actual of PTB^{+} and EPTB cases.

TB case report analyses picture out males were 54% and females (46%) which means, not too much different exposure in sex differencein TB infection. This result is parallel to study conducted at YirgaCheffe Health Center, Ethiopia 2008-2013. From a total of 1190 cases were reported for tuberculosis diseases, 676 (56.8 %) males and females 514 (43.2 %) were diseased by TB (18). This is also consistent with study conducted in Debre Birhan, Ethiopia 2009-2013; from total of 1280 TB cases 649(50.7%) were males(39).

The annual average detection of all forms & pulmonary smear positive tuberculosis cases were 10765(54%) &2115(22%), which is very far from the WHO case detection rate target of ≥83% and≥70% respectively in 2014/15. And the highest detection of all form TB and PTB+ cases were 54% and 26% respectively in 2017 and 2015 years, which is also below the national target (2). The low detection rate of all form TB and PTB^{+} cases might be due to under reporting or poor diagnosis of TB cases.

The highest death rates were 8.5%, 5.4% and 4.3% in 2014 for PTB-, EPTB and PTB+ respectively. This was higher than average of death 1.8% Debre Birhan, Ethiopia between January 2009 and December 2013 and 3.1 in Dabat, northwest Ethiopia, and 2007-2012 (15). It might be

different reason; interruption of treatments and weak implementation of daily observed treatment at facility level, patients used drugs without the recommendation, not properly implementation of advice.

The Limitation of this study was only collected the data's in TB officer and HMIS unites not cross check the data at regional level and each district under the zone. Turnover of the professionals there were lose and incomplete of the data source (HMIS). Lake of equipment's like personal computers and desktops was poor documented.

2.6. Conclusion

Based on the analysis obtained, the following conclusions are made.

The study concluded the number of TB cases were increase in productive age groups (15-64). The highest amount of the report confirmed extra pulmonary tuberculosis whereas the lowest amount in the report were PTB^{+} patients in the South Gondar during analysis period. The treatment success rate, cure rate and detection rate was lower than national target which needs strengthen surveillance system, TB training for health professional and improving TB screening and ensuring quality of laboratory diagnostic tools.

2.7. Recommendation

Based on the above conclusion the following Recommendation is forward.

- Districts health office better to strengthen regular surveillance system to improve treatment success and detection rate
- Health facilities must be care implementation of daily observed treatment at facility level to reduce death rate
- District health office and health facilities encourage health professionals actively finding of cases by screening all HIV patients for TB and all patients with sign and symptom of TB to improve case detection rate
- South Gondar zonal health department,woreda health office should be revise the reports when the EPTB is exceeds compared to the national report
- RHB and any stake holder provide a system for further studying associated factors of TB related with gender that males were more affected than females on this analysis
- Collaboration of RHB, South Gondar zonal Department, woreda health office and NGOs may strengthen the TB control program and by solving the problems

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Chapter 3 : Surveillance System evaluation

Summary

Back ground: Surveillance is known as information for action and Public health surveillance is the on-going, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event. Based on the surveillance impression, Public health emergency management (PHEM is implemented in most of the regions to strengthen the surveillance and early warning system for public health emergencies and events. One function of surveillance system is to assess diseases under eradication and elimination programme being included. So, acute flaccid paralysis is one of the surveillance disease included under eradication program. The aim of this study is to assess the performance of core activities and attributes of surveillance system on AFP

Objective: To evaluate the surveillance system of AFP/polio in south Gondar zone northwestern, Ethiopia.

Method: Cross sectional descriptive study was employed to evaluate the surveillance system of south Gondar zone. Health Facility, District and Zonal PHEM focal persons were interviewed using questionnaire adopted from WHO and CDC surveillance system evaluation questionnaires.

Result: System was found easy to operate so declared simple as collecting all necessary information. It was found flexible with ability to accommodate other diseases. Two (20%) respondents did not follow the national report schedule day. Eighty percent did not have updated guidelines and manuals, two (20%) had no epidemic management guidelines and manuals at all, only five (38%) conduct data analysis for their activities, two (20%) had shortage of weekly reporting form. All respondents reported that they had no budget secured for surveillance activities. All respondents agreed upon the surveillance system is easy to use for case detection and filling the data and on average it takes 10-15 minutes to fill their reports. The health service coverage of south Gondar zone was 89% and majority of respondents agreed that reporting agents accept and well engaged to the surveillance activities.

Conclusion: Surveillance system is help full for detection of the diseases and outbreaks early and timely response of the cases or events. AFP/polio suspected cases were low in number compared with other targeted disease. All visited health facilities and woredas have no updated guidelines. Some of the health facility have shortage of weekly reporting forms and line list. Expected reporting schedule and actual practice of reporting in some of visited facilities is different.

Key words: Acute Flaccid Paralysis, surveillance system, south Gondar zone, 2018

3.1. Background

3.1.1. Introduction

Surveillance is known as information for action and Public health surveillance is the on-going, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health. Data disseminated by a public health surveillance system can be used for immediate public health action, program planning and evaluation, and formulating research hypotheses (1). Although the need for effective surveillance systems has been recognized, there is increasingly international pressure to improve the effectiveness of those system even further (2).

The capacity of surveillance system to accurately describe patterns of disease is of public health importance. Therefore, regular and relevant evaluation of these systems are critical in order to improve the performance and efficiency(3). Depending on the epidemiological, sociological and economic factors disease surveillance system can be complex, meaning that multiple attributes are required to assess their performance and many different methods and tools are needed to evaluate those (4). The evaluation of public health surveillance systems should involve an assessment of system attributes, including simplicity, flexibility, data quality, acceptability, sensitivity, predictive value positive, representativeness, timeliness and stability (5).The primary purpose of surveillance system evaluation is to ensure that problems of public health importance are being monitored efficiently and effectively. The intent of the evaluation is to focus on how well the system operates to meet its purposes and objectives(6) .

As a first step a 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 (7).

In Ethiopia 21 diseases (13 are immediately reportable whereas 8 are weekly reportable) are selected to be included into the routine surveillance. 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(8) . It is carried out through a system which has legal support and extending from the central health authorities down to the peripheral health facilities and community level through sets of communication channels. These sets include upward and down ward reporting and feedback mechanism.

The routine flow of surveillance data is usually from reporting sites to the next level up to the central level. The community and health facilities especially health posts are the small unit source of information. The information collected from this site is compiled in standard forms, analyzed 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 will follow the same route. Those prioritize diseases under surveillance have standard case definition(s) and reporting formats defined by the ministry of health and WHO. Reporting is institutionalized into the health facilities and health offices. The general frame of work flow is shown below.

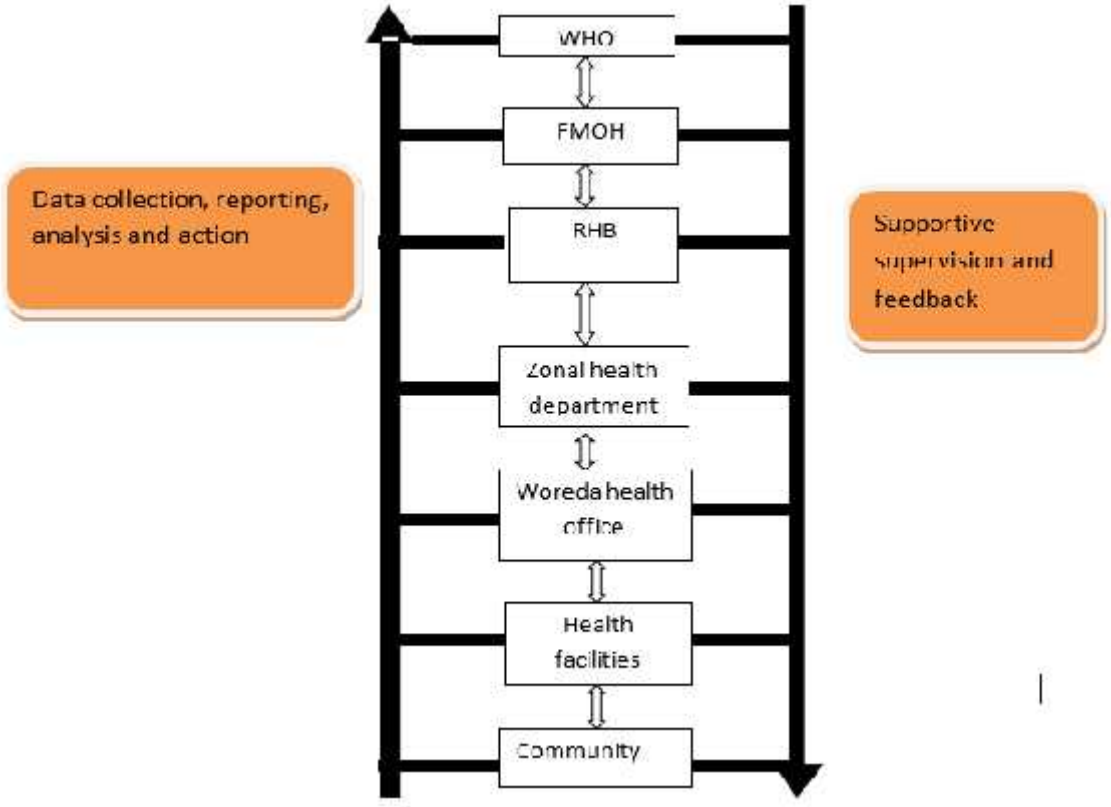

Figure 3.1: the flow of surveillance system in south Gondar zone Northwestern Ethiopia, 2018.

The polio eradication initiative in Ethiopia was started in 1996 based on the guideline provided by

the World Health Organization (WHO). Ethiopia has adapted the four strategies to eradicate polio. These are achieving high routine immunization coverage, national supplemental immunization activities (SIAs), acute flaccid paralysis surveillance and mop-up campaign. Since then the country has been conducting a number of rounds of National Immunization Days (NIDs) and Sub-National Immunization Days (SNIDs) to interrupt circulation of wild polio virus (9).

Ethiopia initiated surveillance in 1997 and AFP forms part of the Integrated Disease Surveillance and Response (IDSR) which was adopted in 1998. Currently, AFP surveillance in the country is conducted by FMOH in collaboration with WHO. The difficult terrain, sparse, migratory population and weak infrastructure in Ethiopia constitute especially challenging conditions for AFP detection. The last laboratory confirmed wild poliovirus was identified in April 2008 in Gambella region. However, the country remains at risk for re-infection because of a number of silent areas and borders with high risk countries (9).

AFP are parts of those reportable disease lists under surveillance in Ethiopia mentioned in the guideline which is weekly and immediately basis.Therefore, in order to solve such problems public health surveillance systems should be evaluated periodically and the evaluation should include recommendations for improving quality, efficiency, and usefulness (1).

3.1.2. Statements of the problem

According to public health surveillance system of Ethiopia a suspected outbreak of immediately reportable diseases such as AFP should be notified from level to level within 30 minutes of identification of a problem for early detection and immediate action. All woreda and levels above should calculate the completeness and timeliness of the reports received on weekly basis. The national target for report completeness and timeliness is greater than or equals to 80%. As an indicator of surveillance sensitivity, at least two cases of non-polio acute flaccid paralysis (AFP) estimated be detected annually per 100,000 populations aged less than 15 years.

AFP surveillance is one of the key strategies for polio eradication. However, there are potential problems that can undermine the importance of AFP surveillance systems. These include inappropriate case definitions or lack of case definitions, staff not adequately trained, zero reporting not implemented, delay in reporting, poor data analysis, interpretation and use, poor data management, poor logistics to support surveillance activities (e.g. insufficient transport mechanisms, specimen kits/carriers, communications) and absence of feedbacks . On the other

hand intensive surveillance achieving close to 100% detection of AFP cases is required to ensure that any and all cases of AFP are detected(9).

3.1.2. Significance of the of the study

The first reasons of this study was evaluation of AFP/polio eradication activities is combining epidemiological and laboratory investigations of acute flaccid paralysis (AFP). Poliomyelitis is the disease which is targeted for eradication from the country and two non-polio AFP cases per 100,000 population are expected to show surveillance system sensitivity. In south Gondar zone there were 18 (36%) AFP suspected cases reported in 2016/17. The second reasons, Surveillance system evaluation was not done before in South Gondar zone. Furthermore, the identified problems delayed case detection, reporting and response during an epidemic might be occurred. Therefore, this study will be conducted to evaluate the status AFP surveillance system activities according to the eradication program, describe the specific attributes and identify areas for improvements.

3.2. Objective

3.2.1. General Objectives

- To evaluate the surveillance system of acute flaccid paralysis/poliomyelitis in South Gondar zone Northwestern Ethiopia, 2018

3.2.2. Specific objectives

- To assess activities of the surveillance system such as case detection, reporting, analysis and response system
- To evaluate the attributes of surveillance system on AFP/ polio
- To identify the strength and weakness of the surveillance system

3.3. Methods and materials

3.3.1. Study Area and period

The South Gondar zone is one of 15 zones of Amhara region state Ethiopiawhichhas 15 woreda and 410 kebeles. It is located in Northwestern Ethiopia with the area of 14095 sq.km. Debre Tabor is the capital town of the South Gondar zone which is 2705m above sea level. The projected total population of South Gondar zone in 2018 is 2526813 out of which 1288675(51%) are females. From the total population 2198327 (87%) resident in rural areas.

Regarding health facilities distribution within the zone, there are seven hospitals (one general), 93 functional health centers and 378 functional health posts operated by the regional government. In addition, there are 54 lower and 20 medium Private clinic, four basic diagnostic and 35 drug stores operated by private owner. The health service coverage of the Zone is greater than 89% and health post and health center health service coverage is 93% and 86% respectively. South Gondar zone is selected purposively out of 13 zones by recommendation/directionfromregional PHEM directorate owner.Because of easy accessibility and the surveillance system evaluation is not done before and poor AFP reporting activity.

Figure 3.1: Map of Fogera and Dera woreda in South Gondar zone Northwestern Ethiopia, 2018

3.3.2. Study Design

Cross sectional descriptive study was used to evaluate the surveillance system AFP in South Gondar zone.

3.3.3. Source population

All health facilities and health offices which are found in South Gondar zone.

3.3.4. Study population

The study populations are selected health offices (one zonal health department and two woreda) and all health facilities in selected woreda.

3.3.5. Study unit

The study units are zonal health department, district health offices, health centers and health posts.

Inclusion criteria

Governmental health facilities and health offices which are currently implementing surveillance system of the country.

Exclusion criteria

Hospitals and private health facilities were excluded due to shortage of resource. Currently non-functional health facilities were also excluded from the study and those woreda do not have PHEM structure and new/ split woreda.

3.3.6. Sampling technique and procedure

South Gondar zonal administration is divided into 13 rural woreda and 2 town administration. From these 13 rural woreda, two woreda were selected purposively based good surveillance approach and silent of AFP surveillance. So Fogera and Dera woreda included in the criteria from each selected woreda two health centers were included in the study by simple random sampling technique. Finally from each selected health centers two health post were included in the assessment by simple random sampling technique. Therefore a total of 15 sites (one zone health department, two woreda, four health centers and eight health posts) were participated in the study.

3.3.7. Data collection Technique and procedure

Questionnaire adopted from WHO and CDC standard questionnaire for surveillance system evaluation was used during data collection at all levels. Zonal, woreda and Health Facility PHEM focal persons and outpatient department workers and other responsible bodies were interviewed.

To confirm responses and ensure quality of the data, observation of documents were done at all levels. Similarly, data at different levels were compared for their consistency.

3.3.8. Dataprocessing and analysis

Data cleaning was done during and after the data collection. The completeness and consistency of collected data were checked and coded manually before entered into a computer. Data analysis was conducted by using Microsoft office Excel 2013. Finally the results of the study were presented by narration, tables and figures.

3.3.9. Ethical clearance

This study was conducted to assess surveillance system of AFP. In addition the study subjects were health institutions which are found in the zone. Therefore Ethical clearance is not necessary for this study, because there is no direct contact with patients or community. Even through, official letter were obtained from regional Public health emergency management directorate, regional health bureau.

3.3.10. Dissemination of the study findings

We will be prepared and shared the written report of both hard and soft copies to Addis Ababa university school of public health and preventive medicine, Amhara Regional Health Bureau, South Gondar zone health department, and all visited woreda health offices and health facilities. Finally effort will be made to publish the finding of the study.

3.3.11. Standard Cases definition

AFP/ polio

Suspected: - Any child under 15 years of age with AFP or any person with paralytic illness at any age in whom the clinician suspects poliomyelitis.

Confirmed:-A suspected AFP case with wild poliovirus isolated from his stool.

3.3.12. Operational case definitions

Terms used in the evaluation were operationally mentioned as follows:-

Case detection: is the process of identifying cases and outbreaks.

Case registration: book logs that used to recording the cases identified.

Outbreak confirmation: refers to the epidemiological and laboratory capacity for confirmation.

Reporting: the way of moving surveillance system from the point of generation up to EPHI/WHO following its hierarchy.

Epidemic preparedness: plan is a written document giving decision-makers and other key player's orientation on a list of activities to be implemented in order to respond to epidemics.

Stakeholders: The organizations or individuals that generate or use surveillance data for promotion of health, prevention and control of diseases.

Usefulness: Usefulness of the surveillance system is reflected by documented changes in policies and procedures as a result of information generated by the system.

Simplicity: Simplicity denotes the structure and ease of operation of the surveillance system.

Flexibility: Flexibility of a surveillance system is its capacity to adapt to changing information needs or operating systems within minimal additional time, personnel and funding.

Quality: The quality of data reflects the completeness and validity of the data recorded in the Zonal Health Department.

Acceptability: Acceptability is the willingness of persons, institutions or organizations to participate in the surveillance system.

Sensitivity: Sensitivity refers to the ability of the system to detect cases or outbreaks through trends in the surveillance data.

Positive predictive value: Positive predictive value refers to cases that actually have the health condition in question.

Representativeness: Representativeness refers to the extent to which the surveillance system accurately describes the occurrence of medical condition over time and their distribution in the population by place and person.

Stability: Stability was assessed by questioning the surveillance officers on the consistency of the system.

3.4. Result

Engagements of stakeholders:-

stakeholders of the surveillance system in South Gondar zone of Amhara region national entities such as zonal health department, woreda health offices, health facilities, field epidemiology residents and the general public. A brief discussion was done with health office and health facility heads, PHEM focal person of selected institutions and other concerned staffs about the importance of surveillance system evaluation before conducting data collection for this study. They assisted us to ask the appropriate inquiries and assessed pertinent attributes of the surveillance system.

Centers for Disease Control and Prevention (CDCP) helped us in supplying the funds field base activity.

Description of the importance of AFP in South Gondar zone

The relevance of public *health surveillance system*

AFP is one of immediately reportable disease that targeted under public health surveillance.

AFP/Polio

At zonal level, 111 suspected AFP cases were reported from 15 woreda, Hospitals and towns from 2013/14 up to midyear of 2017/18. Among the total AFP suspected case 22 cases were reported from those respondent woreda: (6 cases from Fogera woreda and 16 case from Dera woreda). Non-polio AFP cases trends in South Gondar zone from 2005-2010 is describe in the following graph (3.2)

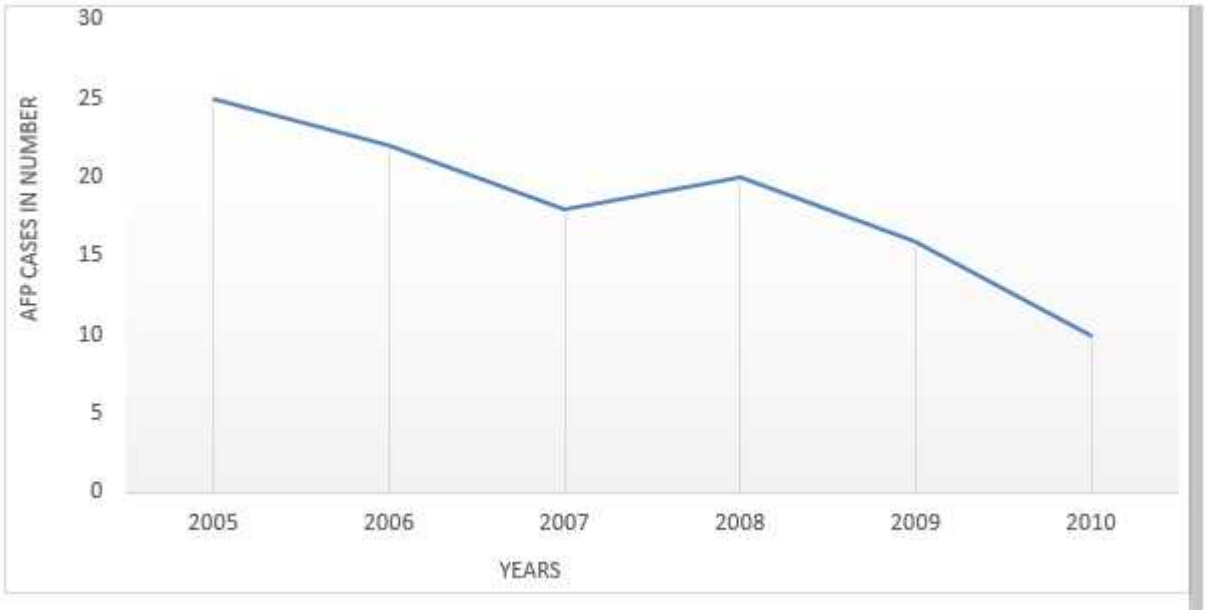

Figure 3.2: Trends of Non polio AFP number from 2013-2017/18in South Gondar zone Northwestern Ethiopia, 2018

Stool adequacy of the zone is 80% which is below the target (>=90%). From the study woreda, Fogera district stool adequacy and stool condition is poor as shown in the below (figure3.3), but in Dera both stool adequacy and stool specimen condition arriving at national laboratory center is

good condition. similarly Tach Gayent, Simada, Woreta, and Ebinat also have poor both stool adequacy and stool specimen conditioning.

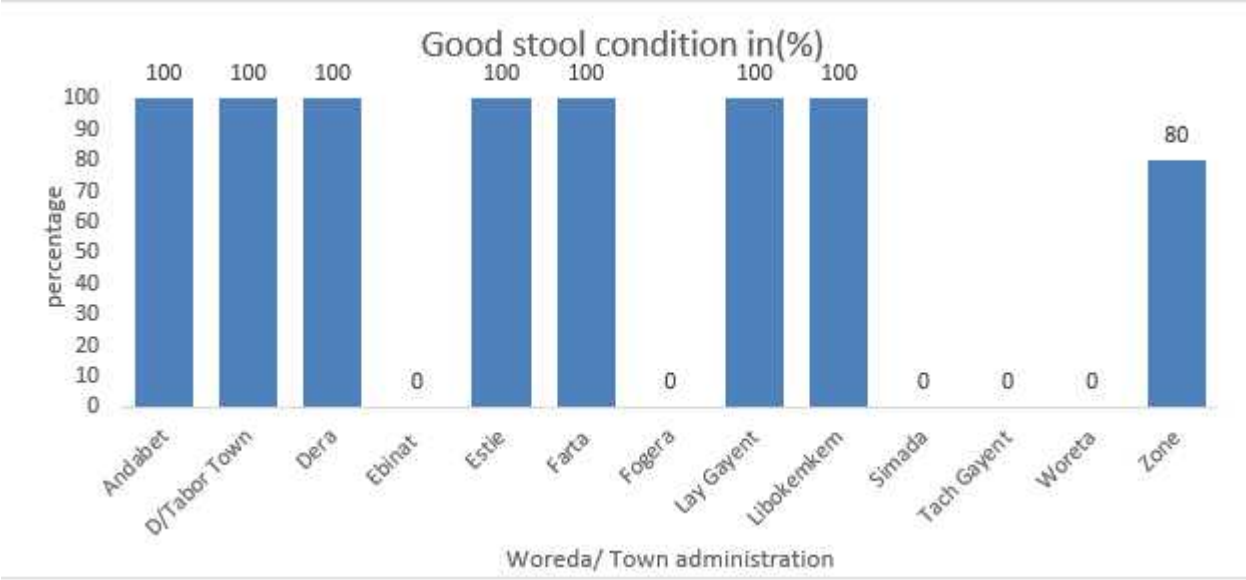

Figure 3.3: Stool adequacy and conditioning of South Gondar zone in Northwestern Ethiopia, 2018

Purpose and operations of the surveillance system

The overall objective of the surveillance system is to improve the ability of health workers to detect early and respond to priority communicable diseases, effective and timely decision making based on evidence, increases efficient utilization of available resources for preventing and controlling communicable diseases and improving the health status of the population under surveillance (10).

Targeted diseases under surveillance and included under this study

The Zonal health department PHEM unit targeted and engaged in activities on 22 priority diseases (13 immediately and 9 weekly reportable diseases), similar to that of Regional and National levels and leishmaniosis disease in regionally and other newly emerging (Table3.1). The data flows routinely transfer from health post to health center then passed to woreda forward to Zonal health department, region health bureau/APHI up to FMoH/EPHI. Resource is very scarce and it needs prioritization. For the reason of that, Federal ministry of health the public health emergency management core process given prioritization to those diseases that are of interest at national and international levels. Of these, 8 diseases (malaria, meningitis, dysentery, typhoid fever, epidemic typhus, relapsing fever, Sever acute malnutrition and scabies) are reported as weekly base and the

rest 15 diseases (yellow fever, rabies, small pox, polio, NNT, measles, guinea warm, viral hemorrhagic fever, cholera, anthrax, avian human influenza, sever acute respiratory syndrome, pandemic influenza, maternal death and prenatal deaths) are reported as immediately and weekly base. Of these targeted diseases under surveillance only AFP were covered in this study due to AFP is under eradication program (table 3.1).

Table 3.1: List of PHEM immediately and weekly reportable diseases

Immediately reportable diseases	**Remark**	**Weekly reportable diseases**	
1. Acute Flaccid Paralysis (AFP) /Polio	Under eradication	1. Dysentery	
2. Anthrax		2. Malaria	Under pre elimination
3. Avian Human		3.Meningococcal Meningitis	
4. Cholera		4.Relapsing fever	
5. Dracunculiasis / Guinea worm	Under eradication	5.Severe Malnutrition	
6. Measles	Under elimination	6. Typhoid fever	
7. NNT	Under elimination	7. Typhus	
10. Smallpox		8. Maternal death	
11. SARS		9.leshimaniasis	Regionally
12. VHF		10.maternal death	
13. Yellow fever		Scabies	

Case definitions

According to the PHEM guideline, there are two case definitions; standard case definitions and community case definitions:

Acute flaccid paralysis (AFP): Any child under 15 years of age with AFP or any person with paralytic illness at any age in whom the clinician suspects poliomyelitis

Community case definitions

It is very important at the community level to strengthen the notification and increase the detection rate of the priority diseases.

Acute flaccid paralysis: Any person with sudden onset of paralysis of the limbs.

The population under surveillance

The national public health emergency management targets all the population in the country to be under surveillance for all the twenty one priority diseases. The same replica were conducted in South Gondar zone.

Table 3.2: The population under surveillance in South Gondar zone by woreda, 2018

S.N	Areas under assessment	Projected total population for 2018		
		Urban	Rural	Total
1	Dera Woreda	49743	249063	293, 915
2	Fogera Woreda	9,029	115,692	261431
3	South Gondar zone	328486	2198327	2526813
4	Amhara	3437766	17212654	20650420

In South Gondar zone more than 87% of the population lived in the rural areas. From 15 respondents 12(80%) agreed that the surveillance system signifies equally rural and urban community, but two of them (13.3%) decided that surveillance system represents more in rural than urban community. One from the respondents confusing for surveillance system.

Table 3.3: Number of Health Facilities Available in the Assessed Areas South Gondar Zone Northwestern Ethiopia, 2018

Administrative area	Total Population	Number of Health Facilities						Health service coverage by HCs
		HPs	HCs	Hos.	NGO	Others	**Total**	
Dera Woreda	293, 915	52	12	1 On construction	0	0	64	Unknown
Fogera Woreda	261431	54	12	0	0	0	66	Unknown
South Gondar zone	2526813	106	24	7	0	0	130	89.5%

3.4.1. Core functions of the surveillance system

Case detection

One of the core functions of the surveillance system is case detection, which is the process of identifying cases and outbreaks. Case definition is important for cases/outbreaks detection and understanding of AFP cases definitions by the health care providers was satisfactory. In relation

to case detection, only 6 (46%) of health facility had the standard case definition and they posted measles, NNT and AFP standard case definitions. All health facilities and district health office had case definitions for disease under eradication and elimination. Standard case definition for AFP disease was also available in all visited health facilities. The health professionals were detecting any suspected cases of AFP using the case definition but the result of laboratoryinvestigation was not received yet as they told.

Case registration

Case registration is the way of recording the cases identified based on the standard case definitions. The clinical register was presented in 4(33.3%) visited health facilities. Concerning case registration most respondents recorded cases in their registration books, but only seven (64%) of the assessed facilities has reported consistence data with their clinical register records to the higher level during the evaluation of one month period reports (4 weekly reports). but the handling of these registers was poor. Evaluation of a one month period reports (4 weekly reports) submitted to the higher level.

All health centers had no standard samples collector and transport media of AFP to the respective regional or national laboratories.

Case confirmation

Case or outbreak confirmation refers to the epidemiological and laboratory capacity for confirmation. Having the capacity for appropriate specimen collection, packaging and transportation is mandatory for case confirmation. All of the health centers were able to collect stool sample and specimen to national lab, all participants have the capacity to handle.

Reporting

There was no shortage of reporting form in the past 6 months in all visited health facilities and health offices. This might be due to some of woreda health offices and health facilities use a different reporting format for weekly reporting systems preparing by themselves. In fact there were shortage of weekly reporting formats in two (20%) of the visited health facility in the last six months (wojit health center and abo quahar health post). Based on the national PHEM guideline, among 15 respondents 10 (69.2%) reported on their assigned scheduled day, four (30.8%) health facility did not report according to the guideline (Zara, wojit and Jigina health posts and Dera health office). All of PHEM focal persons who participated in the surveillance system evaluation respondents 15(100%) have contact address of the nearest assigned PHEM focal person to transfer

and receive data and information. If there was immediately reportable diseases, all respondents should use phone to report these events/cases. Generally, in all assessed health facility and health offices, the report completeness and timeliness were above WHO target (80%).

All of the 8 health Extension workers have been taken orientation on PHEM or AFP surveillance since two years ago. Twenty (63 %) of interviewed respondents and all six health extension workers didn't know the case-based report format for reporting AFP; only the PHEM focal persons were familiar with such formats more. All the health offices didn't take regular back up data from the computers in which they are using. Health post were not reported time which had its own drawback in delivering the report on time and in wasting time of the health extension workers which affect's service quality and is Provided by the health post but also has straight forward impact on the stability of the surveillance system as well.

Data analysis and interpretation

In all of the assessed health offices and health facilities, the PHEM focal person was responsible for data analysis. Among 13 health facilities, five (38.5%) of them conduct data analysis and interpretation partially because mostly they did not perform trend analysis.

Epidemic preparedness and response

There was no specific emergency budget in all visited woreda health offices, Zonal health department and health facilities. Of those visited sites only three (30%) of them had written epidemic preparedness and response plans for their priority diseases. All of them 7(100%) had established RRT and Epidemic Management Committee, but they are activated when an outbreak /epidemic occurrences.

Concerning laboratory confirmation, all suspected AFP cases specimen were sent to EPHI following the specimen collection, packaging and transportation procedures. The result of all samples send to EPHI weren't reply early.

Feed back

Feedback is an important function of all surveillance system. In this surveillance system evaluation we observed documents regarding to receiving feedback from the higher level.Amonginterviewed respondents eight (80%) received feedbacks at least quarterly from higher level that was integrated with other activities for further enhancing their strong side and to improve their weak portion. Two (20%) participants had no any documents about feedback on their performance from the higher levels during 2017/2018.

3.4.2. Supportive functions of surveillance systems

Standards and guidelines

Among 15 health institution, 6(38.5%) institution have no recently updated guidelines like PHEM guideline, Measles guideline and others, but eight (80%) participants have old guidelines like Measles, AFP and NNT guidelines 2008. The other two (20%) participants had no any available national manual or guidelines for implementing the surveillance system. From 15 institution only 46.2 % of the institution have AFP guide line of which 30% were posted on the wall in English version.

Training

Training refers to the needs for capacity building to enhance the quality of the surveillance system through knowledge and skill transfer. Among interviewed respondents, 13 (86.6%) were trained in surveillance and assigned focal persons, but one participant at Dera woreda health office (PHEM focal) did not take training in disease surveillance. Regardless to PHEM focal person, in our study areas some of the staffs were oriented towards surveillance system at each level (zonal, woreda, health center and health post).

Supervision

In this surveillance system evaluation, most of the participants were not conducted regular supportive supervision, rather supportive supervisions were conducted intermittently. All of the study participants were supervised by higher level officers in 2017/018. The frequency of supervision varies from two to six times within the year.

Communication facilities and Resources

Communication facilities the reporting and feed back in any surveillance system. We reviewed that, among the 15 respondents 10 (66.7%) used mobile or fixed phones, one respondent used hard copies(Quahar health post) and the zonal health department used E-mail to transfer data or information to the next level. Surveillance and response activities can be performed when appropriate financial, logistics and human resources are in place. In this surveillance system evaluation, one health center have no electrical power supply, computer and printers. The details of the logistics resources indicated below (Table 3.4).Only zonal institution use email for report

and only Dera woreda used postal service to report their activity and six (40%) of health facility send their reports by phone based and other institution used hard copy to their respective level of institution.

Table 3.4: Availability of resource in Assessed facility of South Gondar zone northwestern Ethiopia, 2018

Number of assessed sites	Number of assessed sites with available Resource							
	Electricity	Motorcycle	Bicycle	Vehicle	Computer	Printer	Fax	Wired phone
One Zone	1	1	0	1	1	1	1	1
Two Woreda	2	2	0	2	2	2	0	2
Four Health centers	3	4	0	0	3	3	0	1
Eight Health posts	0	0	7	0	0	0	0	0

Usefulness

In all visited health offices and health facilities respondents have a common understanding of early detection of epidemic prone diseases under surveillance as the major use of the surveillance system. More over the respondents believe that the surveillance system help to detect the outbreak of the selected disease on time, estimate magnitude of the morbidity, mortality, factors related to those diseases and to permit assessment of the prevention and control program.

AFP surveillance is used as a proxy for Polio surveillance. All acute paralysis may not cause by polio virus yet paralysis is one of the sign and symptoms of AFP cases hence the surveillance is designed in such a manner that it captures true cases poliomyelitis. The surveillance helps to identify the areas where there are wild polio virus circulation, to evaluate the effectiveness polio immunization strategies (Routine and supplementary immunization activities) and the surveillance is also basis for polio eradication certification. All the key informants and the interviewees strongly agreed that the surveillance is important. They emphasized that the disease under surveillance systems are streamlined and integrated it would enable them to uncover outbreaks and to prompt response so as to halt further spread.

All respondent (100%) knew that AFP is immediately reportable diseases under IDSR and the reported data was utilized by decision makers for action. AFP surveillance system and intervention

activities were going to interrupt the cases. They believe this was one of the indicators of usefulness of the system.

3.4.3. Surveillance system attributes

Simplicity

The simplicity of a public health surveillance system refers to both its structure and ease of operation. A surveillance system should be as simple as possible while still meeting its objectives. Simplicity is closely related to acceptance and timeliness. Simplicity also affects the amount of resources required to operate the system (8). As the assessment result, 10 (78%) of interviewed respondents were replied that the case definition of prioritized diseases such as AFP were easily understandable and simple for case detection by all tiers of health professionals. The system takes less than five minutes at 1 (7.7%) health post level and 10 to 15 minutes 3(23.1%) at health center, woreda and zonal levels 7(53.8%) of respondents takes greater than 15 minutes to fill formats. The timing of filling of formats was different from facility to facility: Dera woreda takes 5-10 minutes and zonal department takes to less than 5 minute to fill the format.

Flexibility

The disease surveillance system in the country since 1998 to 2009 E.C follow integrated disease surveillance and response approach. When the new Business Process Reengineering (BPR) was started in the in 2009, Public Health Emergency Management (PHEM) was established as one of the seven new core processes established in Federal Ministry of Health. Its scope is wider than IDSR as it tracks public health emergencies apart from disease outbreaks. During the era of IDSR monthly morbidity and mortality reports were collected from health centers and hospitals. However in the new system, PHEM the reporting begins from the health post and the reporting frequency shifted to immediately and weekly basis. AFP was one of the 23 prioritized diseases and conditions reported currently in spite of the fact that there are 20 priority disease and conditions are prioritized to be reported in the system. It also allows to report other events that are found to be threats for the public. The system is designed in a way that is flexible to include diseases that emerged and reemerged or other health and health related threat might be happened.

A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds. Eighty percent (80%) respondents in the selected sites agreed that the existing surveillance system is flexible in the

structure and reporting format. The reporting format is open for newly emerged and reemerging diseases and conditions. Therefore, the systems can accommodate any event in the" other" variable, for example, new health-related events and changes in case definitions or technology with little additional time, personnel, or allocated funds.

Data quality

The quality of surveillance data depends on their completeness and validity. The acceptability and representativeness of a public health surveillance system are related to data quality. With data of high quality, the system can be accepted by those who participate in it. In addition, the system can accurately represent the health-related event under surveillance. Examining the percentage of "unknown" or "blank" responses on surveillance forms is a straightforward and easy measure of data quality (8). Refresh Training and regular supervision by senior professionals can improve data quality. According to the copies of weekly reports of visited sites, at some health facilities and health offices the reporting format lacks reporting on in-patient cases, in-patient deaths and number of weekly reporting facilities. From visited sites only 6 (55%) of the reporting formats were complete with necessary information including zero report. 10 (91%) of respondents were trained on surveillance system. Missing of important variables like age and sex were observed in the weekly reporting formats.

4. Acceptability

Acceptability reflects the willingness of persons and organizations to participate in the surveillance system. It is a largely subjective measure, but some quantitative measures like patient or agency participation rate, interview completion rates and question refusal rates (if the system involves interviews), completeness of report forms and timeliness of data reporting can be examined to assess acceptability of the system(8).From selected study participants 92.3% responded were believed the reportsaccept by agents and well engaged to the surveillance activities. But one of them agreed that lack of feedback from higher bodies and lack of understanding of the relevance of the data to be collected and send.

We found that the reports were not complete, there were unfilled fields. Feedbacks from the Zonal level to the reporting health facilities were not delivered on time even in some of the health facilities they didn't have any ideas regarding feedbacks .The rate of community participation is still very low despite the community surveillance had been started in the woreda .

Sensitivity

It is the ability of surveillance system to correctly identify those who have the disease (or characteristic) of interest. These indicators cannot be calculated due to lack of complete data for the selected disease under surveillance.

Predictive positive value

The ability of the case definitions to detect true positive cases were assessed. Increasing specificity of the case definition and good communication between persons who report cases and receiving agency can improve PVP. We couldn't calculate the predictive positive value due to there isn`t positive AFP case for wild polio cases because of there wasn't received the results from EPHI whether the cases is positive or negative.

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. From all study participants 12(93%) of them responded that the health seeking behavior of the community was good due to awareness creation done by development armies in collaboration with HEWs. 6(46.2%) rural communities and 7(53.8%) of respondents were understand the representativeness of the system for all communities and all other systems of disease verification.

Timeliness and completeness

Report timeliness is the period of reports delivered in the next level in a public health surveillance system. The increasing use of electronic data collection from reporting sources and the increasing use of electronic data interchange by surveillance systems might promote timeliness. The most relevant time interval might vary with the type of health-related event under surveillance(8). Weekly report timeliness of South Gondar zone was mostly above 95% but during in the assessment week timeliness was 98%. However, the timelines of both Fogera and Dera woreda was 100% whereas other woredaslikeEbinat, Lay Gayent, and Estie were delayed reporting in South Gondar zone.

In 2009/2010 EFY from week 28 up to week 42 (11/3/2009-2/12/2010). The weekly reporting rate (completeness) of the assessed areas 97 % of reporting site were delivered to Fogera woreda ,

99.8 % facility report to for Dera woreda, and the average completeness of South Gondar zone was 98.6 %.

Stability

Stability refers to the reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operated when it is needed) of the public health surveillance system. A lack of dedicated resources might affect the stability of a public health surveillance system(8). About 8(62%) of respondents reported that surveillance system was not fully operating for some period due to lack of resources such as shortage of computer and electricity. All respondents agreed that may newly restructuring the system will not affect the procedures and activities of the surveillance system of the diseases.

3.5. Discussion

Public health surveillance system is crucial for population well-being. Therefore the system should be evaluated continuously to improve early detection and response to public health threats. Surveillance data collection was done weekly and/or immediately based on disease type. Standard case definition for priority disease is important to detect cases first for further actions. Most of the participants posted standard case definition for measles and AFP, however all of them did not post some of case definitions. These may lead to misdiagnosis of cases that will result bad consequences.

Public health emergency management manual was available in most of visited health facility, but not updated that may lead to mismanagement of cases. Shortage of standard reporting form in the two health facility in the past six months earlier to this evaluation may be due to poor planning or delay in requesting the report form the concerned body. Among 15 study institution Dera health center did not send their report according to the national PHEM guideline scheduled day. These creates difficulty to develop uniform reporting period throughout the country for immediate action and proper data management. Immediately and weekly collected data is not an end by itself. It should be analyzed, interpreted and used for decision making starting from local (generators of the data) to the central level in order for the values of the data to be realized.

Supportive supervision helps to strengthen the capacity of staff and ensure that the right skills are used appropriately, the necessary logistics are in place, and that planned activities are implemented according to schedule. In this surveillance system evaluation, most of the participants were not

conducted regular supportive supervision, rather supportive supervisions were conducted intermittently and with integration of other activities. All epidemic management committees did not evaluate their preparedness and experience as per the guideline of the national and regional recommendation.This might be due to lack of budget line and others logistic for emergency management. This all hindered the proper investigation and response expected for epidemic prone diseases. The finding of the evaluation revealed that half of respondents were not prepared epidemic plan and had no stock of drugs and supplies for emergency, rather than they prepared themselves to use drugs and other necessary materials from the health facilities that used routinely. Report completeness and timeliness of the zone was 98%in 2009/2010 EFY which is above the national target (80%). From study participants two (20%) report timeliness were below the national target. Thus in general the system attributes are related to each other, if the data is poor quality leads to the system less acceptable and less representativeness of the population under surveillance and vice versa.

Limitations and strength of the study of the study

Due to the time of political instability the key informative information might not be included and negligence of respondents and politicize of the activities. Private health facilities and Hospitals were not participated in the assessment due to time and resource constraints. So that the sample size may not be adequate to show zonal surveillance system.

3.6. Conclusion

Surveillance system is help full for detection of the diseases and outbreaks early and timely response of the cases or events. AFP suspected cases were low in number compared with other targeted disease. All visited health facilities and woredas have no updated guidelines. Some of the health facility have shortage of weekly reporting forms and line list. Expected reporting schedule and actual practice of reporting in some of visited facilities is different. Regarding to surveillance training, majority of the respondents are trained, but there is also non trained PHEM officer assigned in Dera woreda health office. In concern to epidemic preparedness majority of the respondents did not have proactive plan instead they respond reactively whenever the outbreak arise. Reporting rate of South Gondar zone was above the national target (80%) in 2009/2010 EFY. In general report completeness and timeliness of the study participants were above the national target.

3.7. Recommendation

- Dera and Fogera health office have to avail reporting formats
- visited health post have to reporting based on reporting scheduled
- Budget should be secured /allocate for surveillance activities at all health facility level.
- All woredas have to reported the line list of the events/disease that occurred
- Surveillance data should be analyzed, interpreted and used for decision making at all facility levels.
- Dera and Fogera woreda health office should be avail reporting formats and updated manuals to health facility.
- All Rapid response team in visited facility and woreda should be alerted all the time in respect to preparedness and response to health related events.
- Amhara regional health bureau should be avail stationaries and materials like computer, electricity and wired phone at least one in each health center.
- Amhara public health institute should be provided to untrained PHEM officers/ focal for Basic public health emergency system.

3.8. Reference

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Chapter 4 : Health profile

Health Profile Description of Fogera woreda South Gondar Zone Northwest Ethiopia **February 2018**

Abstract

Background: Health profile description provides an overview of the situation and trends of priority health problems and the health systems, including a description of institutional frame works, key issues and challenges. It is basic for planning, appropriate intervention and an entry point for operational research. Stakeholders in health and health related events in the community have evidence-based information from well compiled health profile.

Objectives: To assess the health and health related condition of Fogera Woreda North west, Ethiopia February, 2018.

Methods: A descriptive study had been conducted in Fogera Woreda since March 1-15/2018. Health and health related data were collected via interviewed, reviewed medical records, Discussion and General observation. The data sources are different sectors (woreda health office, education, administrative, agricultural, and cultural& tourism, finance and water).

Result: the most common diseases in adults and under five age categories were malaria which accounts 20.6% followed by AFI and noon bloody diarrhea 26.6% followed by pneumonia respectively. Vaccination coverage in Fogera district was BCG 86%, Penta3 94%, Measles 93%, and fully 92%. In maternal health service coverage ANC4 54%, Family planning 93%, Institutional deliver 55%, Skilled deliver 54% and Postnatal care 97%.

Conclusion: Malaria followed by Acute febrile illness in Adults and Noon bloody diarrhea followed by pneumonia in under five age groups were the leading morbidity disease in Fogera woreda. There were low maternal health service coverage in the study area. Hygiene and sanitarian activities coverage were also low. Woreda health office should be avail malaria prevention and control material timely.

4.1. Introduction

Health profile is a system of collecting, organizing, summarizing and interpreting health and other health related information/events to portray health and health related conditions such as demographic, socio-economic, political, cultural and others aspect of a particular geographic areas. It is also a process that uses these results to develop strategies to improve the health status of the community. In epidemiologic point of view, it is essential to prioritize health and health related condition occurred within the communities. These summarize and prioritized data is important for public health surveillance officials for planning, implementation and evaluation of public health surveillance program conducted at community level(1).

As of 2011 study done in California shows health profiles provide quick and easy access to the most commonly requested health indicators from the concerned sectors and stakeholders. The profiles present estimates to track changes in insurance status, disease prevalence, health behaviors and overall health status over time and enables frequent release of health estimates that will help policymakers, media, health advocates and others better respond to current events and the impact of a changing the program(2).

4.1.1. Rationale of the Study

Health profile is helpful to prioritizedhealth and health related events in the study area and important for identified the gaps in the community. So far in our country, it is not familiar to find prepared woreda health profile even though basic for planning and for appropriate intervention; and it is an entry point for operational research. It is also important to understand the demographic, socio-economic, morbidity and mortality data of the district. The finding from the health profile description project will help the district and other stakeholders for public health decision making. Therefore this study hopefully activates to do compile health and health related issues of the district for planning, prioritizing health program and health related problems.

4.2. Objective

4.2.1. General Objective

- To assess the health and health related condition of Fogera woreda, Northwest Ethiopia from February 23-30/2018.

4.2.2. Specific Objective

- To describe health status, health indicators and identify other problems to set main concern.
- To determine disease pattern and describe endemic diseases as well as its control and prevention programs in the woreda.

4.3. Methods and Materials

4.3.1. Study Area

The study was conducted in Fogera woreda South Gondar zone Northwestern Ethiopia which is located 623 km away from Addis Ababa and 60 km from Region city (Bahir Dar). According to 2010EFY projection the total population of Fogera is 261431 from which 130454 (49.9%) male. I interviewed concerned participants from health office heads or officers of different departments and performance reports of offices. I utilized supportive poster, organography and charts in the sector on the walls of the office listed on top causes of morbidity, mortality, organizational structure and others well documented. I was reviewed annual reports of the relevant sectors that have sent to the region and also collected, analyzed, and interpret the available data in health office and health institutions. Data was compiled and analyzed using micro-soft excel 2013.

4.3.2. Study Period

All require updated data was collected from February 23-30/ 2018.

4.3.3. Study population

The study was conducted in different sectors of Fogera woreda.

4.3.4 Data collection procedure

The data was collected from health office, education, finance, water, tourism, Agriculture and town administration offices using standard questionnaire. This was conducted by reviewing different documents, interviewed head or officers of different offices, and performance reports of offices.

4.3.5 Data analysis

The data was collected, compiled and analyzed by using Microsoft excel. The data presented by tables, graphs and narrative forms.

4.3.6 Data quality assurance

The data was compared and cross checked with the data collected from woreda Health Office with the data at Zonal department to assure the reliability and validity of the data.

4.3.7. Ethical Considerations

Official letters was obtained from the Amhara regional public health institute (APHI). The purpose and objective of the study for which the data required was briefly explained to the Head of the Woreda Health Office and other concerned sectors prior to the interview and discussion.

4.3.8. Dissemination of findings

The result of finding submitted to Addis Ababa Universality college of Health Sciences school of Public Health, Amhara Regional PHEM office, SGZ health department, and Woreda Health Office.

4.4. Result

4.4.1. Geographical and Climatic Conditions

Fogera was located 623 km far from Addis Ababa in Northwest part of the country and 60 km from the regional Town/Bahir Dar and 44 km from zonal town/Debre Tabor. The boundary of the district is in the North Libokemkem, in the South Dera district, in the East Farta and Estie and in the west Tana Hike. Total area of the district is estimated117414 km square, Average annual rain fall is 1284.2 mm, Altitude above sea level 1820 meter, Maximum temperature of the area is 27.2 and minimum temperature 10.3 degree centigrade, almost all area of the district climatic condition is woynadega. A geographical feature of the district is mainly characterized by flat terrain 78 % while the rest 22% are up down. In Fogera woreda 78% of the land is cultivated, 22% of the land used for grazing. Fogera has a very large area of wetlands, 20% which is a significant characteristic of the district. Only 3% of the land is non-arable.

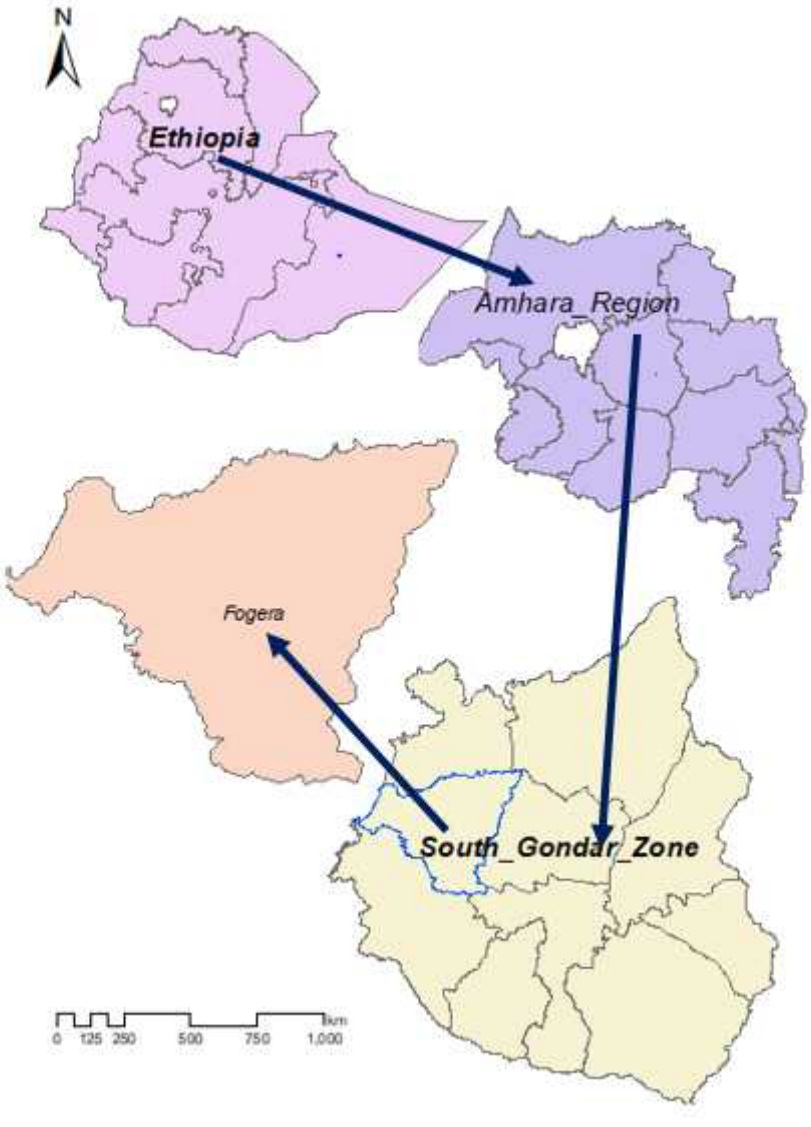

Figure 4.1: Map of Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

4.4.2. Administrative and Socio-demographic conditions

Fogera woreda has 32 kebeles of these 30 rural kebeles and 2 is urban kebeles.The total popultion of the district in 2010 EFY is estimated 261431from which 130454(49.9%) is male.

Male to female ratio of the woreda is almost 1:1, 3.1 % of population is living in urban area and 96 .9% of population is living in rural area. There were 60798 households with average family size of 4.3 and reproductive age group of women(15-49 age group) is 61645 which covers 23.6 % from the total population, ethnicity of the district is almost 100% Amhara, 97.8% of the religion is orthodox, 2% Muslim, 0.2% protestant and Adventist and other(including non-religious).

Table 4.1: Demographic data by residence, sex and Fogera woreda South Gondar zone northwestern Ethiopia, 2018/19

Age group	Urban			Rural			Urban+rural		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
No-population	4074	4090	8164	126380	126887	253267	130454	130977	261431

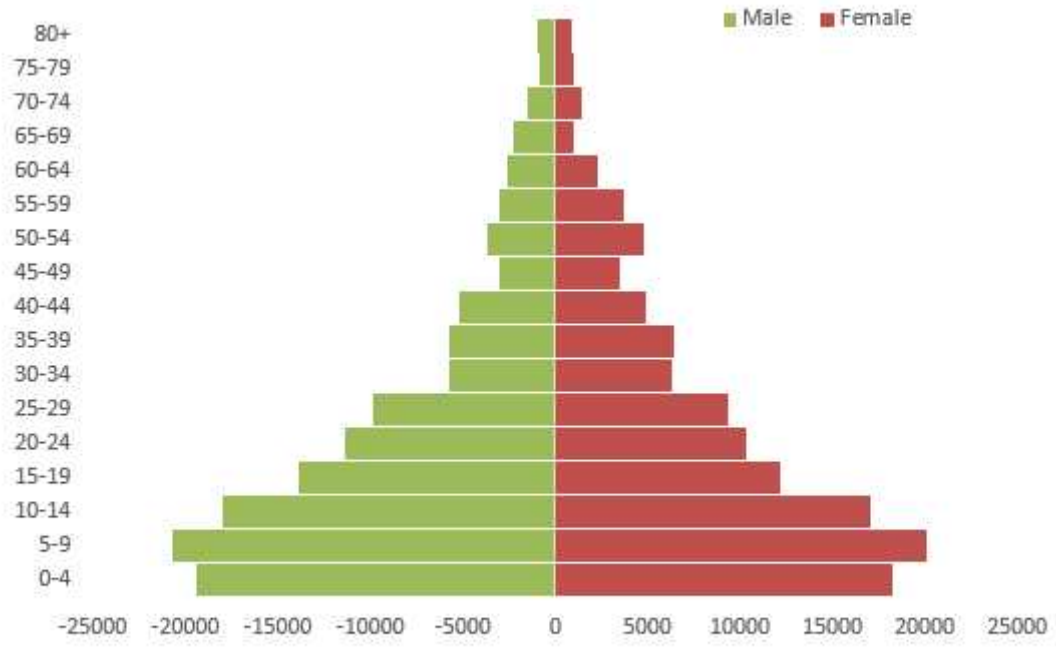

Figure 4.2: Population demography in Fogera woreda South Gondar zone northwestern Ethiopia, 2018.

4.4.3. Socioeconomic condition

Agriculture is main source of economy in the district, average household income is 2.5 kuntal per year, there is 2 cropping seasons including irrigation, common crop products in the woreda is Rice, Maize, Teff, Small Millet , Vetch and Chickpea whereas other economical source of the district is irrigational products like tomato , potato, onion and other products.

4.4.4. Education and School Health

In Fogera district there are 2 kindergartens, 102 elementary and 5 high school and there were 10579, 59250, 111and 3881 kindergarten, elementary, special need and high school students respectively. From total students 35122(47.6%) was female students, in the district 2129 teachers were present from which 826(38.8%) were female teachers. Dropout rate of elementary and high school students were 0.5% and 3.3% respectively and female dropout rate were 0.3 % and 1.44% respectively. From total schools 55(58%) have water supply, 59(62%) have functional latrine and 44(46%) have health club.

Table 4.2: Number of schools, students and teachers in Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

Type of School	**No of schools**	**Numbers of Teachers**			**Numbers of Students**			**Student school Drop out**	**Female student drop out**
		Male	**Female**	**Total**	**Male**	**Female**	**Total**		
Kindergarten	2	0	5	5	5200	5379	10579		
Primary									
1-8	102	1132	777	1909	31291	27959	59250	256(0.43%)	130(0.22%)
Special need		5	5	10	49	62	111		
9-12	5	171	49	220	2159	1722	3881	129(3.3%)	56(1.44%)
Total	109	1308	831	2129	38699	35122	73821	385(0.52%)	186(0.25%)

-school with water supply=55(58%)

-school with functional latrine=59(62%)

-school with HIV/other health club=44(46%)

4.4.5. Health facilities and health related information

There are 9 health center and 46 health posts in the district, based on physical health facility accessibility one health center with 5 health posts for 25,000 populations potential health coverage

is 86%. Health centers which serve more than the standard population's Meneguzer, Alember, Quhar, Kidisthana, Guramba and Addis b/Christian 39904, 38181, 37043, , 31494, 32560and 28334 population respectively ,below the standards Deba and Kintie serve for 15428 and 11772 population, the only health centers which approximately serve with the standard is Weje (26715). There are 13 primary clinic and 1 drug vender private institutions in the district.

Table 4.3: Cluster health center population size in Fogera woreda South Gondar zone northwestern Ethiopia, 2018

Name of cluster H/center	Total population			House hold	Estimated live birth	Under 15 years	15-49age reproductive women
	Male	Female	Total				
Quhar	18484	18559	37043	8615	1248	15791	8735
Weje	13331	13384	26715	6213	900	11389	6299
Deba	7699	7729	15428	3588	520	6577	3638
Kidisthana	15716	15778	31494	7324	1061	13426	7426
Addis b/cristian	14139	14195	28334	6589	955	12079	6681
Alember	19052	19129	38181	8879	1287	16277	9003
Kintie	5874	5897	11772	2738	397	5018	2776
Guramba	16247	16313	32560	7572	1097	13880	7678
Meneguzer	19912	19992	39904	9280	1345	17011	9409
Total	130454	130977	261431	60798	8810	111448	61645

*Health Institutions and Infrastructure:*From the total health centers 7(77.78%) and health post 8(17.78%) have 24 hours electric power supply, almost all health centers have wireless phone service user but no health posts have wireless telephone rather they are giving a service with their private Mobile. health centers have piped water supply8(88.8%) and only 8(19.6%)of health post

have piped water, 4(44.4%) of health centers have always transport access but the remaining 5 has seasonal transport access mostly accessible during Meher and 8(17.78%) of health post have yearly transport access and 26 health posts have seasonal transportation access.

Table 4.4: Health Facilities and Infrastructures of Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

Infrastructure	Health Centers	Health Posts
With 24 hours power supply	7	8
With telephone service(wireless and cabled)	All	0
With Piped Water Supply	8	8
With Land Transportation Access	4	5
Seasonal land Transportation	9	26

Health personnel: There is no General practitioner in the district, mid-wafers professionals around 80% fulfilled; only 31% of medical laboratory professionals are available, above 85% of health extension workers are available in the district and only 9% of environmental professional is available.

Table 4.5: Number of health professionals by educational level in Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

S/N	Profession type		Deployed			Requi	Ga
			M	**F**	**Total**		
1	**Physicians (GP)**		0	0	0	0	0
2	**Nurse**	**Diploma**	52	33	85	92	7
		Degree	3	2	5	15	11
3	**Health officer**	**Degree**	17	8	25	37	12
4	**Mid-wife**	**Diploma**	9	9	18	18	0
		Degree	1	4	5	11	6
5	**Medical lab**	**Diploma**	5	7	12	31	19
		Degree	1	0	1	11	10
6	**Pharmacy**	**Diploma**	8	4	12	22	10
		Degree	2	1	3	11	8
7	**Environmental**		1	0	1	11	10
8	**HEW**		0	84	84	96	12
9	**HIT**	**Diploma**	8	1	9	10	1
10	**Administrative staff**		66	39	105	235	130

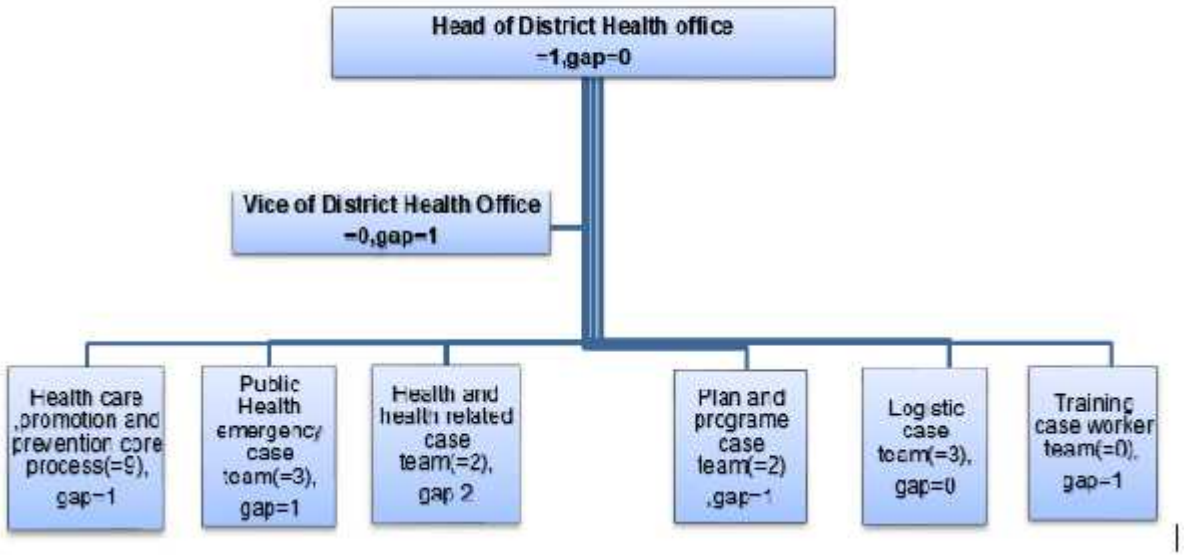

Figure 4.3: Oregano-graph of Fogera woreda Health office Northwestern Ethiopia, 2018

Vital Statistics and Health Indicators: In the district there was 9133 expected pregnancy and 5718 live birth, crude birth rate was 9827/100000, maternal mortality ratio 37, maternal mortality rate 3/100,000, dependency ratio and 96.75.

Table 4.6: Vital statistics and health indicators in Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

1	Pregnant women	9133
2	Live births	8131
3	Crude birth rate	9827/100000
4	maternal mortality rate	0.03
5	Estimated live birth	3.37
6	Surviving infant	3.11
7	Average household size	4.3
8	Crude death rate	NA
9	Child mortality	No data
10	Under 5 mortality rate	No data
11	Infant mortality rate	No data

Maternal health service coverage:

8810(95.2%) pregnancy mothers has ANC_1 follow up, ANC4 6315(83%), TT2, Pregnancy 6785(80 %), TT2 non pregnancy 11377(22%), Institutional delivery 5145(55%), Skilled delivery 4823(54%) , postnatal care 8189(97%), Family planning usage 47312(93%) family planning by method pills 4288(9.1%), Injectable 35331(74.7%), Implant 3587(7.6%), IUCD 29(0.06%) , Others 4077(8.6%) and contraceptive prevalence rate was 80%.

Table 4.7: Maternal health service coverage of Fogera district in South Gondar zone Northwestern Ethiopia, 2018

No.	Activities	Plane	Achievement	Coverage %
1	ANC_1	9250	9873	95.2
2	ANC_4	7595	6315	83
3	TT_2 pregnancy	8456	6785	80
4	TT_2 non pregnancy	50762	11377	22
5	Family planning new	15629	12026	83
6	Family planning repeat	35133	53286	151
7	F.p both new and repeat	50762	47312	93
8	Contraceptive prevalence rate			83
9	Institutional delivery	9315	5145	55
10	Skilled delivery	8666	3229	37.3
11	Health extension delivery	866	39	4.5
12	Postnatal care			55

Maternal health service coverage like ANC, Skilled delivery and post-natal care were display in the next graph

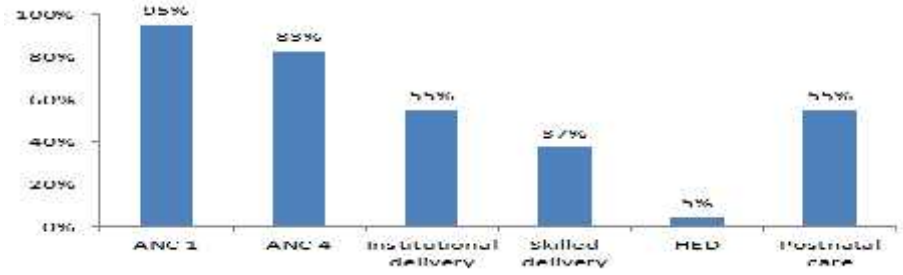

Figure 4.4: ANC1, ANC4, Institutional delivery, postnatal care and skilled delivery coverage in % Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

Morbidity (disease) and mortality: Malaria pf 16601(20.6%) is the leading causes of morbidity in adults followed by malaria other than pf or PV 10369(12.87%), AFI 10249(12.7%), Pneumonia 7976(9.9%), Helminthiasis 7952(9.87), AURI 7477(9.3%), Dyspepsia 7140(8.9%), infection of skin and sub cutaneous tissue 4733(5.9%), Diarrhea non bloody 4239(5.3%) and Trauma 3850(4.9%). In pediatrics or under 5 children diarrhea non bloody 6630(22.6%) is the leading cause morbidity followed by pneumonia 4491(17.91%), malaria pf 3660(14.7%), Malaria PV 3191(12.9%), AFI 2436(9.8%), AURI 1283(5.14%), ISST 937(3.75%), Diarrhea with bloody 854(3.4%), other or unspecified disease of eye and 748(3%) and diarrhea with dehydration 733(2.9%).

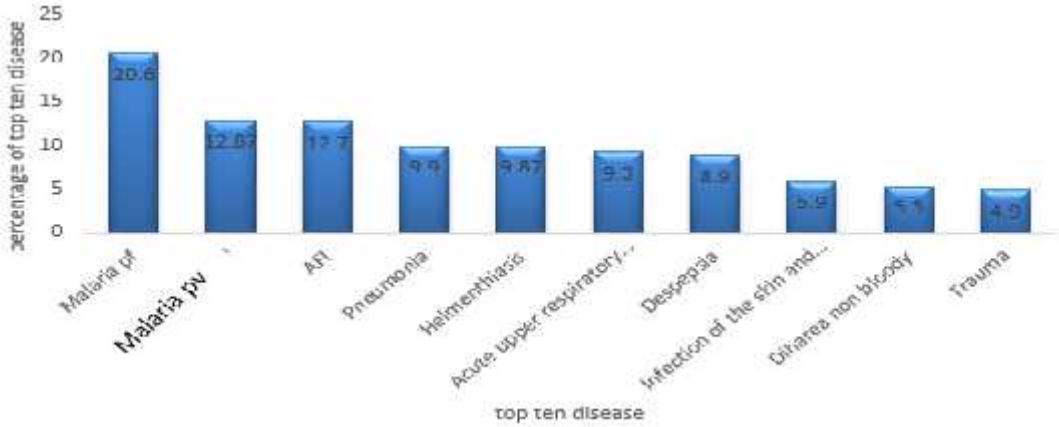

Figure 4.5: Top 10 morbidity cases in adults in Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

Noon bloody diarrhea in under five age category is the leading cases of morbidity in Fogera woreda followed by pneumonia. The whole description of top five morbidity diseases in under five age category were discussed in the next table.

Table 4.8: Top five causes of morbidity and mortality in under five age group in Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

Morbidity and mortality cases in unger5 age groups					
Morbidity			Mortality		
Rank	Disease	%	Rank	Disease	%
1	Diarrhea noon bloody	26.6	1	0	0
2	Pneumonia	17.91	2	0	0
3	Malaria PF	14.7	3	0	0
4	Malaria other than pf	12.9	4	0	0
5	AFI	9.8	5	0	0

4.4.6 Common disease in the district

Tuberculosis and Leprosy: Tuberculosis is an endemic disease in Fogera district. Microscopically smear positive Tuberculosis cases detection is 22(8.8%), all from of TB case is 271(52.2%) from the total TB tested, TB case screened for HIV 271(100%) TB treatment success rate 21(87.5%) and cure rate of 18(75%) from their plan.

Table 4.9: Tuberculosis and leprosy cases in Fogera woreda South Gondar zone Northwestern Ethiopia 2018

S/N	Cases	Plan	Achievement in Number			%
			Male	Female	Total	
1	New pulmonary TB smear positive	251	8	14	22	9
2	New pulmonary TB smear negative		34	29	63	
3	Extra pulmonary TB	268	94	26	186	69
4	Relapse		4	1	5	
5	TB detection rate all forms	519	136	69	276	53
6	TB suspected	2510	unknown	unknown	1156	46
7	TB treatment success rate	24	unknown	unknown	21	88
8	TB treatment cure rate	24	unknown	unknown	18	75
9	TB cases screened for HIV	276	unknown	unknown	250	91
10	Defaulters	0	0	0	0	0
11	No of new Leprosy cases detected	0	0	0	0	0
12	Prevalence of Leprosy	0	0	0	0	0
13	No of Leprosy RX completed	0	0	0	0	0

HIV AIDS: From total 18509 peoples who have tested for HIV 0.35% was HIV positive,from total tested 2150 individuals were tested at VCT 0.23% HIV positive, 5025 individuals were tested at PITC from which 0.1% were HIV positive, 4880(58%) pregnant women were tested for HIV from which 9 mothers were positive, total peoples living with HIV who get clinical care are 461, newly started on ART ,currently on ART, ever started on ART is 17,151 and 136 respectively and newly enrolled on pre-ART is 11.

Malaria: All Fogera district (261431) population is at risk for malaria, from total 159,510 OPD attendances 93964 blood film and RDT was done and 31149 was positive, positivity rate is 33%, about 60% of malaria cases are pf and 81% of malaria cases are adult. There were 4 admission cases due to malaria pf, those are adults and no death is reported due to malaria. ITN distribution

coverage is 100% both in rural and urban and utilization was 80% and 95% in rural and urban respectively based on weakly reports of HEW,IRS coverage is 98% in rural kebeles.

Confirmed Malaria cases by species were descripted in the next pie chart.

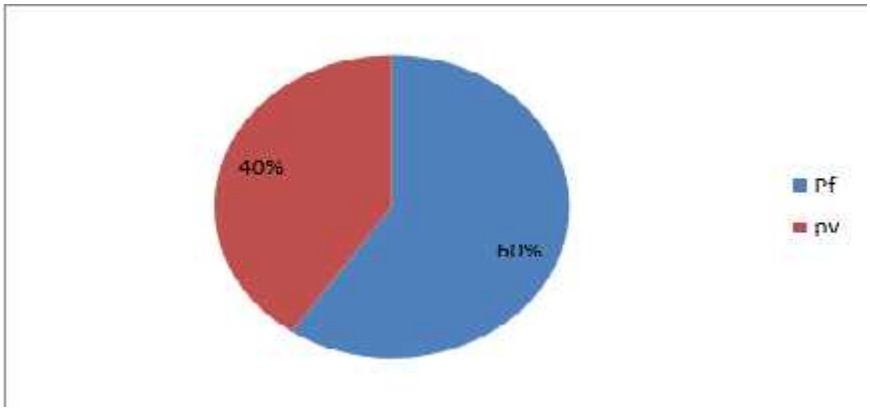

Figure 4.6: Confirmed Malaria cases by species in Fogera woreda South Gondar zone Northwestern Ethiopia, 2018

Distribution of malaria by age category in Fogera woreda south Wollo Zone Northwestern Ethiopia 2017/18 showed in the next graph.

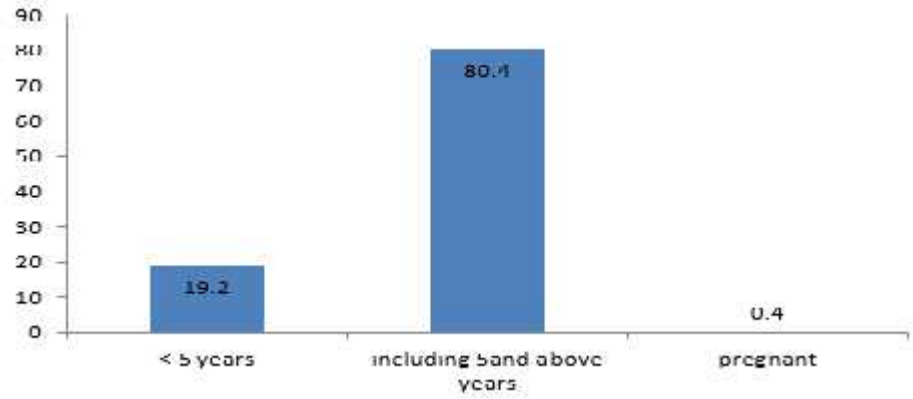

Figure 4.7: Confirmed malaria cases by age category in Fogera woreda South Gondar zone Northwestern Ethiopia 2018

Trends of malaria in WHO epi week from epi-Week 1-51/2017 in species showed in the graph below

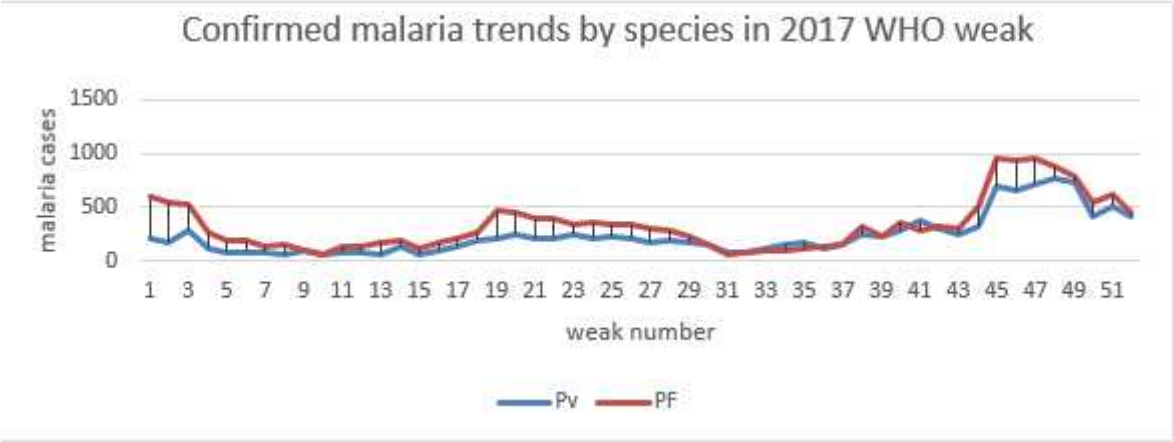

Figure 4.8: Malaria weakly trend by species in Fogera woreda S/Gondar zone Northwestern Ethiopia, 2018

Trachoma: Trachoma has high prevalence in the district, the backlog in the district is 4430 from which 594(13%) was done in 2009 EFY and free from trachoma.

4.4.7. Hygiene and Health related activities

There were 32816(56%)latrine in the district from which 10909(19%) was unimproved latrine and latrine utilization rate was 78% and good solid waste management system was 53%, all 32 Kebeles accessed to safe water supply with coverage of 634(44.63%) from which 588(92.7%) hand dug well ,15(2.4%) protected spring water ,18(2.8%) manual drilling ,10(1.8%) shallow well, 3(.47%) was rope pump well which was chlorinated every 3 months. Even if safe water supply addressed every Kebele every population was not addressed safe water supply.

Table 4.10: Hygiene and water supply Fogera district S/Gondar zone Northwestern Ethiopia, 2018

S/N	**Description**	Plane	**Number**	**Coverage (%)**
1	Households with Improved Latrine	57650	10909	19%
2	Household with Unimproved Latrine	57650	21907	38%
3	Latrine utilization rate	32816	25430	78%
4	Total latrine coverage	57650	32816	56%
4	Good solid waste management system	58332	30916	53%
4	Safe Water Supply	1420	634	44.63%
5	Number of Kebeles Accessed to safe Water Supply	32	32	100%

4.4.8. Disasters and outbreaks occurred

In 2009EFY Fogera District there was no disaster situation and no outbreak occurred. But in the last 5years there were malaria and measles outbreaks in the district.

4.4.9. Nutrition and foods

To screen nutritional status for pediatrics or under 5 children 214,915 growth monitoring is done from which 27.5% moderately malnourished and 0.2% sever malnourished .People who is living with HIV identified clinically undernourished that received supplementary food or therapeutic is 55.

4.4.10. Health Budget allocations

By 2009 EFY total budget allocated in Fogera district including health facilities was 113,072,600 ETB and budget allocated for health was 13,804,383 ETB from with the same year funds from partners but not got 2010 EFY budget allocation in Fogera district due to a frequently meeting of the concerned person.

4.4.11. Harmful Traditional practices in the District

Milk tooth extraction, Uvulectomy involving and early marriage female circumcision were common Harmful traditional practice in the District in 2009EFY.

4.4.12. Emergency drugs and supplies

In the past two years there was shortage of some essential drugs like ferrous and folic acid and TAT in Fogera district.

4.4.13. Public health emergency disease in the district

In 2009 EFY 4 measles cases (with negative results) and weren't any NNT and AFP cases reported.

Table 4.11: Among immediately reportable diseases in Fogera woreda South Gondar zone Ethiopia, 2018

Diseased	Plane	Achievement	Coverage
AFP	2	0	0%
Measles	4	4	100%
NNT	2	0	0

4.4.14. Priorities Identified

Low performance of TB cure rate 75%

Limitation of health facilities infrastructure.

Low latrine coverage 56%

Low performance on home delivery free, Low active surveillance activities

4.5. Discussion

In 2009 EFY the exact value of ANC 1st 9873(95.2%), ANC 4th 6315(83%), institutional delivery 5145 (55%), skilled delivery 3229(37.2%). This is greater than the national EDHS 2016 report ANC1 62%, ANC4 32%, institutional delivery 28%, skilled delivery 26%.Family planning which refers to a conscious effort by a couple to limit or space the number of children they have through the use of contraceptive methods. Total family planning coverage 47312(93%) from which modern family planning usage was 43,235(85%), inject able and pills 35331(69.5%) and 4288(8.4%) respectively which is higher compared with national coverage 23% and 2% respectively and the usage of implant and IUCD was 3587(7%) and 29(0.06%) which is low compared with the national coverage of 8% and 2% respectively and contraceptive prevalence rate was 80%(3).

Since Fogera is hot spot area for malaria In 2009 EFY total BF or RDT done in the district was 93,464 from which confirmed malaria cases was 31,009 and 60% of this was pf, positivity rate of malaria was 33%, which cover 34% south Gondar zone malaria report, prevalence of malaria 123/1000 which is high when compared with 2015 national report 91/1000 populations. Even if the prevalence of the disease is still high the burden, hospitalization and mortality is decreased from year to year due to health seeking behavior of people and getting early treatment, accessibility of health centers and quality of health service (detection rate increased). ITN distribution was 100% but utilization rate 80% by HEW weakly surveillance report, IRS coverage was 98 %. Even though strong prevention activity is done the parasite is endemic and persists yearly due to the area is suitable to the parasite so further strong prevention activity is needed(4, 5)

.

In 2009EFY immunization status of Fogera district was BCG 7274(86%), penta1 7512(96%), penta3 7337(94%), rota1 7482(96%), rota2 7318(94%), measles 7222(93%) and fully 7185(92%) which is higher compared with national EDHS 2016 report BCG 69%, penta1 73%, penta3 53%, rota164%, rota2 56%, measles 54% and fully 39% respectively. In Amhara region measles and fully is 62% and 46% respectively which is higher than the national coverage but less than the Fogera district(6).

In Fogera district 2009EFY safe water supply was 44.63% and all type of house hold latrine coverage was 56% which is lower than the national coverage 65% and 68% respectively. In Fogera district TB detection rate all forms are 276 (53%), new pulmonary smear positive cases are 22(9%),extra pulmonary TB cases are 186(69%), screened for HIV 250(91%), TB treatment success rate 21(88%)which is increased from 84% 2008EFY, TB treatment cure rate 18(75%)which is decreased from 84% from 2008EFY. When compared with 2008EFY TB detection all forms 263(41%) increased to 53% in 2009 (6, 7).

From the total health centers 7(77.7%) and from health post 8(17.8%) has 24 hours electric power supply, health centers has 88.9% cable telephone service but no health post which have telephone service, all health centers have piped water supply and only 8(17.8%)of health post have piped water, 8(44.4%) of health centers have yearly transport access but the remaining 5 has seasonal transport access and 5(11%) of health post have yearly transport access and 26 health posts have seasonal transportation access. From total health professionals 259(71%) is fulfilled, midwifery profession is 85% better whereas environmental profession was 9% only which indicates the hygiene and sanitation activity is neglected. Totally the district has a health workforce of 0.6/1000 which is lower compared with the national 0.7/1000 and WHO standard 2.3/1000 population, health officer almost 1:10,000, clinical nurse1.78:5000which is similar to WHO standard, midwifery nurse 0.46:5000, health extension worker 0.84:2500 which is lower than the WHO standard 1;5000,1:2500 respectively.

From total students (47.6%) was female students and in the district 2129 teachers were present from which (39%) were female teachers. Dropout rate of elementary and high school students were 0.43% and 3.3% respectively and female dropout rate were 0.22% and 1.44% in elementary and high school respectively. But the dropout rate of male in high school is greater than female this is due to addicted by chat and unwanted things and becomes hopeless. From total schools 55(58%) have water supply, 59(62%) have functional latrine and 44(46%) have health club (8).

In the district in 2009 EFY there were no disaster and outbreak recorded, whereas there was 2 measles suspected cases whose result was negative but no NNT and AFP cases reported here. From their yearly plan the measles 100% AFP 0%, and NNT 0%. There was different harm full traditional practice in the district which is common in all Amhara regions towards in measles.

when someone becomes infected simple keep in home and free from any invitation and shading in home(7)

Limitation

Discrepancy of data in HMIS report and program report, absence of the necessary data from PHEM officers.

4.6. Conclusion

In Fogera woreda there were many health related problems/events occur according to the places due to water lodging and center for any of travelers in Amhara region. Common diseases that occur in the woreda Malaria and non- bloody diarrhea was the leading cause of morbidity in the district in adult and under five year children respectively. ITN coverage was 100% and IRS also conducted whereas malariais still the leading causes of morbidity in the district .There were also a gap in ANC 4^{th} and skilled delivery attended by health personnel. In the woreda staffs proportions Environmental health accounts 9% which indicated negligibility of sanitation and hygiene. Latrine and safe water coverage were very low in the woreda and also low TB treatment success rate and TB detection rate; there was Low coverage of health professionals, high dropout rate of students in high school this is due to high burden of works in their home.

4.7. Recommendation

Based on the findings the following recommendations are forwarded:

Fogera woreda's health office should be gave the credit for the prevention of malaria cases moreover other cases which is presented in the district.

- Health facilities should Improve ANC follow up and Institutional delivery
- Regional health bureau, South Gondar health department office and district health office should participate to prevent and control common diseases
- The District health office should keep data in appropriate and easily accessible manner
- Amhara Regional Health Bureau, SGH office, District health office, NGOs, local district administrative community and partners should participate to solve the problem of endemic disease such as TB, Trachoma, malaria and HIV

4.8. Reference

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Chapter 5 : Meher Assessment

Meher Assessment in South Wollo and Oromia zone of Amhara region North West Ethiopia, 2018

Executive Summary

Introduction: Ethiopia has been conducting human health and nutrition emergency needs assessment twice a year during *Meher and Belg* seasons. Amhara Region is one of the nine administrative regions in the country which conducted the assessment. The assessment was done both in food items and in non-food parts for health and nutrition, Education, Water hygiene and sanitation (WASH) emergencies and protection.

Objectives of the assessment:-To Assess humanitarian planning and determine magnitudes of hazards of different types in South Wollo and Oromia zone northwestern Ethiopia 2019/18.

Methods and materials: The assessment was conducted using a nationally standardized non-food Meher assessment check list. Data was collected by interviewed, reviewed and discussion. Data sources were from four health posts, four health centers, four Woreda Health Offices and two Zonal Health Departments.

Result: According to the assessment findings noon bloody diarrhea followed by pneumonia were the leading cause of morbidity in under five age category. In adult's acute febrile illnesses (AFI) followed by malaria were the leading cause of morbidity in adults in the visited woredas. There were measles and Rabies outbreaks in Oromo zone in Artumafursie woreda with a total of 49 measles cases with one deaths and 4 Rabies case without death reported. There were also outbreak of pertussis and scabies in South Wollo Mekedela Woreda 1019 cases reported and 5600 scabies case in three woreda in the zone reported.

All (100%) visited zones and woredas were anticipated Rabies, pertussis, AWD, malaria and measles as an outbreak.

Conclusion: In visited zones and woredas there were a shortage of Operational cost/ budget to overcome the emergency situations. Poor coordination among multi sectoral body both at district and zonal level for early detection and control an epidemic diseases. In all visited woreda malnutrition screening coverage were low.

5.1. Introduction

Ethiopia has been conducting human health and nutrition emergency needs assessment twice a year during *Meher and Belg* seasons. During the assessment possible human health and nutrition risks were expected to be identified and numbers of beneficiaries were estimated(1).

Government and humanitarian community response to immediate threats to lives and livelihoods in affected areas is going on. Besides disaster risk management interventions undertaking is on progress (2). Priorities for humanitarian interventions like nutrition interventions, preparedness plan and response for epidemic prone diseases like AWD, Malaria, measles and the others, distribution of water purification chemicals, and monitoring of the health condition of the population is underway at each level.

The Disaster Risk Management and Food Security Sector (DRMFSS) has organized the seasonal multi-agency needs assessment for post-harvest (Meher).The multi-agency team deployed for the assessment of Meher composed of experts from Regional metrologies agency, BOWE, RBH, FAO, WFP, Concern worldwide, Regional women and youth bureau and Amhara Region disaster management and food security commission were deployed to Eight zones of Amhara region.

Amhara Region is one of the nine administrative regions in the country. It is the second populated region with the total population of 29379294 and with mean annual growth rate of 1.8 %(3). The Region is located in the Northwestern part of Ethiopia between 9°20' and 14°20' North latitude and 36° 20' and 40° 20' East longitude." Its land area is estimates at about 170000 square kilometers. Amhara borders Tigray Region in the North, Afar in the East, Oromia in the South, Benishangul-Gumiz in the Southwest and the country of Sudan in north. In the region there are 15 zones, 3 Town administrations 167 woredas and about 3,431 kebeles, from which 318 are urban kebeles. The Meher assessment was conducted in Amhara Region from November 10 up to December 04, 2018 in six selected woredas of two zones, South Wollo and Oromia.

5.2. Objectives

5.2.1. General objective

- To assess coordination and humanitarian planning and responses in vulnerable areas of South Wollo and Oromia zones Northwestern Ethiopia, 2018

5.2.2. 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 identify the existing capacity of the health services to address health and nutrition emergencies likely to occur during the upcoming six months of 2019
- To determine the shortcomings (gaps) in the capacity of the existing health services to address health and nutrition emergencies likely to occur between Januarys to June 2019
- To formulate workable mechanisms and develop necessary plans for preparedness of health and nutrition for appropriate and adequately addressing the potential emergencies

5.3. Methods

5.3.1. Assessment area

The assessment was conducted using a nationally standardized non- food Meher assessment check list. In addition to the formatted checklists, observations were also made based on discussions with officials and concerned experts. Data were collected from four health posts, four health centers, four Woreda Health Offices and two Zonal Health Departments. Based on the checklist and discussions, information was collected on existing and or potential emergencies on health, and nutrition. Information collected on health include: top ten/five diseases, disease outbreaks, epidemic prone diseases and nutritional status. Based on the discussion with zonal health departments and Regional teams.

5.3.2. Source of Data: Generally both qualitative and quantitative data collection methods were used.

- Briefing was conducted at zonal and each assessed woredas.
- Debriefing was made on assessment findings to visited woredas and Zones.
- Secondary data were collected using checklists

5.3.3. Interview with key informants

Interview was made with zonal and woredas' heads, PHEM, drugs and medical supplies and nutrition officers, health centers' heads, drugs and medical supplies and PHEM focal persons and health posts' health extension workers. Other relevant officers such as plan officers and health information technicians were also interviewed.

5.3.4. Secondary data

Review of PHEM reports weekly, Monthly HMIS and quarterly reports as well as annual reports were reviewed to capture necessary data.

5.3.5. Observation

Observation of reports, different registration books and tally sheets was made at health post, health center, woreda health office and zonal health department level to ascertain the data obtained. Thus, we reviewed records and reports at these health institutions. .

5.3.6. Data analysis

Database template given from central coordinating team was used to compile the data. Microsoft excel was used to compute tables and graph.

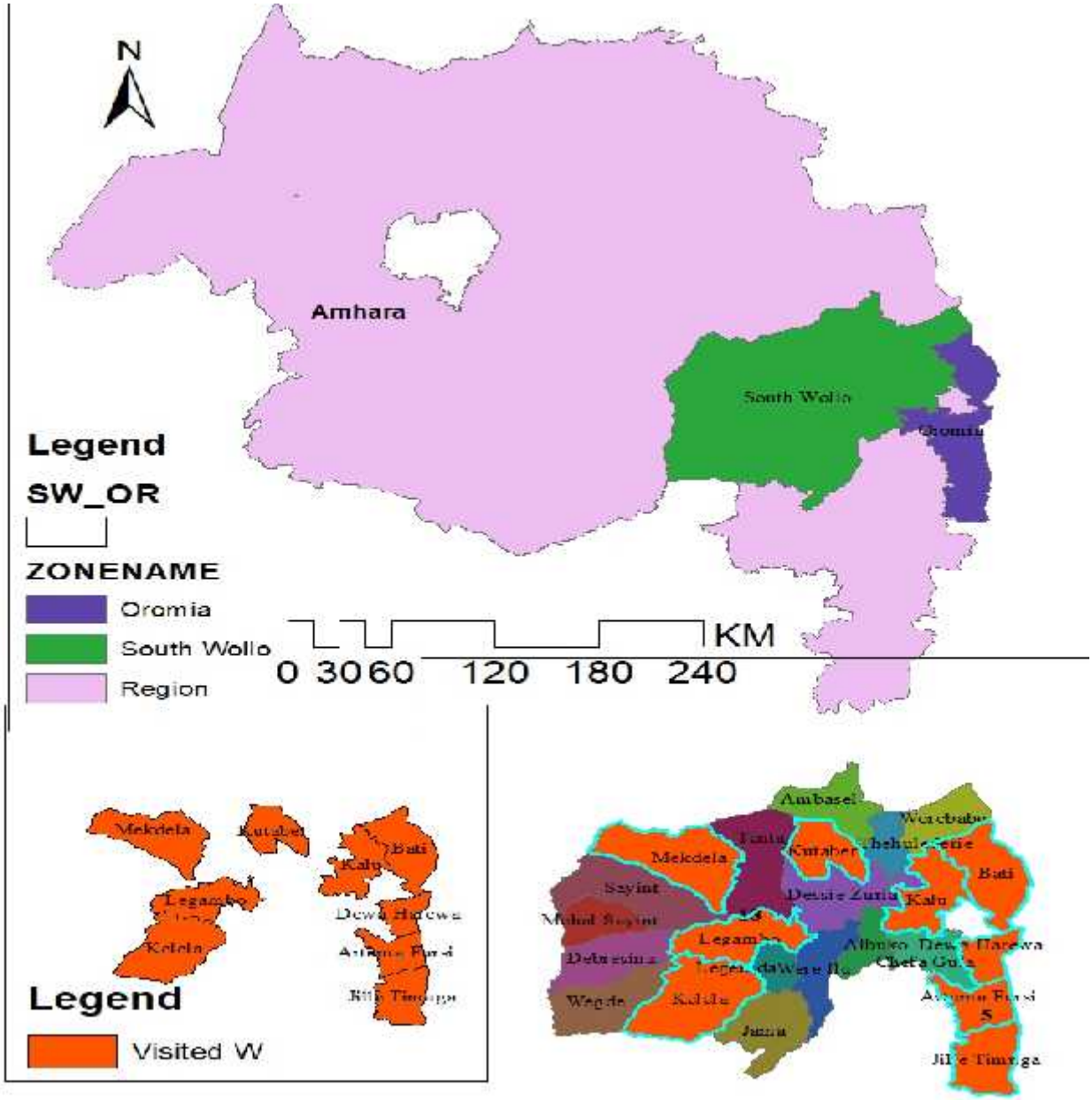

Figure 5.1: Maps of visited woreda during Meher Assessment in Northwestern Ethiopia, 2018

5.4. Results

Zonal level

South Wollo and Oromia zones were selected for health and nutrition part of the Meher Assessment in 2018.

5.4.1. Coordination

Both visited ZHDs have four PHEM officers each and all visited woredas have two PHEM officers each and all visited centers have PHEM focal persons. All visited health institutions reported PHEM reports as scheduled dates. Multi-sectoral coordination forum was established in both zones health departments and the members had monthly meeting; but when there is an emergency meeting was conducted daily. All visited health offices and ZHDs have prepared public health emergency preparedness plan and have allocated emergency response fund.

5.4.2. Anticipated epidemics

Acute watery diarrhea (AWD), Measles, Scabies, Meningitis, Pertussis and Malaria are anticipate to occur as epidemic with risk in all population who live in both zones of all woredas.

5.4.3. Ongoing outbreak

There was scabies ongoing outbreak in visited woredas of both zones but the were no ongoing outbreak of malaria, measles, AWD and Meningitis in both zones during the assessment period but in the past three months there was measles outbreak in Oromia zone with 49 cases with one deaths and 4 cases Rabies reported. Pertussis also other outbreaks which occurred in South Wollo zone of Mekedela woreda within 1019 cases during the assessment period. In both zone there were an ongoing outbreak of scabies which around 5000 cases in S/Wollo and 1500 cases in Oromia zones were reported during the assessment period.

5.4.4. Drugs and medical supplies

In both ’ ZHDs’ stored emergency drugs such as Coartem, different forms of Artesunate, Artemether IM, quinine, chloroquine, ceftriaxone are stoked out from the store. Other emergency drugs such as doxycycline, Ringer lactate, ORS, Vit A are available in some amounts but not documented or registered in terms of total requirement, available and stocked out.

In both zones nutritional supplies such as, F_{100}, F_{75}, RUTF, Resomal, SC treatment kits are unavailable during assessment time. Some amounts of malnutrition drug supplies availed by projects working on there. Whereas, other supplies such as amoxicillin, SC opening kit are

available in visited zones of all woredas. Laboratory supplies such as RDT for malaria and CTC kit for AWD are available at in both zones of visited woredas but there shelf life near becomes stocked out. CBS++, RUSF, Gloves, Syringes, other PPEs, individual clean delivery kits, all RH medical supplies and drugs are limited in both zones.

5.4.5. Risk factors

Malaria is endemic in both zones having malaria vector breeding sites, interrupted and potentially interrupting rivers, unprotected irrigations. Inboth zones there were 25% of the population at high risk of malaria in 2018/19 budget year. In South Wollo zone LLINs was distributed in 361Kebel of 60637number of LLINs for 183028 populations and its coverage is 78 % zonal level. Based on IRS performance in 2011 budget year (2011 Ec.), South Wollo zone targeted 18164 HHs and had performed 89.5%. Both zones responded that case management, environmental management, IRS, and LLINs distribution were the common activities conducted to prevent and control malaria.

During our assessment other observations on health emergencies/risks of epidemic were new emerging unknown events like psychosis/psychological problems and infestation of insect in South Wollo zone Ambasel and Tehulederie Woredas.

South Wollo zonal water coverage is 76.5% an estimated 647,669 people have no access to safe drinking water in the zone (Source Zonal Water department). Sanitation coverage is 80% an estimated 551,208 peoples are, without basic sanitation, practicing open field defecation (Source Zonal health Department). It is reported that there is critical shortage of safe water at low land areas of the zones. On top of the lack of water and sanitation service, Water quality is also pressing issues across the zone.

In Oromia the water coverage was not available during the assessment time due to respected professional not presented there. Based on latrine coverage and utilization, in both zone average of latrine coverage and latrine utilization was 76%, and 59% respectively. Major challenges during epidemic was limited coordination, lack of emergency budget, commitment and shortage of human resource especially at lower level.

In South Wollo zone Legambo woreda there were Flooding during spring season May/2018 which entering 52 water scheme, drinking water turbidity was out of standard. Six water scheme were also closed/banned due to poor quality of water. Due to topography problem of Akesta town and site of borehole, Sewerage and flood discharge from town/household is over flooding the borehole. As a result, the bacteriological result of the water was positive for E.coli test. With such different

factors there is low water coverage and poor hygiene sanitation exercise which lead to anticipate of potential outbreak of disease such as AWD and scabies in these woredas. In low land areas, on average an individual travels more than 2 hours on daily bases and notice that school absenteeism and drop out may relate with fetching water from long distance. There is significant number of available water points but not functional. Total of 965 water points are not functionalin the zone, which all needs immediate maintenances. There were high rate of 75(15%) non-functional water schemes at Kalu woreda. Similarly, 89(21%) water supply schemes are non- functional at Sayient woreda.

5.4.6. Nutrition SAM and MAM management, May to October, 2018

Facilities with SAM management from May to October, 2018 in South Wollo and Oromia zone

Table 5.1: Number of health facilities, Malnutrition and Malnutrition treatment sites in South Wollo and Oromia zones

Ser. No.	Demographic characteristics	Name of zone	
		South Wollo	Oromia zone
1	Health posts	526	107
2	Health centers	128	27
3	Hospitals	9	2
4	SAM	2849	1531
5	MAM	52946	6511
6	**SCs**	90	29
7	**OTP sites**	624	132

The distribution of health facilities in visited woreda of south Wollo and Oromia zone, northwestern Ethiopia, 2018

Table 5.2: Health facilities of South Wollo and Oromia zones with their SAM management sites, 2018

Name of zone	Total no. of hospitals	Total no. of health centers	Total no. of health posts	No. of SCs	No. of OTPs	Total no. of OTP/SC reported
Oromia	2	27	105	29	132	134(100 %)
S/Wollo	9	128	564	90	624	714(100%)

Total	12	155	669	119	756	835(100%)

Admission and performance of the therapeutic feeding program for SAM management

In both zones children younger than five years with SAM are admitted and managed at OTP sites and SCs.

Table 5.3: Admission performance of in under-five children therapeutic feeding from May to October in 2017 and 2018 in South Wollo and Oromia zones

Name of zone	**# of new SAM Children admitted**	**% of SAM children cured**	**% of SAM children defaulted**	**% of SAM children died**	**% of SAM children non-respondent**	**% of SAM children other**
	2018	2018	2018	2018	2018	2018
Oromia	1531	59.5	2.3	0	0	01
South Wollo	2849	96.9	1.2	0.35	1.1	2.4
Total	4380	78.2	1.75	0	04	72

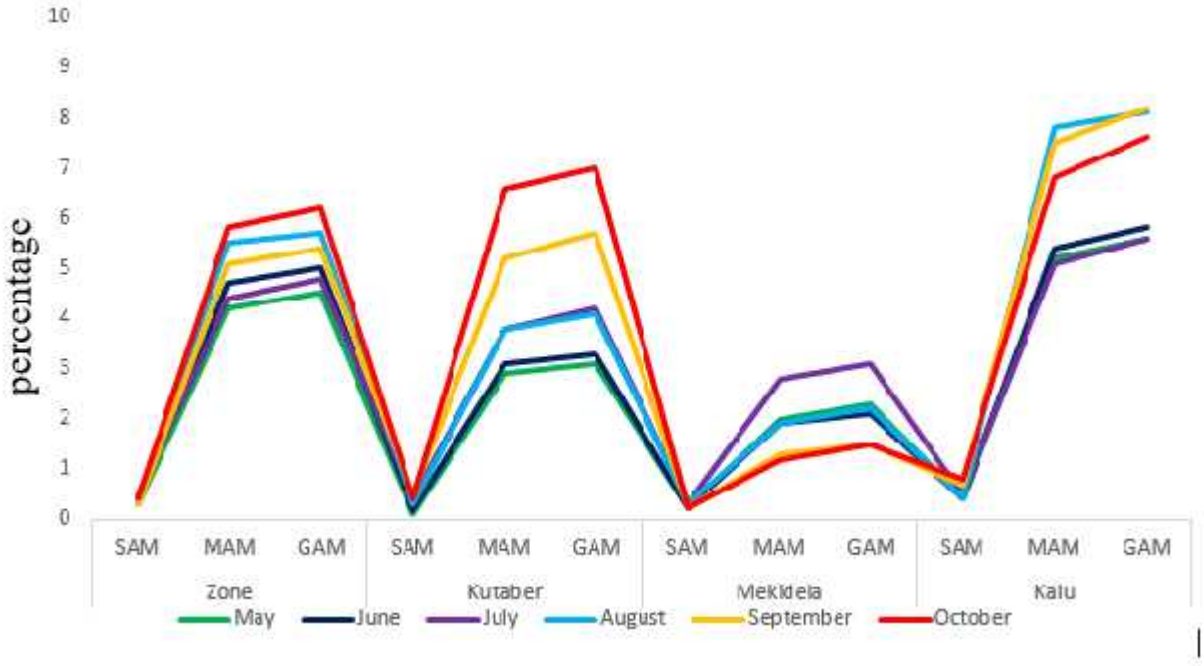

Figure 5.2: Trends of SAM, MAM and GAM rate in S/W/Z with selected woredas of children, May – October, 2018

Screening coverages of pregnant and lactation women in South Wollo zone with visited woredas were displayed in below graphs.

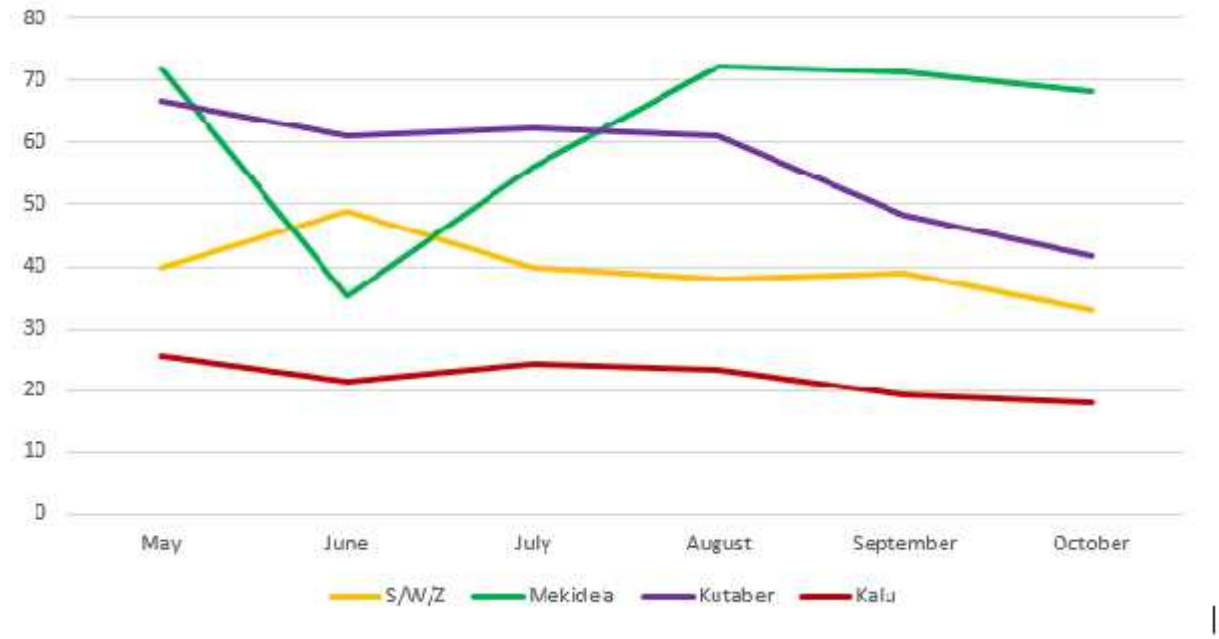

Figure 5.3: Trends of Screening coverage of Pregnant and lactating women in S/W/Zone with selected woredas in previous six months

Screening coverages of children in visited woredas including South Wollo zone was displayed in below graph.

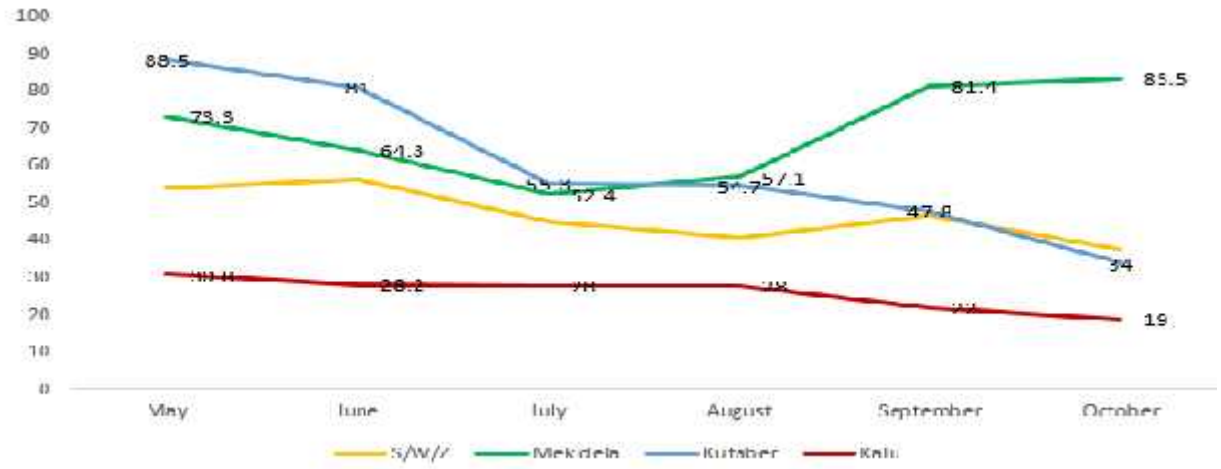

Figure 5.4: Trends of screening coverage of children in S/W/Zone with selected woredas in previous six months

The number of newly admitted SAM case in Oromia zone Amhara region 2018 is displayed in below graph.

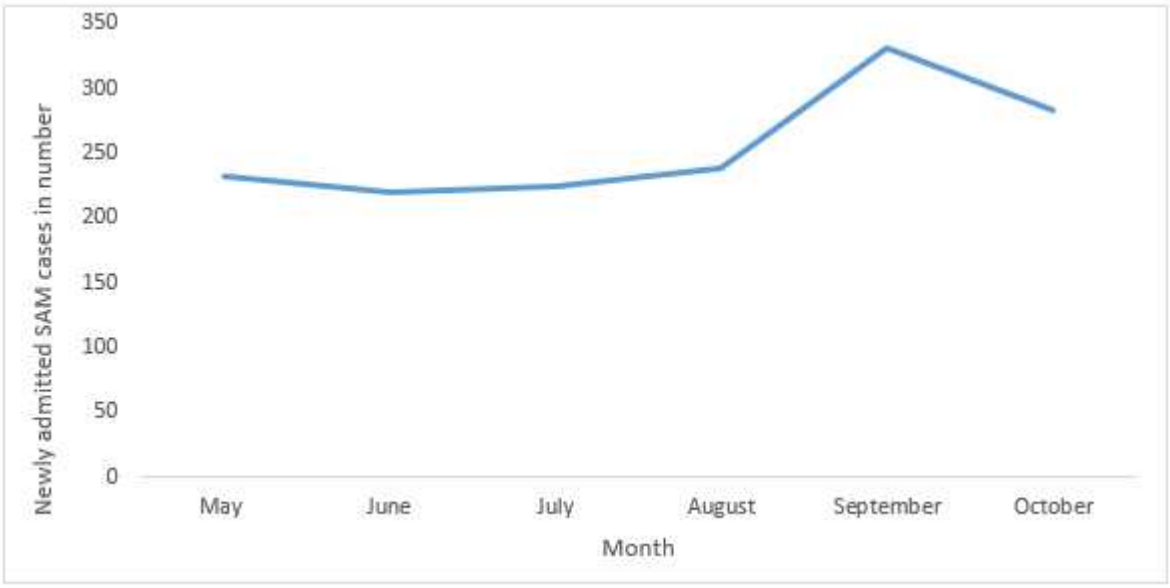

Figure 5.5: The number of new SAM case in Oromia Zone Northwestern Ethiopia, 2018

MAM cases management: Children with MAM aren't well managed in both zone even they have not any data about MAM cases of children the reason reflecting from both of them due to lack resource. There is no TSFP program in both zones. But there is some cured MAM cases in Oromia Zone only from July to October display in graph below.

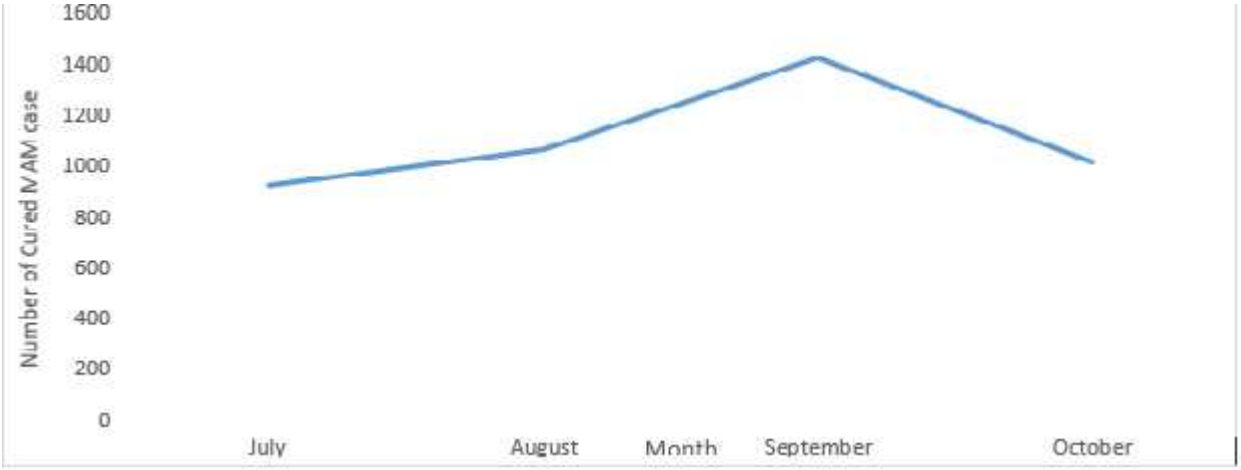

Figure 5.6: Trends of cured MAM cases in Oromia zone northwestern Ethiopia, 2018

5.4.7. Screening

Most of the HFs in the two zones used was routine screening modality. The performance of Vit A and Deworming supplementations in were 73% in South Wollo whereas there is no data in Oromo zone. The reasons when Vit A and Deworming in available of data in Oromia zone in the last six months due to the security problems.

Table 5.4: Screening performance from 6-59 months old children May to October, 2018 in South Wollo zone

Months	Target Children 6-59 months	# of screened	Screening Coverage (%)	SAM			#of children with no edema& MUAC11to 11.9 cm	% proxy GAM for children	% proxy SAM for children
				MUAC<11cm	Edema	Total	MAM		
May	385424	207864	53.9	638	3	641	8880	4.5	0.3
June	385424	217847	56.5	881	7	888	10168	5.0	0.4
July	388732	174996	45	816	20	836	7693	4.8	0.47
August	388732	158166	40.7	689	1	690	8468	5.7	0.43
September	388732	180572	46.5	643	0	643	9238	5.4	0.3
October	388732	146071	37.6	610	4	614	8499	6.2	0.4
Total	2325776	1085516	46.6	4277	35	4612	52946	5.3	0.42

Nutrition screening performance in Oromia zone

Nutrition screening performance of under-five age category in Oromia zone of Amhara region were descripted below table. Number of SAM, MAM and GAM were indicated also.

Table 5.5: Screening performance from May to October, 2018 in Oromia zone

Months	Target Children 6-59 months	# of screened	Screening Coverage (%)	SAM			# of children with no edema & MUAC 11to 11.9 cm	% proxy GAM for children	% proxy SAM for children
				MUAC <11cm	Edema	Total	MAM		
May	-	-	-	-	-	-	-	-	-

June	-	-	-	-	-	-	-	-	-
July	73072	50232	68.7	301	8	309	2287	5.2	0.6
august	73072	37187	50.8	194	7	201	1744	5.2	0.5
September	73072	53197	72.8	308	12	320	2480	5.3	0.6
October	-	-	-	-	-	-	-	-	-
Total	219216	140616	64.1	803	27	830	6511	5.2	0.6

In malnutrition screening programs both pregnant and lactating mothers up to 6 months are included in the program. The HFs in the two zones routinely performs the PLW screening.

Table 5.6: Screening performance of PLW in South Wollo zone from May to October, 2018

Months	Target PLW	# of screened PLW	Screening coverage	# of PLW WMUAC<23cm	% proxy GAM for PLW
May	**100845**	**40637**	**40**	**6287**	**15**
June	**100845**	**49736**	**49**	**6282**	**12**
July	**101710**	**40508**	**40**	**6146**	**15**
august	**101710**	**38741**	**38**	**5904**	**15**
September	**101710**	**40087**	**39**	**7084**	**17**
October	**101710**	**33931**	**33**	**6472**	**19**
Total	**608530**	**243640**	**40**	**38175**	**15.67**

Table 5.7: Screening performance of PLW in Oromia zone from May to October, 2018

Months	Target PLW	# of screened PLW	Screening coverage	# of PLW MUAC<23cm	% proxy GAM for PLW
May	-	---	---	---	---
June	-	---	---	---	---
July	19119	**9841**	**51.5**	**2338**	**24**
august	19119	**10892**	**57**	**2304**	**21**
September	19119	**9838**	**51.5**	**1893**	**19**
October	-	-	-	-	-
Total	57357	30571	53.3	6535	21.4

The respondents in the two zones expected that drought, shortage of safe water supply, could be risks for emergency nutrition. The major challenges faced in the two zones in nutrition response were turnover of trained staffs, budget deficit, and low road access to urban kebeles.

Major challenges and gaps identified

- Inability to control scabies in both zones
- Stock out of some emergency drugs and medical supplies in zonal stores
- Low coverage and utilization of latrine under visited zone of all woreda
- High malaria reported in the two zones
- Poor data management experience in all visited woreda and unwillingness to share the information especially Kalu woreda
- Low screening performance to identify nutritional status of children b/n 6 months to 59 months age and PLW in both zones and instability of trend of performance nutritional status
- Absence of emergency logistics (drugs and medical supplies) registration or documentation in terms of total requirement, available and stocked out.

5.4. Discussion

Public health emergency Preparedness and response plan with drugs and supplies to mitigate anticipated and unanticipated outbreaks at local and national level crucial. The team through its mission assessed the presence and absence of such tools in the visited zones and woredas. Vigilant

surveillance system for early detection of epidemics at the health center and district level is critical for timely and effective responses. Simple tools for data collection, analysis, and transmission must be in place. The professionals were no engaged for any activity right on the visited time due to political instability and regular leader shifting.

Malaria is the critical problems in Oromia zone due to left over of prevention and control activity in season 2018/19 due to shortage of logistics and instability problem. The distribution of LLINs and IRS activity were not timely provided and conducted.

Challenges faced during assessment

- Zithromax campaign was overlapped with our data collection and key informants.
- The main problems that faced during the assessment time of shifting leaderships at all level and all sectors especially Mekedela and Kutaber
- Unwillingness of officers to share data and information's
- Security problems during the assessment some interruption during visiting

5.5. Conclusion

In visited zones and woredas there were a shortage of operational cost/ budget to overcome the emergency situations. Poor coordination among multi sectoral body both at district and zonal level for early detection and control an epidemic diseases. In all visited woreda malnutrition screening coverage were low. Acute watery diarrhea, Measle and malaria were anticipate diseases. Water supply, hygiene and sanitation in all visited woredas were poor. In some woredas there were poor data quality and documentations.

5.6. Recommendations

- Regional health bureau and partners working in visited zones have to give attention for the control scabies from the HP level to RHB level as large as the government level
- Visited zones and RHB have to monitor and evaluate data quality and documentation
- Latrine coverage and utilization, LLINs distribution and utilization should be improve
- Screening activities to identify nutritional status of children and PLW at HP and HC level should strengthen and regular Monitor &Evaluate by health officers and focal persons have to conduct

- Except Mekedela woreda visited woreda should be plan for emergency budget
- Both South Wollo and Oromia zone have to strengthen Vit A and Deworming activities
- Emergency logistics should be register appropriately and timely requested at zonal stores

5.8. Reference

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Chapter 6 : Epi-Project proposal

Determinants of health seeking behavior following rabies exposure in Amhara region Ethiopia, May 2019

6.1. Introduction

6.1.1. Back ground

Rabies is a viral zoonosis and human infection usually occurs following a transdermal bite or scratch by an infected animal. Etiologic agent of this disease is the rabies virus belonging to the genus *Lyssavirus* and family Rhabdoviridae and the clinical signs include sudden behavioral change, hyper salivation, paralysis, hydro and photo phobia, restlessness, aggressiveness and biting inanimate objects (1).

Globally, human mortality from endemic canine rabies was estimated to be 55,000 deaths per year and 56% of the estimated deaths occur in Asia and 44% in Africa. About 98 % of the human rabies cases occur in Developing countries that possess large number of dogs, many of which are stray(2).

Once exposed by a bite from a rabid animal, human rabies can only be prevented through prompt post-exposure treatment, which includes wound washing, administration of an antibiotic, tetanus antitoxin (in severe bites) and active post-exposure prophylaxis (PEP) vaccine. Otherwise, rabies is invariably a fatal disease once clinical signs are manifested. This means that urgent post-exposure Treatment with prophylaxis is needed to reduce the likelihood of human mortality(3).

In Ethiopia, rabies is an important disease that has been recognized for many century. Nationwide data on rabies are not available to reveal the actual magnitude of the problem. However, the distribution of vaccine to the various regions and the fragmented reports on human and animal rabies cases are strong indicators of the wide spread nature of the disease in the country (4). The magnitude of the problem is higher in capital cities like Addis Ababa which hold large stray dog population and other associated factors (5).

Even if, rabies is a notifiable disease in Ethiopia and all prevention and control activities are coordinated at the national level using initiative of one health approach. The disease is under surveillance because the number of cause occurred in the district were greater than the number of cases reported under public health surveillance system

In Ethiopia, in a selected urban district, a rural highland district and a rural lowland district, the annual rabid dog exposures were estimated to be 135, 101 and 86 bites per 100,000 inhabitants, respectively (6). According of the data, complete PEP treatment consists of 17 doses of a nervous tissue vaccine, administered consecutively during the first 14 days after exposure, with the remaining three doses being given at intervals of 10 days, that is at day 24, 34 and 44. Whereas WHO recommended intramuscular rabies vaccine (purified chick embryo cell vaccine (PCECV) - Rabipur) on day 0, 3, 7 and 28 as per the rabies post exposure treatment guideline(7).

Most of the studies concerning rabies in Ethiopia have focused on levels of public awareness, attitudes and practices in cases of rabies exposure(8). None of these studies specifically identified factors which explain the medical treatment seeking behavior or the likelihood of receiving sufficient treatment doses among affected individuals. Understanding these factors is essential to support decisions in mitigating the hindrances to seek medical treatment that otherwise could lead to an increased burden of rabies. The decision to engage with medical channels following exposure or illness is influenced by a variety of geographical, social, economic, cultural and organizational factors (6).

In the Amhara region rabies and dog bite exposed persons seeking medical service upon exposure were report as Rabies and exposed persons who did not got medical service upon exposure reported as Dog bite. Based on the regional 2018/19 Data, from total bite cases reported to health seeking medical service upon exposure, while only 26.9% of cases were received sufficient doses of PEP and there were 11.8 per 1000 population case fatality rates registered this might be due to shortage of post exposure prophylaxis because before died all exposed persons were visited health facility.

This study will evaluate the health seeking and compliance behaviors of people following potential exposure to rabies in Amhara region using a contact-tracing questionnaire survey. The study findings are expect to inform strategies to increase delivery of PEP in the treatment centers, expand treatment center in other health centers and hospitals, improve PEP-uptake by ‘patients after exposure’ through targeted community-based education program and eventually achieve reduce human deaths due to dog-mediated rabies in the country.

6.2. Objective

6.2.1. General objective

- To determine the likelihood of seeking medical treatment behavior at a health center following rabies exposure and compliance of the required PEP treatments in selected woredas/administrative in Amhara region Ethiopia, 2019

6.2.2. Specific objective

- To assess community medical treatment seeking behavior at health center following rabies and dog bite exposure
- To characterize the likelihood compliance of the required PEP treatment.

6.3. Methods and materials

6.3.1. Study area: this survey based upon case investigation will be conducted in three selected districts. Namely Bahir Dar, Dega Damot and Gazgibla which represent urban, rural highland and rural lowland areas with populations of 314007, 181222 and 83017 inhabitants respectively (9).

Bahir Dar is an urban 563 km Northwest of Addis Ababa, Dega Damot is a rural high land district located west to Bahir Dar where most high area near to destination of Abay and people adopt a mixed crop-livestock farming system. Gazgibla is a district in the lowlands of the Eastern part of Amhara region where the majority of people depends on livestock rearing system. In Amhara region, there were only four facilities which deliver human post-exposure prophylaxis services to individuals exposed to rabies.

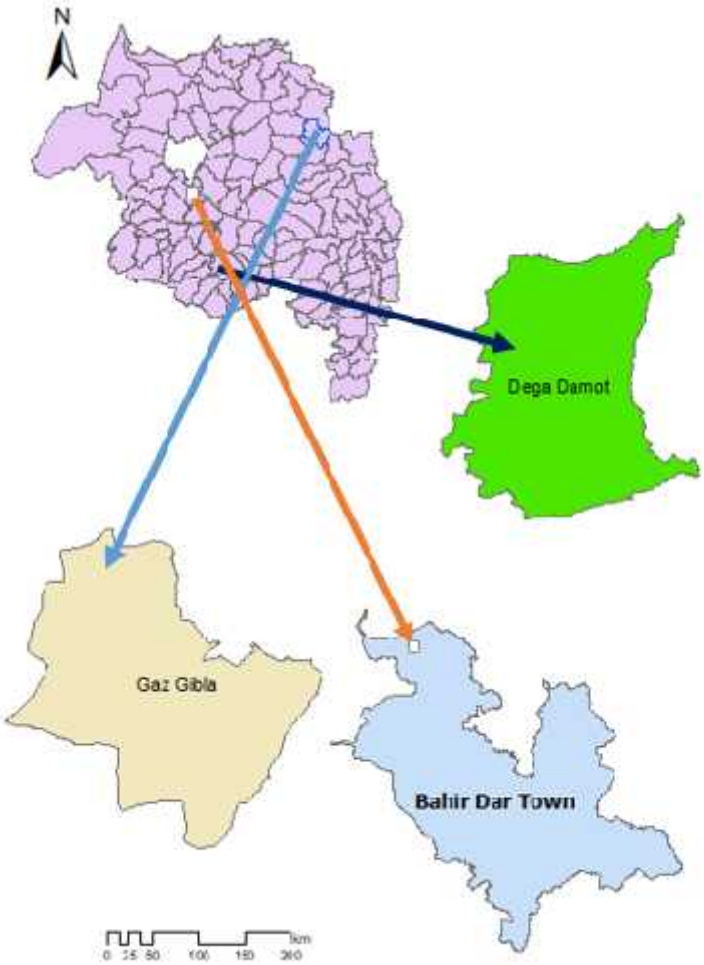

Figure 6.1: Maps of selected districts and administrative in Northwest Ethiopia, 2019

6.3.2. Study period:the study will conduct fromJuly 15/2019 to September 15/2019.

6.3.3. Source population: people who resident in Amhara region.

6.3.4. Study population: population in Amhara region who have exposure of rabies and dog bite.

6.3.5. Study Design: community based cross-sectional study design will be apply.

6.3.6. Sampling procedure:Based on the Amhara region public health emergency management data base in 2018/19 from July to May a total of 1115 dog bites and 427 rabies cases were reported. The report indicated that bites which took PEP were reported as rabies cases and bites which was not took PEP as dog bite. So, to study this situations cluster sampling method will apply based on residency followed by altitude. First classified the region by residency which means urban and rural then rural classified by altitude high land (above 2500 meter asl) and lowland (below 500 meter). Among the urban classifications, I plan to select Bahir Dar via burden of rabies and dog bite reports. From the same principles plan to select Dega Damot from high land rural woredas and Gazgibla from lowland rural woredas.

I will interview all exposed people who resident in the selected woredas/administrative including exposed people who may not reported via health facility. Will also use traditional healer registration book and spiritual data by contact tracing. The magnitudes of rabies exposed people and dog bite in Bahir Dar, Dega Damot and Gazgibla from July to May were 353, 15 and 11 respectively. Five deaths (four in one house hold) were reported in Dega Damot woreda and not reported deaths also present around three in Bahir Dar town.

6.3.7. Data collection:

Data on rabies and dog bite who visited health centers after being bitten by dog in the period between

July2018 and May2019 will collect from the records of health facility in the selected districts/administrative and traditional healers. The list of bite cases will collect from the health facility then sort into registration of rabies and dog bite and given to health extension workers. Health extension workers practicing in each village of the districts will train on techniques to carry out interviews using a structured questionnaire as well as in searching for cases that will not reported to health facility, using the contact tracing method (6). Health extension worker will contact each cases house, asked their oral consent to participate in the study. In cases where the case will a child, an adult family member will interview.

The questionnaire will pre-test with 10 dog bite persons around Bahir Dar zuria woreda. Based on these pre-tests, the questionnaire will check its clarity and adjust it if there will barrier/unclear for the study participants.

The exclusion criteria used for data collection were:

-Any bite persons who may not be traced after attempts to contact and interview;

-bitepersons who decline consent to be interviewed, and

- bite persons who died prior to follow-up.

Interviewers will be selected from the respective hospitals and traditional healers, questionnaires and data collection methods prior to administering the study. PHEM officer will used as supervise and coordinate data collective participants/health extension workers and voluntaries in each study area.

6.3.8. Data analysis

The data will enter into a database developed in Epi Info™ version 7 and analyze using SPSS version 22. Descriptive statistics will calculate for each variable of interest to compare responses to questions related to the knowledge, attitudes and practices of rabies. The result will present in tables and graphs.

6.4. Expected output

This study may be address the problems of community medical treatment seeking behaviors after exposed of rabies and dog bite. It may also identify the gaps of cases took medical treatment were very low (26.9%) as compared the total exposed people. It may indicate the distance of treatment centers, Shortage of post exposure prophylaxis, up taking of PEP after exposure will be the major problems. Based on this finding the decision makers will put plan and programs accordingly.

6.5. Ethical Considerations

The study will be conducted after ethical clearance from school of public health (SPH) and Addis Ababa University Medical faculty research Review Board. Supporting letter will also be write by School of public health to Amhara regional health bureau. We also write a letter for the selected woredas/administrative. Confidentiality of the information will be assured and privacy of the information will also be maintained. Additionally, informed consent will be developed and we will ask for the interviewees their consent to take part in the study .They will be enrolled in the study if they decide to do so. They have also the right and the freedom to withdraw themselves from the study and are not obliged to answer all of the questions.

6.5. Work plan

Table 6.1: Tentative work plan for epidemiology project activity

July15/2019 Orientation	Data collection		Data filling and cleaning	Data export, labeling, analysis	Writing and compile	Edit and comment	Submission date
	July 18/19	Aug 11/19					
			Aug 12-20/19				
				Aug21-25/19			
					Aug26-Sept 6/19		
						Sept 7-14/19	
							Sept15/2019

Budget break down

Table 6.2: Distribution of budgets in each activities

	Activities/Supplies	Qty.	Unit pay/cost (ETB)	Duration of activity	Total (ETB)
I	**Training**				
	Principal investigator	1	450	2	900
	Data collectors	8	450	2	7200
	Supervisor	3	450	2	2700
	Hall, Tea and coffee			2	2000
	Sub total				**12800**
II	**Per diem for Data collection(Gazgibla & Dega Damot)**				
	Principal investigator	1	450	20	9000
	Data collectors& 2 driver	6+2	300	20	48000
	Supervisor	2	300	20	12000
	Sub total				**69000**
	Per diem for Data collection(Bahir Dar)				
III	Principal investigator				
	Data collectors& 1 driver	6+1	70	25	12250
	Supervisor	1	70	25	1750
	Sub total				**14000**
	Printing and binding, pen, pencil, air time, notebook	**1500 ETB**			
IV	**fuel cost**	512.07 litter	**19.2 ETB**	**3**	**9831.744 ETB**
	Total				**107,131.74 ETB**

*With 5% contingency the total budget for the project is **112,488.33 ETB***

Remark:

Team members: Six health expansion workers and two public health officer will us in the two district and six PHEM focal one in each sub city of Bahir Dar town as data collectors with one PHEM officer as supervisor and coordinator. The data collection will take fifteen days in Dega Damot and Gazgibla and twenty five day for Bahir Dra town(because of there were high number of Rabies cases reported and many traditional healers presented here).

Distance from Bahir Dar: - Gazgibla 520 km+ 30 %(Kebele distance consider)

- Dega Damot 220 km+30(Kebele distance consider)
- Bahir Dar at most 34 km per day for 25 day movement in each sub city

6.7. Reference

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Chapter 7 : Manuscript and abstract

Pertussis outbreak investigation in Sayient Woreda Eastern part of Amhara region, North West Ethiopia, 2019

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Abstract

Background: Pertussis is a highly contagious respiratory illness caused by *Bordetella pertussis*. Pertussis was one of the most common infectious causes of morbidity and death with an average yearly rate of 150 cases per 100,000 populations. Pertussis is vaccine preventable bacterial infections that affects all susceptible individuals.

Objective: - Investigation was done to verify the existence of an outbreak and to identify factors contributed for the occurrence of pertussis outbreak in Sayient woreda, South Wollo zone North Western Ethiopia, 2019.

Methods: Unmatched community based case control and descriptive cross sectional investigation were conducted with one to two ratios. The study participants were selected by simple random method using the line list. We used structured questionnaire to collect data from cases and controls. The data clearing and filling was done on Epi info 7. The collected data was analyzed by SPSS and presented in table and graph.

Results: A total of 535 cases were identified with an overall attack rate of 3.1 per 1000 population. The median age of 10, ranged from 3 months to 28 years. The more affected groups were females. Lack of awareness on mode of transmission AOR (adjusted odds ratio): 1.614, (95% CI 1.030–9.53) was associated with developing pertussis. Have-not knowledge for prevention and control of pertussis AOR: 4.644 (95% CL 2.194-9.830) which means risk factor for the expansion of pertussis infection.

Conclusions: The pertussis outbreak was occurred in Guameda clusters of Sayient district. The factor that significantly contributes for the occurrence of pertussis outbreak was unknown of mode of transmission and also the presence of affected persons in the house was significantly for the occurrence of pertussis outbreak. Have-not knowledge of prevention and control measures is contribute a risk factor for the expansion of pertussis in Sayient woreda. Strengthen of routine immunization services, surveillance and early treatment of infected patients with appropriate antibiotics.

Keywords: Pertussis, Outbreak, Sayient, Northwestern Ethiopia, 2019

1.1. Introduction

1.1.1. Background

Pertussis or whooping cough is a highly infectious respiratory illness caused by *Bordetella pertussis* or *Bordetella Para pertussis(1).*

Pertussis is an acute and contagious infection of the respiratory tract caused by Bordetella pertussis or *Bordetella Para pertussis*. Bordetella pertussis is a fastidious gram-negative, toxin-producing bacillus that causes damage to the respiratory tract. It infects only humans and is the most important Bordetella species causing human disease. The disease is transmitted from an infected person to susceptible persons primarily through aerosolized droplets of respiratory secretions. The bacteria can survive for several days on dry surfaces; so it is also possible to get the bacteria by touching surfaces and contaminated nose and mouth. The patient of pertussis starts to be infectious starting from the initiation of symptoms up to 3 weeks of the paroxysmal phase of illness(2).

Pertussis has a worldwide distribution in many countries throughout the world with cyclical and persisted episodes of outbreaks every 3 to 5 years despite widespread immunization. Globally millions of cases and tens of thousands of deaths occur annually even pertussis surveillance is difficult hence disease burden goes largely unrecognized. Pertussis is highly communicable disease with attack rates of 80% to 100% among unimmunized household contacts and 20% within households in well-immunized populations. Neither natural disease nor Vaccination provides complete or lifelong immunity; wanes after 8-15 years.

It is essentially a disease of infancy and early childhood, but at least half of the deaths resulting from pertussis infection occur in the first year of life. Although other agents like *B. parapertussis* and Adenovirus are associated

with the etiology of whooping cough, at present the most important cause is *B. pertussis (2)*. Infants and young children have remained most susceptible to pertussis-related morbidity and mortality. In recent years infants younger than 6 months who are not old enough to have received three doses of the diphtheria–tetanus–pertussis vaccine and under vaccinated preschool children have been at higher risk for pertussis-associated complications(3). WHO estimated that in 2008, about 16 million cases of pertussis occurred worldwide, 95% of which were in developing countries, and that some 195,000 patients died from this disease (4).

Although thought of as a disease of childhood, pertussis can affect people of all ages and is increasingly being identified as a cause of prolonged coughing illness in adolescents and adults. In unimmunized populations, pertussis incidence peaks during the preschool years, and well over half of children have the disease before reaching adulthood (5). Recent trends show an increasing incidence of pertussis among adolescents and adults. Severe morbidity and high mortality rates are restricted almost entirely to infants. Children and adults who have not been vaccinated, infants who have not yet completed the immunization series, and adults and adolescents whose immunity to the disease has diminished are at increased risk for developing whooping cough and also for spreading the disease(6).

In highly immunized populations with at least 95% coverage, the peak incidence is among infants who have not completed the three-dose primary immunization series. Before the institution of widespread immunization programs in the developed world, pertussis was one of the most common infectious causes of morbidity and death with an average yearly rate of 150 cases per 100,000 populations. With universal childhood immunization, the number of reported cases fell by >95%, and mortality rates decreased even more dramatically (7).

The overall attack rate of the outbreak was 1.3 per 1000 inhabitants, which is less than pertussis outbreak in Papua New Guinea (8).

Complications frequently occur during the paroxysmal stage and are more common among infants than older or adults. Complications can include bacterial infection (Pneumonia), neurological complications, weight loss, dehydrations and other related factor in infected person (4).

1.1.2 Rational of field visit/supportive supervision

Sayient woreda has been affected by pertussis outbreak with 535 cases since Oct 15, 2011 E.C. Although this disease was reported on Dec16/2011E.C by South Wollo zone health department. On Dec 24/2011 the regional investigator teams were deployed for further investigation and supported of the intervention to Sayient woreda. Sayient woreda is map/selected as vulnerable woreda after confirmed of pertussis in Mekedela which is border to Sayient. The vaccination coverage of Sayient woreda 2010 was 123 % but pertussis occurred as an outbreak in Sayient woreda South Wollo Zone. This study is committed to build prevention and control activities of pertussis after all.

2.2. Objectives

2.2.1. Genera objective

To investigate the pertussis outbreaks and determine risk factors of pertussis in Sayient woreda, South Wollo zone, Northwestern Ethiopia, January 2019

2.2.2. Specific objective

- To verify the existence outbreak
- To characterize the extent of the outbreak in terms of place, person and time
- To identify potential risk factors of the disease transmission

2.3. Methods and Materials

2.3.1. Study area

Sayient woreda is Sayient district has 1urban and 35 rural villages/ kebeles. According Ethiopian fiscal year national population and housing census, the total population of the district was estimated to be 171927 in 2019. The district has 32 health posts, seven health centers and 1 hospital. Investigation was conducted in Ambasember Kebele of Sayient woreda. Sayient is one of the districts of South Wollo zone of Amhara region. Sayient is bordered by Mehal Sayient in the South, Legambo in Southeast, Mekedela in North and East and Simada in West (Fig. 1).

2.3.2. Study Design

Unmatched case control study was conducted in Sayient woreda South Wollo Zone Northwestern Ethiopia. Fifty cases with one hundred controls that had no previous history of whipping cough and post-tissue vomiting. We used WHO case definition which used to actively search for the cases in the communities and house to house level.

2.3.3. Target population

All populations resident in Sayient woreda

2.3.4. Study population

All population found in affected kebeles of Sayient woreda.

2.3.5 Study Unit

Populations who had whooping cough and neighbors hoods without having cough and pot-tissue vomiting.

2.3.6. Operational definitions

Case definitions of Amhara Regional pertussis guideline

Suspect case of pertussis:In the absence of other apparent causes, a person with cough lasting

at least 2 weeks with at least one of the follow ing symptoms:-

Paroxysms of coughing/ Inspiratory whoop/Post-tissue vomiting/ Apnea (with or without cyanosis) (for infants under one years) /a case diagnosed as pertussis by a physician.

Confirmed:A case of acute cough illness of any duration with a positive culture for *B. pertussis*, or a case that meets the clinical case definition and is confirmed by PCR, or a case that meets the clinical case definition and is epidemiologically linked directly to a lab-confirmed case.

Epidemic of pertussis:is a situation when two or more cases clustered in time.

Ambasember is the one from thirty six kebeles which found in Sayient woreda when pertussis outbreak were occurred from December 16/2018 up to January 29/2019.

2.3.7. Sample size determination and sampling: Sample size of pertussis outbreak was calculated by Epi Info 7 with AOR= 5.859 (10). There were 139 cases line list in the cluster before started investigation. 50 suspected cases and 100 controls were selected based on simple random methods and conventionally by using line lists.

All information hypothesized as risk factors for the pertussis outbreak were collected. We verified vaccination status retrospectively by observing the vaccination cards, registration and on history of vaccination. Parents or guardians of the study participant were interviewed for those aged less than 7 years old.

2.3.9. Community-based surveillance

On October 25/2018 in Mekedela which border of Sayient, active surveillance was implemented in the community to identify pertussis cases who have whooping cough with post tissues vomiting illness. On right time, nasopharyngeal swabs were performed by the physicians using swab. Sample was collected and transport to the University of Gondar Hospital laboratory to identify *B. pertussis.*

2.3.10. Laboratory analysis

Nineteen samples were collected from Mekedela and evaluated at University of Gondar laboratory. Among those thirteen were culture and 100% of the culture grows bacteria. PCR was used for laboratory confirmation of pathogens. PCR testing targeted genes coding for an insertion element (IS481) and for pertussis toxin promoter (9)

Furthermore, human specimens were inoculated on Regan-Lowe (Charcoal horse blood) agar plates containing cephalexin. The plates were incubated at 37°C and checked daily for up to 7 days for the presence of typical colonies (9).

2.3.11. Statistical methods

Analysis was performed by SPSS version 22 statistical software package. Frequency and percentage were calculated for the study variables. P value and two tail Fisher's exact test was used to calculate and determine significance. In all statistical tests, the differences were considered to be statistically significant if P value less than 0.05

Dependent variable

Pertussis case status (respondents' status)

Independent variables include:

Sociodemographic Characteristics such as:

Age, sex, family size, educational status, occ upation, marital status etc.

Variables related to clinical history of diseases such as:- presence of whooping cough, conjunctivitis, edema, ear discharge, pneumonia, hernia etc.

Expected risk factors related variables such as: - vaccination status, number of penta dose received, knowledge of modes of measles transmission, knowledge of prevention of pertussis, contact history with person who have whooping cough, presence of whooping cough in classmate, family and neighbors/relatives etc.

2.3.12. Ethical consideration

A written official letter of cooperation was obtained from Amhara public health institute Public health emergency management directorate to South Wollo zone and Sayient woreda health office and data collection was started after getting permission and provision of a written official letter from the district health office. The purpose and objective of the study for which the data required were briefly explain the purpose of the study conducted to the each participant of the study prior to interview. The study conducted in align with home case treatment and prevention activities. Verbal informed consent was used in the process of data collecting from the study participants. Confidentiality of responses maintained throughout the process

and the study conducted in line with house to house case search and provision of advice on the importance of modern medical treatment for the prevention and control of pertussis outbreak.

2.3.13. Dissemination plan

We will prepared and shared the written documents both hard and soft copies to Sayient district health office, each health centers in the district, South Wollo zone health department and Amhara national regional state. Findings of the investigation will be presented and submitted to Department of Epidemiology at Addis Ababa University.

2.4. Result

2.4.1. History of pertussis in surrounding area

Outbreak of pertussis was started in Mekedela woreda on September 15/2018 with attack rate of 5.8 per 1000 persons. During the time being of outbreak Sayient woreda which is near to Mekedela was mapping as high risk area of pertussis. This cases was confirmed at University of Gondar through cell culture and PCR. From a total of 19 samples 100% of the cases were positive Bordetella pertussis with culture and PCR. Pertussis outbreak occurred from December 16/12/2018 to January 22/1/2019 in Sayient woreda with a total of 535 cases with complications of hernia, edema, pneumonia and conjunctivitis were identified. All pertussis cases were reported in Guameda cluster Ambasember (12) Kebele.

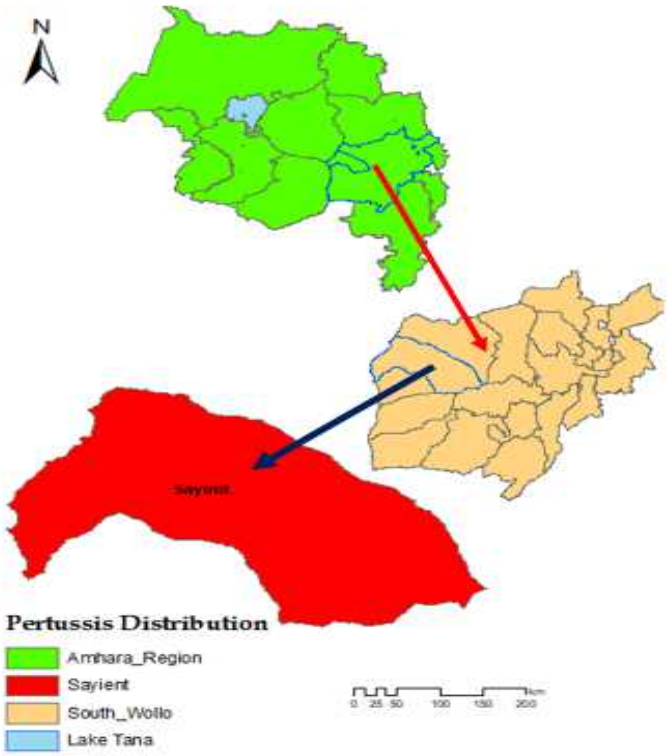

Figure 7.1.1: Map of pertussis outbreak occurred area

Among the total cases 85 (56.6%) of them were females. In case control study, the age of the cases were ranged from 3 months to 28 years with (median age =10, IQR_1=.7 & IQR_3=12). Of the total study participants 19 (38%) of them were 10-14 aged cases and 57(57%) 10-14 aged controls. In the health post there weren't any EPI (Expanded programme on Immunization) registration documents and data. Whereas based on the checklist, among 89(59.3%) vaccinated status of study

participants 4 (4.5%), 3 (3.4%), 58(65.2%) an d 24 (26.9%) were vaccinated for one dose, tw o dose, three dose and full dose respectively,

while the remaining 26(17.3%) and 35(23.3%) were unvaccinated and unknown respectively (Fig. 6). Study participants were respond the number of doses received but there wasn't vaccination card in their home as evidence.

2.4.2. Vaccination coverage

Affected villages/kebeles health posts didn't have vaccination data and refrigerators for the storage of vaccines, as result in these villages/kebeles there was no routine immunization service starting from October 2018. As the community said, when they got immunization service in this Kebele irregular period came from Guameda health center and Gult gots which is difficult topography have not got immunization access on time.

Immunization card was not given for vaccinated children. There was not immunization monitoring charts/growth monitoring in Ambasember health post. This health post had not showed pertussis vaccination coverage of affected kebeles.

2.4.3. Pertussis outbreak situation

Pertussis outbreak was reported as an outbreak since Dec 25/2018 E.C. but the cough was started in Oct 25/2018 as the study participants reply and information gathered from Wogdi general primary school teachers. As school director said, due to school absenteeism of three students reported the cough on Nov 4/2018 for Health extension worker who work in Ambasember health post. The cough was started on 28 age group male in communities after came back festivals on Oct 1/2018 from Mekedela. 139 number of cases were reported before intervention begins on Dec 27/2018 and a total of 396 cases were trussed by active cases search/house to house/case treatment and campaign. Then after a week the cases were transmitted to Tenta woreda with a total of 109 pertussis cases. The epi curve of pertussis outbreak displayed in the next graph (Fig 2)

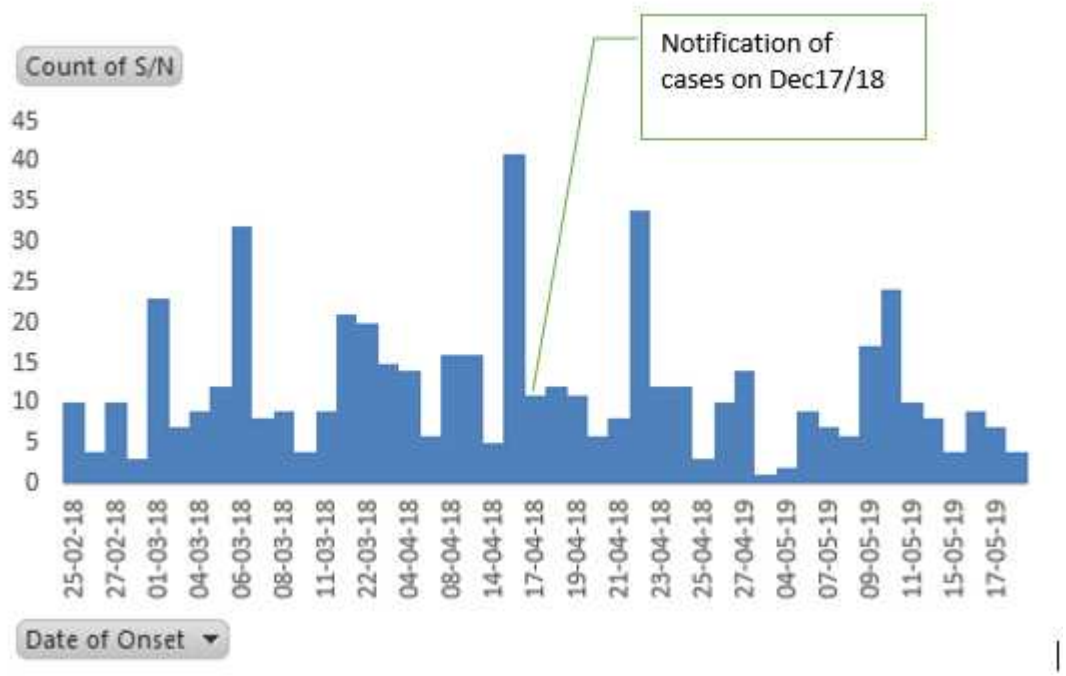

Figure 1.2:Epi curve of pertussis cases by date of onset of cough in Guameda cluster, Sayient district, South Wollo zone, Amhara, Ethiopia, from Oct 25/2019 to January 22/2019

2.4.4. Sociodemographic Sayient

Sayient woreda held 171927 total population with 73241 under fifteen age groups. From the 35 rural kebeles 7 of them were hard to reach area. The social behavior of population were closely interactive and had population movement for daily laborer to adjusted woredas and other zones. The residency have mixed farming system behavior.

2.4.5 Age category of study participants

76(50.6 %) of study participants were 10-14 age group and 10(6.7%) greater or equal to fifteen age groups. During our investigation the index case reported with age group of greater than fifteen. The study participants of age category displayed in the below graph (Fig.3).

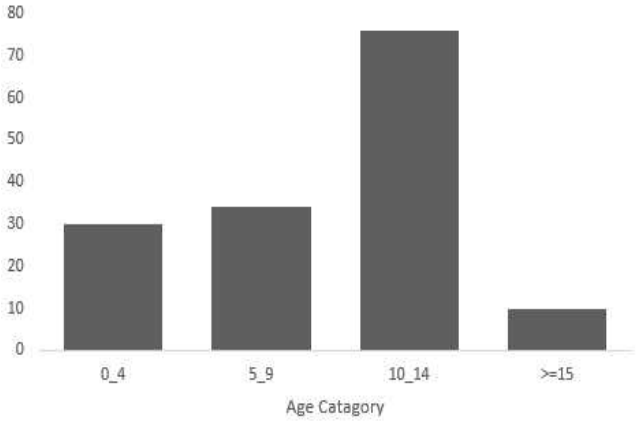

Figure 1.3: Age category of study participants in Sayient woreda, South Wollo zone, North West part of Ethiopia, 2018/19

2.4.6. Pertussis case with contacts relations

From the 50 case 29(58%) of the case have a family contact. All study participants exposed to a person with inspiratory whooping cough, post-tissue vomiting. The exposures of cases with classmate, family and relatives were showed below the graph (Fig.4)

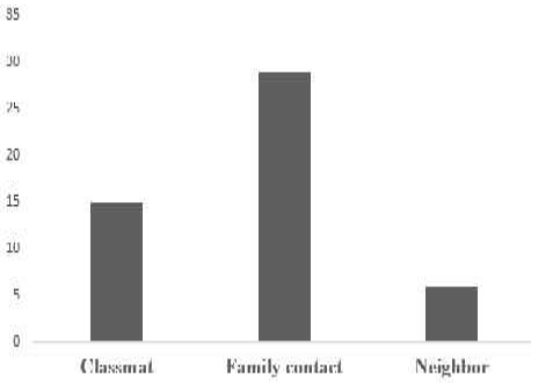

Figure 1.4: Contact relation of cases in Sayient woreda, South Wollo zone, North West part of Ethiopia, 2018/19

2.4.7. Mode of transmission and prevention of pertussis: Among the study participants 86(57.3%) have known for the mode of transmission of pertussis from person to person via (sneezing, coughing, and sleeping) together face to face and 90(60%) of the participants unknown for a method of prevention and control of pertussis. Mode of transmission and methods of prevention and control of pertussis participant's response displayed in below graph (fig. 5).

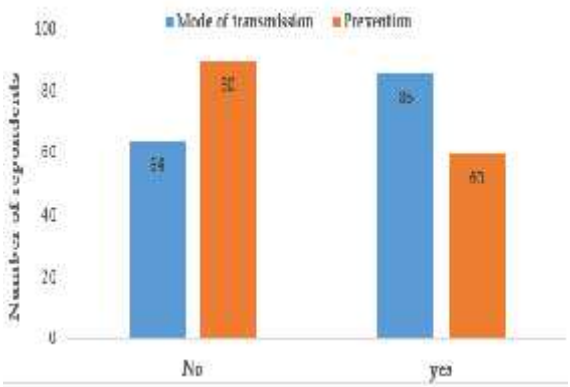

Figure1.5: Knowledge of study participant's response in mode of transmission and prevention of pertussis cases in Sayient woreda, South Wollo, North West part of Ethiopia, 2018/19

2.4.8. Vaccination status of cases

Among the study participants 95(63.3%), 41(27.3%) and 14(9.3) of the study participants were vaccinated, unknown and unvaccinated respectively. 41.3 % among the vaccinated participants took three dose. The vaccination status of participants with disaggregation dose displayed in graph (fig.6).

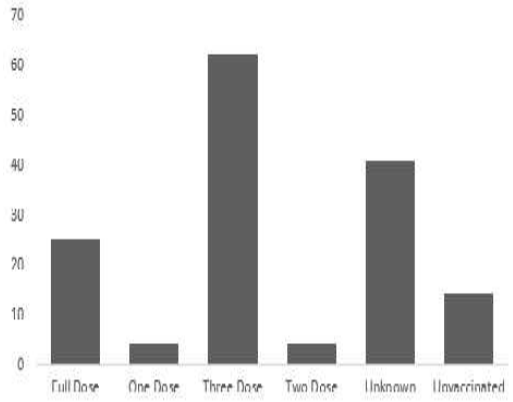

Figure 1.6; Vaccination of status with dose of study participants in Sayient woreda, South Wollo zone North Western Ethiopia, 2018/19

2.4.9. History of pertussis in study participants

67(44.7%) of participants haven't a history of sick in pertussis in their life and 16(10.7%) were sick in pertussis. The history of pertussis cases in study participants showed in below graph (F.g.7).

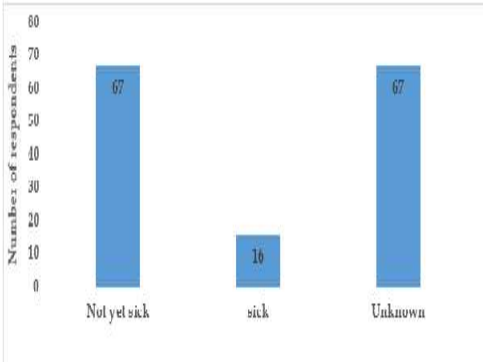

Figure 1.7: Study participants in pertussis history in Sayient woreda, South Wollo zone North West part of Ethiopia, 2018/19

2.4.10. Determinates of pertussis

In this investigation a total of 50 cases and 100 controls who resided in affected kebeles were selected for case control study, with a ratio of one case to two controls. Among the total 50 interviewed cases 27(54%) of them were females and among the total 100 controls 58 (58%) of them were females. Among the cases 19(38%) were in age category of 10-14.

Variable in bivariate analysis were indicated in the next table of each variables in different table.

Respondents who have not history of vaccination OR=9.375(2.659-33.057) and having contact case history in family OR=0.000(2.006-56.348) as showed below table.

Table 7.1.1: variables with respondent association

Variable	Category		Cases (50)	Control (100)	OR, 95%, CL	P-Value
Did you have vaccinated?	Yes		20(40%)	69(69%)		
	No		10(20%)	16(16%)	9.375(2.659-33.057)	.000
	Unknown		20(40%)	15(15%)	3.571(1.627-7.840)	.002
Do you know Prevention measures of pertussis	yes	Ventilation	18(36%)	37(37%)		
		Isolation	19(38%)	30(30%)		
		Vaccination	18(36%)	32(32%)	At least one	
	No		21(42%)	53(53%)	2.524(1.199-5.311)	0.015
Do you know Mode of Transmission	Yes		35(70)	51(51%)		
	No		15(30%	49(49%)	2.242(1.09-4.609)	0.028
From where did you have contact cases?	Classmate		15(30%)	54(54%)	2.037(0.729-5.689)	0.175
	Family		29(58%)	2(2%)	10.633(2.006-56.348)	0.000
	Relatives		6(12%)	44(44%)		
Age category	0-4		9(18%)	21(21%)	0.381(.136-1.068)	0.067
	5-9		18(36)	16(16%)		
	10-14		18(36)	57(57%)	0.296(0.127-.593)	0.05
	>=15		4(8%)	6(6%)	0.593(0.141-2.484)	.474

Bivariate analysis of independent determinant factors of unknown mode of transmission and haven't knowledge for prevention control measure of pertussis in the communities with OR= 2.242 (95% Cl 1.09- 4.609) and OR=2.524(1.199-5.311) respectively.

The result of multivariate logistic analysis of different variables which showed in significance in bivariate analysis. The multivariate analysis of relation of contact, mode of transmission and knowledge of prevention and control methods of pertussis descripted in the next table.

Table 1.2: multivariate analysis of variables which have significant association in bivariate analysis.

Variables	category	Cases =50	Controls =100	AOR, 95%, CL	P-value
Contact relation	Classmate		54(54%)	6.987(1.186-41.151)	.000
	Family		2(2%)		
	Neighbors		44(44%)		
Do you know mode of transmission(sneezing, Coughing, sleeping)	Yes		51(51%)	1.614(1.333-9.535)	.029
	No		49(49%)		
Do you have prevention and control for pertussis (ventilation, isolation, vaccination)	Yes		47(47%)	4.644(2.194-9.830	.001
	No		53(53%)		
Did you vaccinated	yes		69(69%)		.055
	No		16(16%)	3.621(0.971-13.501)	
	unknown		15(15%)	1.773(1.955-16.08	.011

2.4.11. Public health measures taken

Pertussis outbreak occurred in three Kebele/gots of Guameda cluster of Sayient woreda. One of the Kebele/gots which pertussis occurred was hard to reach area and inaccessible for transport. Intervention measures were taken in three phases. The first phase was took on Dec 18/2011 by Sayient woreda health office to conducted case management and health education.

The second phase was conducted by woreda health office on Dec 23/2011 on Guameda health center case managements and orientation of Kebele leaders and community focal for the status of pertussis cases (locally ”TIKTIK’).

The third phases was on January 05/2011 with integrally Regional, Zonal, Woreda and cluster teams. Logistics were delivered in affected clusters and social mobilization activities on communities. House to house case search, health education, orientation of schools, campaign on school and Kebele. Kebele leaders, Community focal and teachers were involved for active cases searches and health educations. Routine

vaccination was started on hard to reach areas and activation of information flows from communities to health facilities, Kebele leaders and school directors.

1.5. Discussion

The presence of suspected pertussis outbreak were checked after arrived in Ambasember kebele of Guamada cluster Sayient woreda. The signs and symptoms of the cases were leads to pertussis based on standard case definitions of the regional draft guideline. We were communicated the result of suspected pertussis which collected in Adjust woredas (Mekedela) before a months and discussed with woreda PHEM officer the history of index cases then consensuses it is pertussis by epidemiological link.

Over the period of outbreak, the overall attack rate of the outbreak was 3.1 per 1000 persons, which is less than pertussis outbreak in Papua New Guinea (4%) and greater than pertussis outbreak in Mekedela(1.3%) (9, 10). This might be due to recovering of cases before case detected and under reporting of cases or weak surveillance activities.

33.5% of pertussis cases had received three doses of pertussis vaccine during interviewed, this could be due to the vaccine might not be in good condition to prevent pertussis infection or recall biased of respondents because we haven't yet got immunization card.

Females were more affected than males. The outbreak affected age ranges from 3 months to 39 years which is the same result with studies of Alemaw in medikeda. Most of pertussis complication were occurred under 4 age groups which developed to umbilicus hernia, otitis media, edema, pneumonia and one cases kidney failure. This complication were occurred due to not time seen at health facility by different reasons like poor seeking behavior of communities, heard to reach area, interruption of routine immunization and susceptible age category.

This investigation identified respondent's unknown mode of transmission 1.614 times that remained significantly associated with the occurrence of pertussis outbreak in Sayient district, South Wollo zone. This factors might be infected persons in the house and class, different history from previously sick But WHO study showed that previously affected patients are rarely infected(3).

The present of infected persons in the family had OR =6.986 (95% CL 1.186-41.151) with significantly independent risk factor for pertussis outbreak. This large of upper confidence interval might be due to haven't knowledge of prevention and mode of

transmission of pertussis from persons to person. This study is similar with the study of Alemaw in Mekedela (10).

This investigation identified respondent's hav en't knowledge for prevention and control of pertussis had OR= 4.644(95% Cl 2.194-9.830) which is associated risk factor for the occurrence of pertussis outbreak in Sayient district, South Wollo zone. This is might be due to haven't knowledge prevention have not ventilation, isolation and vaccination infected persons in their corresponding period.

The likelihood contributing factor complication was pertussis related malnutrition, post tissue vomiting and poor seeking behavior of people because of unreachable health facility, is far from their living environment. The most affected age group was 10-14 years 375 (70 %) with the attack rate of 2.2 per 1000 population which lower than the study of Alemaw(5, 10). This might be due to poor data quality and collected of data after recovery.

Strength of the study

This investigations clearly indicated the distribution of pertussis. This investigation also directed preparedness and planning, risk mapping and risk communication. This finding were presented at each level and the regional health bureau used it as a road map for resource mobilization and evaluation of immunization activities.

Limitation of the study

Absence of vaccination card was difficult to determine the vaccination status, dose received, exact date of vaccination and other relevant information which could cause information bias. Recall bias on the date of onset by the cases and their mothers since the investigation was conducted lately after 339 cases were occurred. Absence of vaccination data in affected Kebele was one the problems.

1.6. Conclusion

Pertussis outbreak had occurred in remote villages/kebeles of Sayient district south Wollo zone. There was no vaccination data in the cluster at health post level to associate vaccination coverage with occurrence of pertussis outbreak. The outbreak was reporting after 3 months of the occurrence of more complicated and problems on peace administrative. In this outbreak the overall attack rate was 3.1 per 1000 population. All complicated cases were occurred under 4 age category. The presence of infected person in family is contributed risk factor for pertussis. Unknown of mode of transmission was significantly contributes factor for the expansion of pertussis outbreak and haven't knowledge of pertussis the presence of affected persons in the house was

insignificantly for the occurrence of pertussis outbreak due to knowledge of prevention and control.

1.7. Recommendation

Prevention and control of pertussis outbreak in the South Wollo zone forwarded this action points

- Health workers at each level should be strengthen health education activities for prevention and the mode of transmission of pertussis (TIKTIK) from one person to others.
- Sayient woreda health offices have to strength active case search surveillance for early notification of the diseases/events occur.
- Strength of coordination at Kebele level including school directors, Kebele leaders, health development army and religious leaders for early notification diseases and events.
- Guameda cluster health center should have to establish and implement routine EPI service in affected Kebele/villages/kebeles
- Sayient woreda health office alerted when there is a rumor of cases/event in adjustment woredas and regions.

1.8. Reference

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Abstract

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Title: pertussis outbreak investigation in Sayient woreda South Wollo zone northwestern Ethiopia 2019.

Background: Anthrax is a zoonotic bacterial disease caused by *Bacillus anthracis*, which primarily affects livestock. Anthrax is an endemic disease in Ethiopia occurring before and after the rainy season. Conducting an outbreak investigation foranthrax is important for the strength of the surveillance systemand strongly promotinga one health approach.

Objective: - The studywas done to verify the existence of outbreak and determine risk factors ofanthrax in Farta woredaSouth Gondar zone Northwestern Ethiopia,2019

Methods: An unmatched, community based, case control study was conducted from March 25-April 1/2019. We used a structured questionnaire to collect data, reviewing of documents and discussion with live stoke and health office staffs. The collected data were analyzed by SPSS and presented in tables and graphs.

Results: A total of 20 human anthrax cases with attack rate of 2.5 per 1000 population in affected Kebele.The median age was 37.5, ranging from 1 month to 65 years. The cases were 66.7% male and 77.8% were 15 and aboveyears. Woreda health offices and livestock office hadn't joint plan for the prevention of zoonotic disease. People who had unvaccinated animals were positively associated with anthrax; AOR = 8.113 (95% CI 1.685-39.056). People who had heard about anthrax disease were negatively associated with anthrax; AOR = 0.114 (95% Cl 0.025-0.524).

Conclusions: An anthrax outbreak occurred in Wawa Mengera kebele of Farta woreda. The presence of unvaccinated animals in a household had risk factor for the occurrence of anthrax cases. Whereas a person who had heard anthrax prior outbreak was protective factor for Anthrax. Farta woreda health and livestock offices should be initiate one health approach for prevention of zoonotic diseases. Strengthening health education on vaccination of animals, mode of transmission and disposal of dead animals is essential for prevention of anthrax cases.

Keywords: Anthrax, Outbreak, Farta, Northwestern Ethiopia, 2019

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Resident advisor: Dr. Alemayehu Bekel and Dr. Hagos Ashenafi, **FETP Entry:** 2017/2018

Title: data analysis of Tuberculosis in Amhara Region, Ethiopia, 2014-2017.

Abstract

Background: Worldwide, more humans die as a result of tuberculosis each year than from any other infectious disease. Ethiopia is among the 22 High TB Burden Countries and among the 27 high MDR TB burden countries in the world. Compounded with HIV/AIDS, TB has become a formidable threat to the country. There is not well documented on the distribution of TB in South Gondar Zone.

Objective: To estimate the case and death of tuberculosis and treatment outcome of enrolled in different types of TB cases.

Methods: A cross sectional study was used to analyze a four years data of Tuberculosis. The sample sizes that used all TB cases reported during July1/2014-Jun30/2017. The collected datafrom SGZ health department were checked by Microsoft Excel.

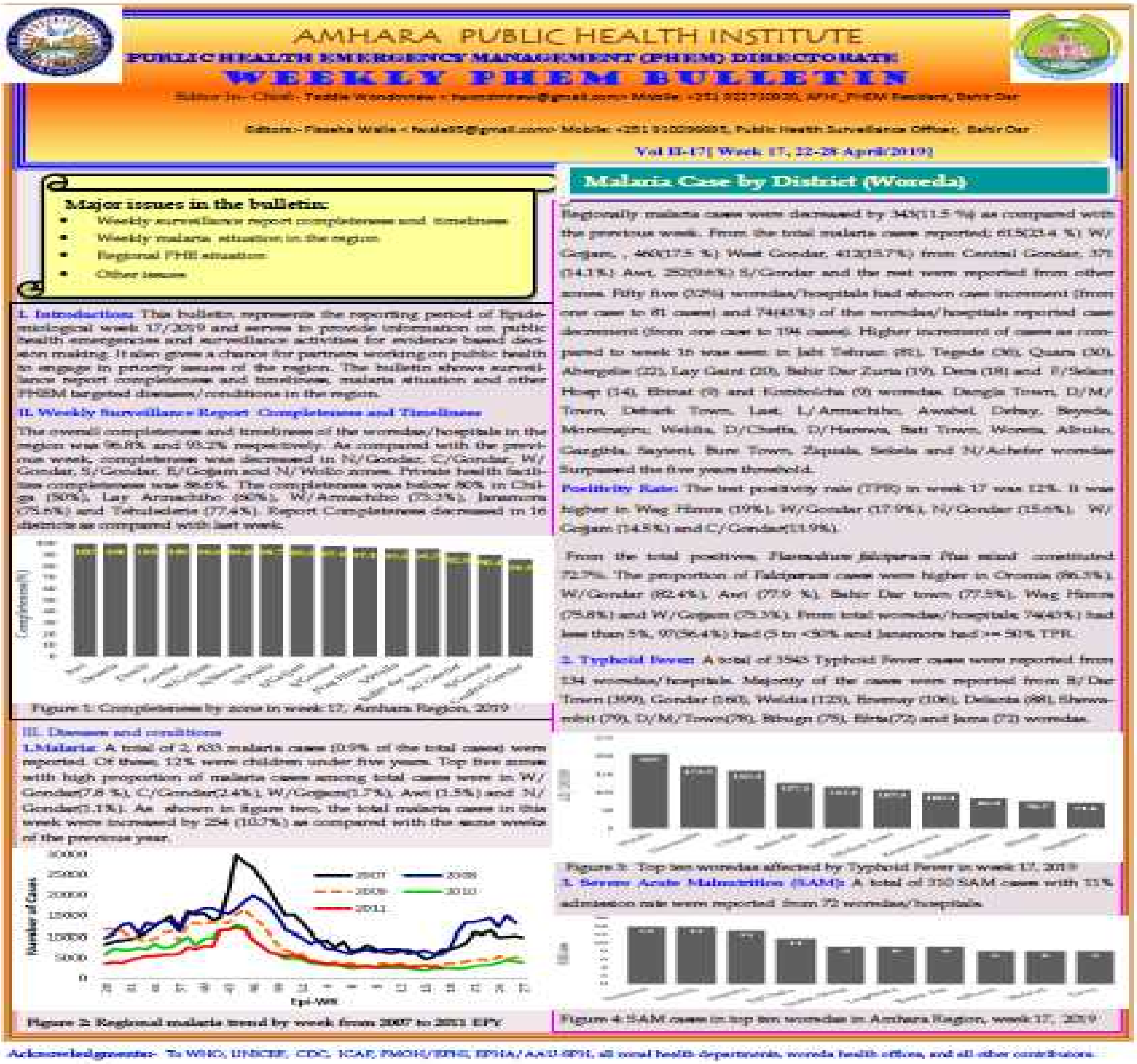
Result: Atotal of 10756 TB cases were included in the analysis at South Gondar Zone during the analysis period of which 5841(54%) were males. Among total TB cases reported 87.9 %(9454) were 15-65 age groups and all form TB was 50% and smear positive pulmonary TB 22%. The proportion of TB was EPTB (49%); PTB- (31%) and PTB+ (20%) and all form TB cases with related of age were 89%, 9% and 2% for ≥15, 5-14 and 0-4 years old respectively. incidences were 125 in 2014 and as low as 105 in 2016. The highest death rate was 8.5% by PTB+ in 2014 and the lowest 2.5 by EPTB in 2017 were observed.

Conclusion: The highest amounts were extra pulmonary tuberculosis whereas the lowest amounts were PTB^{+} patients. Based on the above conclusion the following Recommendation is forward**.** District health office and health facilities encourage health professionals finding of cases by screening all HIV patients for TB and all patients with sign and symptom of TB including surveillance system improvement to detect cases early.

Keywords: - *Tuberculosis, South Gondar Zone, Ethiopia, 2018*

Chapter 8 : Other work outputs

Bulletin, Feedback, situational update, summary reports of Vaccine preventable disease, developed of Rabies and Anthrax line list and case based.


AMHARA PUBLIC HEALTH INSTITUTE

PUBLIC HEALTH EMERGENCY MANAGEMENT (PHEM) DIRECTORATE

WEEKLY PHEM BULLETIN

Vol II-17| Week 17, 22-28 April/2019|

Major issues in the bulletin:

- Weekly surveillance report completeness and timeliness
- Weekly malaria situation in the region
- Regional PHE situation
- Other issues

I. Introduction: This bulletin represents the reporting period of Epidemiological week 17/2019 and serves to provide information on public health emergencies and surveillance activities for evidence based decision making. It also gives a chance for partners working on public health to engage in priority issues of the region. The bulletin shows surveillance report completeness and timeliness, malaria situation and other PHEM targeted diseases/conditions in the region.

II. Weekly Surveillance Report Completeness and Timeliness

The overall completeness and timeliness of the woredas/hospitals in the region was 96.8% and 93.2% respectively. As compared with the previous week, completeness was decreased in N/Gondar, C/Gondar, W/Gondar, S/Gondar, E/Gojam and N/Wollo zones. Private health facilities completeness was 86.6%. The completeness was below 80% in Chilga (50%), Lay Armachiho (60%), W/Armachiho (73.3%), Janamora (75.6%) and Tehuledere (77.4%). Report Completeness decreased in 16 districts as compared with last week.

Figure 1: Completeness by zone in week 17, Amhara Region, 2019

III. Diseases and conditions

1. Malaria: A total of 2, 633 malaria cases (0.9% of the total cases) were reported. Of these, 12% were children under five years. Top five zones with high proportion of malaria cases among total cases were in: W/Gondar(7.8 %), C/Gondar(2.4%), W/Gojam(1.7%), Awi (1.5%) and N/Gondar(1.1%). As shown in figure two, the total malaria cases in this week were increased by 254 (10.7%) as compared with the same weeks of the previous year.

Figure 2: Regional malaria trend by week from 2007 to 2011 EFY

Malaria Case by District (Woreda)

Regionally malaria cases were decreased by 345(11.5 %) as compared with the previous week. From the total malaria cases reported; 615(23.4 %) W/Gojam, , 460(17.5 %) West Gondar, 412(15.7%) from Central Gondar, 371 (14.1%) Awi, 252(9.6%) S/Gondar and the rest were reported from other zones. Fifty five (32%) woredas/hospitals had shown case increment (from one case to 81 cases) and 74(43%) of the woredas/hospitals reported case decrement (from one case to 194 cases). Higher increment of cases as compared to week 16 was seen in Jabi Tehnan (81), Tegede (36), Quara (30), Abergelie (22), Lay Gaint (20), Bahir Dar Zuria (19), Dera (18) and F/Selam Hosp (14), Ebinat (9) and Kombolcha (9) woredas. Dangla Town, D/M/Town, Debark Town, Last, L/Armachiho, Awabel, Debay, Beyeda, Moretnajiru, Weldia, D/Cheffa, D/Hamwa, Bati Town, Worena, Alfuko, Gangibla, Sayient, Bure Town, Ziquala, Sekela and N/Achefer woredas Surpassed the five years threshold.

Positivity Rate: The test positivity rate (TPR) in week 17 was 12%. It was higher in Wag Himra (19%), W/Gondar (17.9%), N/Gondar (15.6%), W/Gojam (14.5%) and C/Gondar(13.9%).

From the total positives, *Plasmodium falciparum* Plus mixed constituted 72.7%. The proportion of Falciparum cases were higher in Oromia (86.7%), W/Gondar (82.4%), Awi (77.9 %), Bahir Dar town (77.5%), Wag Himra (75.8%) and W/Gojam (75.3%). From total woredas/hospitals; 74(43%) had less than 5%, 97(56.4%) had (5 to <50% and Janamora had >= 50% TPR.

2. Typhoid Fever: A total of 3545 Typhoid Fever cases were reported from 134 woredas/hospitals. Majority of the cases were reported from B/Dar Town (359), Gondar (160), Weldia (125), Enemay (106), Debark (88), Shewarobit (79), D/M/Town(78), Bibugn (75), Birta(72) and Jama (72) woredas.

Figure 3: Top ten woredas affected by Typhoid Fever in week 17, 2019

3. Severe Acute Malnutrition (SAM): A total of 310 SAM cases with 11% admission rate were reported from 72 woredas/hospitals.

Figure 4: SAM cases in top ten woredas in Amhara Region, week 17, 2019

Acknowledgments:- To WHO, UNICEF, CDC, ICAP, FMOH/EPHI, EPHA/AAU-SPH, all zonal health departments, woreda health offices, and all other contributors.

4. Meningococcal Meningitides: Six suspected meningitis cases were reported from North Mecha (3) and Sayint(3).

5. Dysentery: A total of 2749(228/7.7%) decrement as compared to last week. Dysentery cases were reported from 153 woredas/hospitals in the region. Majority of the cases were reported from Andabet(122), Debay (92), kelleta (86), Debarik (67), Wadela (56), Habru (55) and Yilmana (52)woredas.

Figure 5: Top ten woredas affected by Dysentery in Amhara Week 17, 2019

6. Epidemic Typhus: A total of 2,157 (915/29.8%) decrement as compared to last week. Epidemic typhus cases were reported from 87 woredas/hospitals. Majority of cases were reported from Bahir Dar (326), Mekert (108), InjibaraTown(102), D/M/Town (100), Banchiben (83), D/Birhan Town(68), Dessie Town(68), Wadela (56), Meda w (55) and Kutaber (55) woredas.

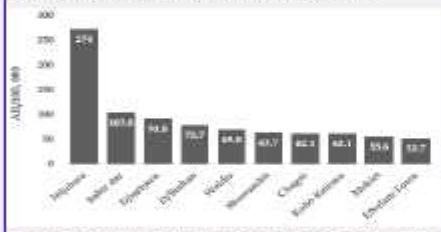


Figure 6: Top ten Woredas affected by Epidemic Typhus in Amhara Region, Week 17, 2019

7.Visceral Leishmaniasis (VL): A total of 9 Visceral Leishmaniasis cases were reported from W/Armachiho (6), B/Dar Town (1), Libokemkem (1) and G/Wuha (1) woredas.

8. Cutaneous Leishmaniasis (CL):- A total of 8 Cutaneous Leishmaniasis cases were reported from Dessie (7) and Libokemkem (1).

9. Relapsing Fever: There was no Relapsing fever case reported in this week.

10. Scabies: A total of 1183 scabies cases were reported from 63 woredas/ hospitals. The case was decreased by 405(27%) compared with last week. 42.4% of scabies reported from W/Gojam followed by N/Shewa (16.4%).

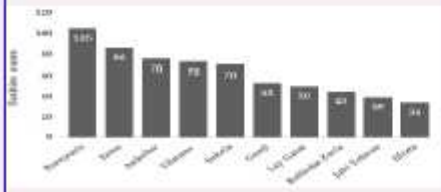


Figure 7: Top ten scabies reported woredas in Amhara Region, Week 17, 2019.

11. AFP: Three suspected AFP cases were reported from Dembia, Gondar Town and Sayint Woredas.

12. NNT: There was no NNT case and death reported in this week.

13. Guinea Worm: There was no case or rumor of Guinea Worm reported in this week.

14. AWD: Thirty one suspected acute watery diarrhea cases and 2 deaths (from Tselemt) were reported from Tselemt (20), M/Sayisent (8), Abergelle (2) and Beyeda (1) reported in this week.

15. Anthrax: Eighteen suspected Anthrax cases were reported from Ziquala (5), Abergelle (3), Sekela (3), Debara (2), D/Tabor Hosp (2), Farta (1), Gondar Zuria (1) and F/Selam Hosp (1).

16. Pertussis: Thirty suspected Pertussis cases were reported from Sayisent (21) and Debarq(9) in this week.

17. Measles: A total of 55 measles cases and no death were reported from 18 woredas/ hospitals. Measles outbreak woredas within one month were Wogdi, Simada, Aneded, Fagita Lekoma, Kutaber, A/Pure, Alefa, Banchiben, Debarik, Debark Town, Bugna, Kemise Town and Gondar Town. Outbreaks were managed by health facilities as per measles outbreak management protocol. Base on national guideline (>=5 suspected Measle case and >=3 confirmed Measle cases reported in one months said to be an outbreak).

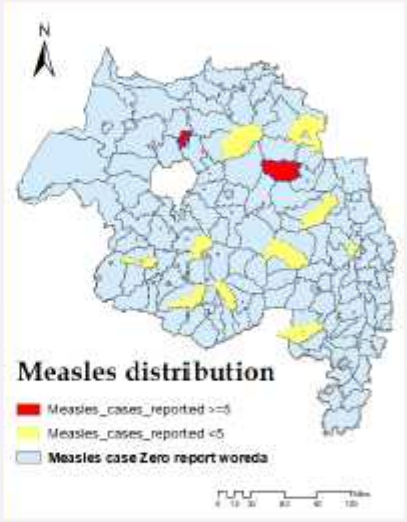


Fig. 8:- Measles cases distribution by woreda in Amhara Region, Week 17, 2019

18. Rabies and Dog Bites: A total of 48 suspected rabies exposures cases and one death (from Tenta) were reported in the region. These were reported from Gondar Town (20), Bahir Dar Town(18), F/Selam Hosp (4), D/M/Hosp (4) Jama (1) and Tefera Hailu Hosp (1).

19. Maternal Death: Two maternal deaths were reported from Artuma Fure and Ebinat woredas.

20. Perinatal Death: Twenty two perinatal deaths were reported from Bahir Dar (15), Dessie Town(3), D/Tabor Hospital(2), Dejen (1) and Sayint (1).

Challenges:

- Shortage of anti rabies post exposure prophylaxis all over the region.
- Budget and logistic shortage for scabies response.

AMHARA PUBLIC HEALTH INSTITUTE

PUBLIC HEALTH EMERGENCY MANAGEMENT (PHEM) DIRECTORATE

WEEKLY PHEM BULLETIN

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Vol II-18[Week 18, 29-05 May/2019]

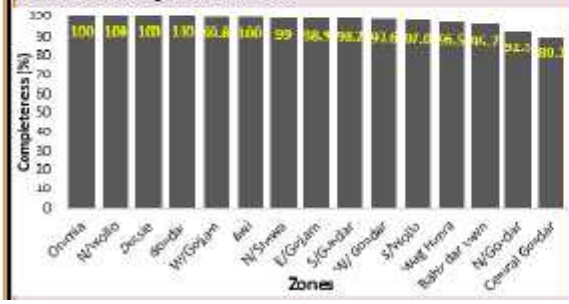
Major issues in the bulletin:

- Weekly surveillance report completeness and timeliness
- Weekly malaria situation in the region
- Regional PHE situation
- Other issues

I. Introduction: This bulletin represents the reporting period of Epidemiological week 18/2019 and serves to provide information on public health emergencies and surveillance activities for evidence based decision making. It also gives a chance for partners working on public health to engage in priority issues of the region. The bulletin shows surveillance report completeness and timeliness, malaria situation and other PHEM targeted diseases/conditions in the region.

II. Weekly Surveillance Report Completeness and Timeliness:

The overall completeness and timeliness of the woredas/hospitals in the region was 97.4% and 95.9% respectively. As compared with the previous week, completeness was decreased in Wag Hemira, N/Shewa, Awi and E/Gojjam zones. Private health facilities completeness was 84.7%. The completeness was below 80% in Chilga (51.7%), Janamora (78%), Sedie (78.9%) and Abergelie (79.2%) Report Completeness decreased in 14 districts as compared to last week.



Malaria Case by District (Woreda)

Regionally malaria cases were increased by 105 (18.8 %) as compared to the previous week. From the total malaria cases reported, 707(24.2%) from W/Gojjam, 560(18%) Central Gondar, 411(13.1%) West Gondar, 395(12.6%) Awi and 372(11.9%) S/Gondar and the rest were reported from other zones. Eighty one (47.1%) woredas/hospitals had shown case increment (from one case to 131 cases) and 56(32.6%) of the woredas/hospitals reported case decrement (from one case to 59 cases). Higher increment of cases as compared to week 17 was seen in Dera (131), T/ Armachiho (81), Bahir Dar Zuria (80), Tegede (56), F/Selam town (50), Dabat (29), Chagni (25), Ayehu (15), Quarit (15) and Mirab Belesa (15) woredas. Alefa, Bati town, Dabat, Mirab Belesa, Gozamen, Adi Arkay, Mida W., Bahir Dar zuria, Abergelie, F/Selam town, Dera, Quara and Ambasel woredas Surpassed the five years threshold woredas.

Positivity Rate: The test positivity rate (TPR) in week 18 was 12.8%. It was higher in Wag Himra (21.7%), W/Gojjam (19%), S/Gondar (17.5%), W/Gondar (16.1%) and C/Gondar (15.7%).

From the total positives, *Plasmodium falciparum Plus mixed* constituted 74.8 %. The proportion of *falciparum* cases were higher in Oromia (86.1%), Wag hemira (85.2), W/Gondar (84.4%), N/Gondar (81.6%) and Awi (79.5%). From the total woredas/hospitals 65(37.8%) had less than 5%, 103(59.9%) had (5 to <50%) and Badeber, H/Mariam and Wadela had =100% & Metta =50% TPR.

2. Typhoid Fever: A total of 3953(410/11.6%↑) increment as compared the last week. Typhoid Fever cases were reported from 134 Woredas/hospitals. Majority of the cases were reported from B/Dar Town (390), Shewarobit

Amhara Public Health Institute

Public Health Emergency Management Directorate

Summary Report of pertussis outbreak in Amhara Region Ethiopia from July 1 /2018 to as of February 2/ 2019

By Taddie Wondmnew

February, 2019

Bahir Dar, Ethiopia

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List of acronyms and abbreviation

APHI	Amhara public health institute
Penta	pentavalent
PHEM	Public health emergency management
WHO	World health organization

Executive summary

A total of 1892 pertussis case were reported in 6 woredas of Amhara region 2018/19. Among the total pertussis cases 86.7% were reporting in south Wollo zone and 52.4 % in Mekedela woreda.

From all reported cases 733(38.7%) were have Penta two dose vaccination status. Age group of 5-14 accounted 1253(66.2 %).507(26.8%) were reported in December 2018. The largest number of cases reported with relative to date of onset on 12/12/2018 is 108(5.7 %). Number of petussis outbreak reported in weekly PHEM and line list is diferent in number.

1. Background

1.1. Introduction

Pertussis is an acute and contagious infection of the respiratory tract caused by Bordetella pertussis. Bordetella pertussis is a fastidious gram-negative, toxin-producing bacillus that causes damage to the respiratory tract. It infects only humans and is the most important Bordetella species causing human disease. The disease is transmitted from an infected person to susceptible persons primarily through aerosolized droplets of respiratory secretions. The bacteria can survive for several days on dry surfaces; so it is also possible to get the bacteria by touching surfaces and contaminated nose and mouth. The patient of pertussis starts to be infectious starting from the initiation of symptoms up to 3 weeks of the paroxysmal phase of illness (1).

Classic pertussis, or whooping cough, is characterized by intermittent paroxysms (spasms) of severe coughing lasting from 6 to 10 weeks. Pertussis typically lacks fever and classically progresses through three stages. The first stage is the Catarrhal (1–2 weeks) phase and it is characterized by mild, upper respiratory tract symptoms gradually develop with an intermittent non-productive cough. The second phase is the Paroxysmal (1–6 weeks or longer) phase and it is characterized by spasms of cough end with a gasp, whoop, or vomiting (post-tussive emesis). Adolescents and adults may have less dramatic symptoms. The last stage the Convalescent (2–6 weeks or longer) phase is a gradual resolution of the paroxysmal coughing. The Chinese name for pertussis is "the 100-day cough," which accurately describes the clinical course of the illness as pertussis has an insidious onset and prolonged coughing illness with courses of clinical phases that lasts months. Even though Pertussis clinical manifestations vary by age, classic pertussis is most often seen in preschool and school-age children and under one year infants may usually present with apnea (2, 3).

The disease has a worldwide distribution with cyclical and persisted episodes of outbreaks every 3 to 5 years despite widespread immunization. Globally millions of cases and tens of thousands of deaths occur annually even pertussis surveillance is difficult hence disease burden goes largely unrecognized. Pertussis is highly communicable disease with attack rates of 80% to 100% among unimmunized household contacts and 20% within households in well-immunized populations. Neither natural disease nor Vaccination provides complete or lifelong immunity; wanes after 8-15 years (4).

Although thought of as a disease of childhood, pertussis can affect people of all ages and is increasingly being identified as a cause of prolonged coughing illness in adolescents and adults. In unimmunized populations, pertussis incidence peaks during the preschool years, and well over half of children have the disease before reaching adulthood. Recent trends show an increasing incidence of pertussis among adolescents and adults. Severe morbidity and high mortality rates are restricted almost entirely to infants. Children and adults who have not been vaccinated, infants who have not yet completed the immunization series, and adults and adolescents whose immunity to the disease has diminished are at increased risk for developing whooping cough and also for spreading the disease (4, 5).

In highly immunized populations with at least 95% coverage, the peak incidence is among infants who have not completed the three-dose primary immunization series. Before the institution of widespread immunization programs in the developed world, pertussis was one of the most common infectious causes of morbidity and death with an average yearly rate of 150 cases per 100,000 populations. With universal childhood immunization, the number of reported cases fell by >95%, and mortality rates decreased even more dramatically (6).

Complications frequently occur during the paroxysmal stage and are more common among infants than among older children or adults. Complications can include bacterial infection (Pneumonia), neurological complications, weight loss, dehydrations and other effects related with pressure effects of paroxysm. Antimicrobial treatment should be initiated as soon as pertussis is suspected in a patient to prevent/minimize severity of the disease (7).

1.2. Statement of the problem

In the past six month of Amhara regional bureau report indicated that the pentavalent coverage of some woredas are above 100 %. Whereas the vaccination preventable diseases like pertussis is now a time an outbreak of in some woredas of Amhara region.

1.3. Significance of situational report

This summary report of pertussis outbreak will helps to identify gaps and major challenge of reporting cases in line list and Weekly PHEM base. This situational analysis will also help to Prioritizing age groups and high risk areas in pertussis outbreak.

2. The objective

The objective of this summary is to identify gaps of reporting system and distribution of pertussis in Amhara region, 2011 years.

3. Methods and materials used for summary report

Areas of pertussis outbreak occurred in Dabark, Mekdela, Sayient, Tenta, Dahana and Yilmana woredas in Amhara region from July/1/2010 to Feb/6/2011. Line list and weekly PHEM reports were used to develop this summary report. The line list has variables but in situational report analyze used age, sex, date of onset of illness, reporting zone and woredas, vaccination status, age category.

3.1. Operational definitions

Case definitions

Suspect case of pertussis:Non-improving cough of 14 days or more or cough of any duration with paroxysms or cough of any duration with whoop.

Confirmed:A case of acute cough illness of any duration with a positive culture for *B. pertussis*, or a case that meets the clinical case definition and is confirmed by PCR, or a case that meets the clinical case definition and is epidemiologically linked directly to a lab-confirmed case.

Epidemic of pertussis:is a situation when two or more cases clustered in time of one area.

4. Situations of Pertussis outbreak in Amhara regional state

Pertussis outbreak were started as an outbreak in Debark zuria woreda since 21/12/2010. However pertussis outbreak started in 15/11/2010 but reported as an outbreak in September 5/1/2011. A total 1892 pertussis cases were report in Amhara region starting from July 1/2010. Among the number of pertussis case the largest number were reported in south Wollo 1647(86.7%), West Gojjam 119(6.3%), Waghimera 87(4.6%) and North Gondar 45(2.4%). 733(38.7 %) pertussis cases had a history of two dose vaccination whereas 123(6.5 %) from the total cases were vaccinated history within unknown dose.

4.1. Vaccination coverage of Pentavalent

Vaccination coverage of Penta 3 high in Dahana woreda is 102 % and low in Yilmana Densa 53% as the past six month reported indicated.

Vaccination coverage of affected woredas of pentavalent in the past six months in Amhara region 2018/19 in table 1.

Table 1: pentavalent vaccination coverage of affected woredas in past six months.

S/N	Woredas	Vaccination coverage		
		Penta 1	Penta3	Full dose
1	Debark Zuria	94%	83%	71%
2	Mekdela	96%	95%	89%
3	Sayint	77%	74%	67%
4	Tenta	85%	81%	70%
5	Dehana	115%	102%	83%
6	Yilmana Densa	58%	53%	50%

4.2. Vaccination status pertussis cases

From 1892 total number of pertussis cases report in six woredas of Amhara region 733(38.7) cases were vaccinated two dose of pentavalent. The immunization status of reported cases indicated in figure 1.

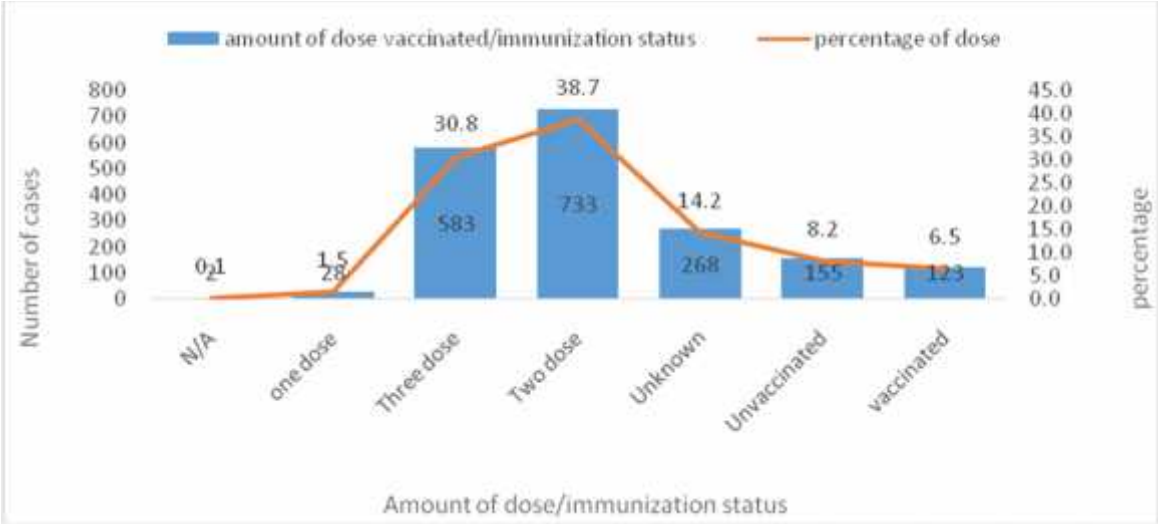

Figure 1: immunization status of reported pertussis cases in Amhara region 2108/19.

4.3. Distribution of cases by woreda

The distribution of pertussis cases were high in south Wollo zone Mekedela woreda and low in North Gondar Debark zuria woreda. The distribution of pertussis cases in different woredas of Amhara region 2018/19 in figure2.

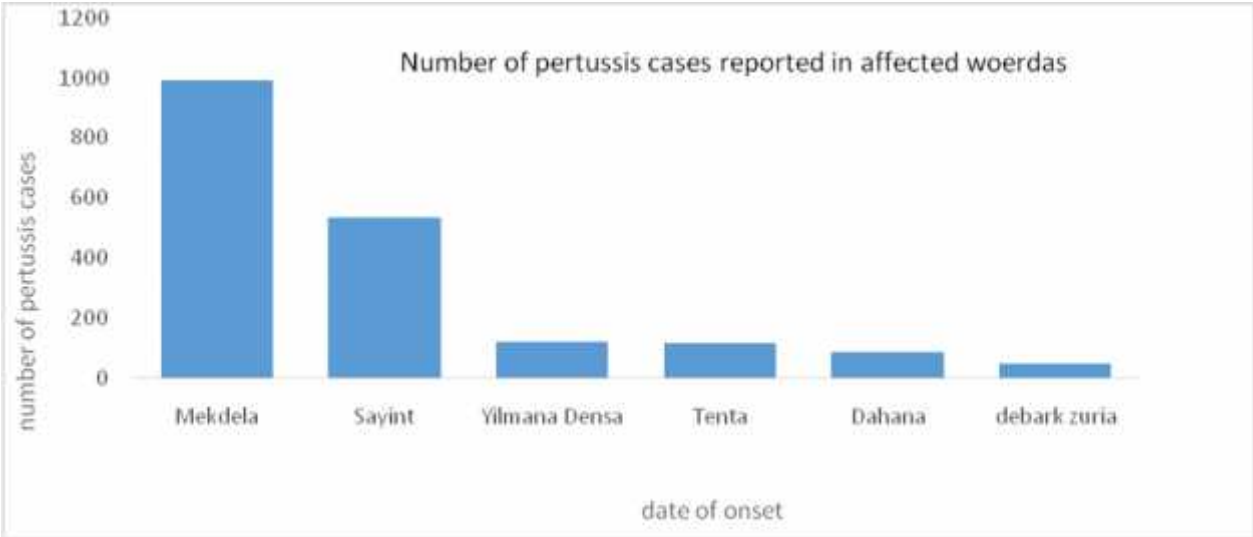

Figure 2. Reported pertussis cases by woredas from July 1/2018- as of February 1/ 2019.

4.4. Areas of pertussis outbreak on

Starting from July 1/2018 pertussis outbreak reported in different woredas of Amhara region 2018/19.

Pertussis affected woreda and high risk of woreda in Amhara region showed as below in map.

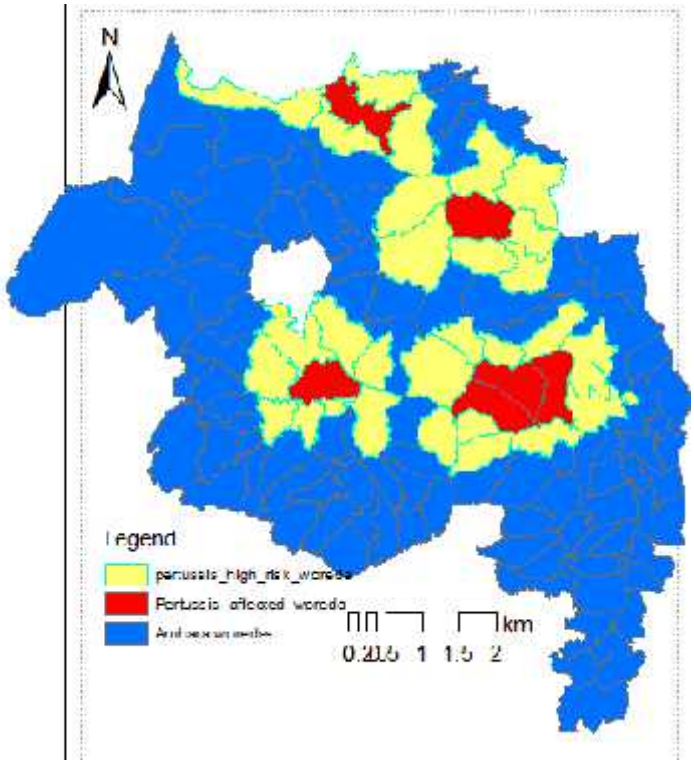

Figure 2: Map of pertussis affected woredas and high risk areas

4.5. Distribution of pertussis case by age category and sex

The number of pertussis cases in male acounts 980(51.7 %) and 5-14 age group acounts 1253(66.2%). The distribution of pertussis cases in diferent age group within sex indicated in figure 3 beloew here.

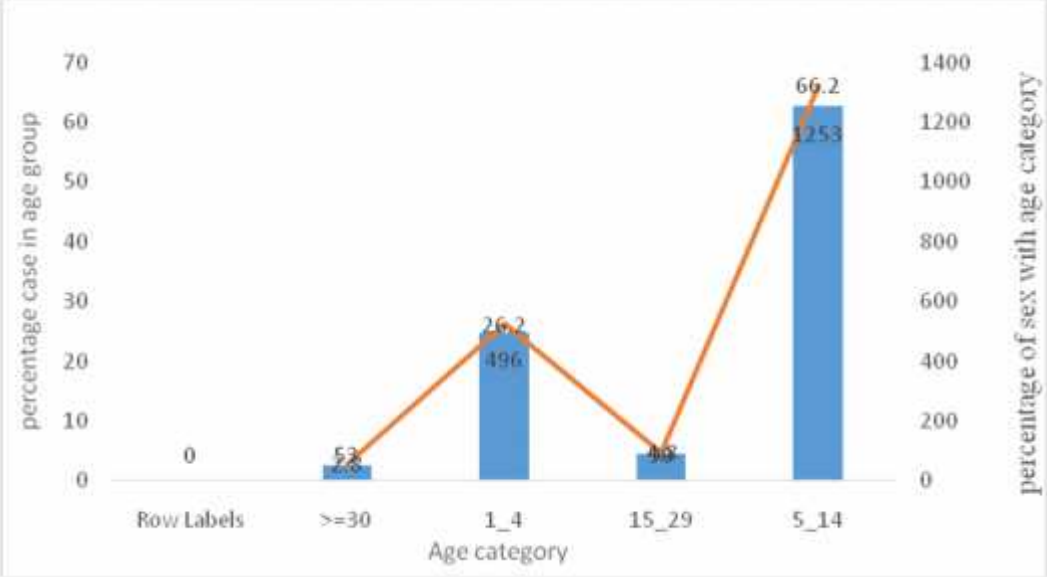

Figure 3: pertussis case in different age category of affected woreda in amhara region 2018/19.

4.6. Distribution of case by month

Since pertussis outbreak occurred in Debark zuria woreda in July/2018. However, this outbreak contused up to know in different districts of Amhara region. The highest number of pertussis cases were reported in December 507(26.8 %) 2018. The distribution of cases reported in each month is descripted in figure 3.

Figure 4: number of pertussis case reported in each month of affected woreda in amhara region 2018/19.

The lagest number of pertussis case occurred based on date onsent on 12/12/2018 and 17/01/2019 which acounts 108 and 100respectively. The index case of pertussis occurred on 21/7/2018 at Debark Zuria woreda based of linlist report. Date of onsent of cases presented in figure 5.

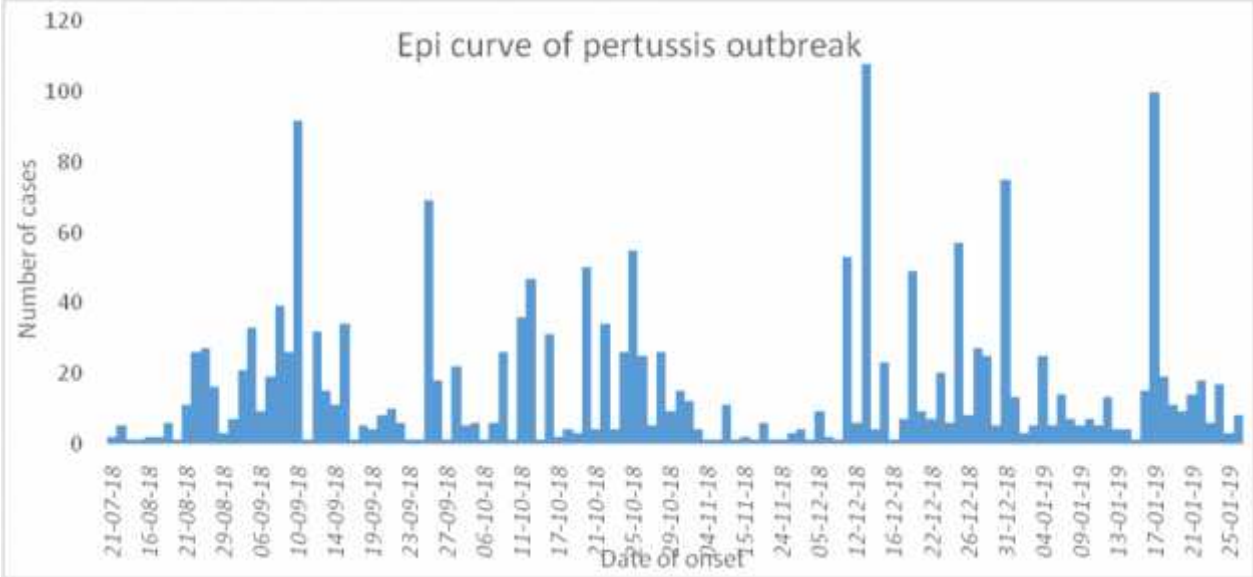

Figure 5: Date of onset of pertussis case in Amhara region 2018/19.

4.7. Descripancy of reporting pertussis cases

Outbreak cases were reporting both weekly PHEM report and line list. However, the number of cases reporting in weekly PHEM report is vary with reporting in line list. The number of pertussis case reporting in weekly PHEM from 1892 pertussis cases were 470(24.8) only. The number cases reporting in line list but not in weekly PHEM is 1193(63%) and reporting in weekly PHEM but not in line lsit is 179(9.5%).

The difference number of pertussis cases reporting in Weekly PHEM and line list presented below in table 2.

Table 2: the number of pertussis cases reporting in weekly PHEM report and line list in Amhara region 2018/19.

S/N	Woreda Name	weekly PHEM report	report by Line list	Difference
1	Debark zuria	0	45	-45
2	Dahana	224	87	-137
3	Mekdela	35	992	-957

4	Sayient	408	535	-127
5	Tenta	50	114	-64
6	Yilmana	161	119	-42
7	**Total**	**470**	**1892**	**-1422**

5. Complications of pertussis outbreak

Pertussis outbreak holds complications in Sayient and Tenta woreda like umblical herinia, edema and sever conjuctivies in under five years. Some of the complication of pertussis presented in below picture.

6. Taking action

Envestigation of pertussis cases

To inform them to plan campaign for case management

Daily communication of zones and woredas where pertussis outbreak occurred

Supported by logistics/ drugs/ and technical

To communicted for active case surveillance

7. Identified gaps

Late outbreak detection and absence of immediate response

Error line listing of cases (date on set of disease and date seen at health facility is not correctly filed)

Deference weekly PHEM reported case and Line listed cases (Mekedela (-957), Sayient (-127) … total of (-1422))

Case reporting in PHEM weekly report weren't reporting in line list timely

Some of the woreda had a negligence of reporting system reporting in weekly PHEM couldn't report in line list

Late reporting of cases specially Mekedela (date of onset of case July 15//2010 whereas report started sept 5/2011

Vaccination status of cases is not categorized by dose

Haven't pertussis vaccination status

8. Challenges

Problems of cold chain

Budget/drug shortage and attriation rate

Integration problem

Lack of documentation

Resistance of communities social mobilization

9. Recommendation

1. The woreda health office should strength active case search surveillance system.

2. Woreda health office provides logistics to manage cases early.

3. Complete line listed of cases with true data of date of onset, date seen at health facilities, vaccination status and outcomes.

4. Zonal health department and woreda should be discussed the occurrence of outbreak according to vaccination coverage.

5. Zonal PHEM officers should be active revised cases reporting in weekly PHEM and line listed

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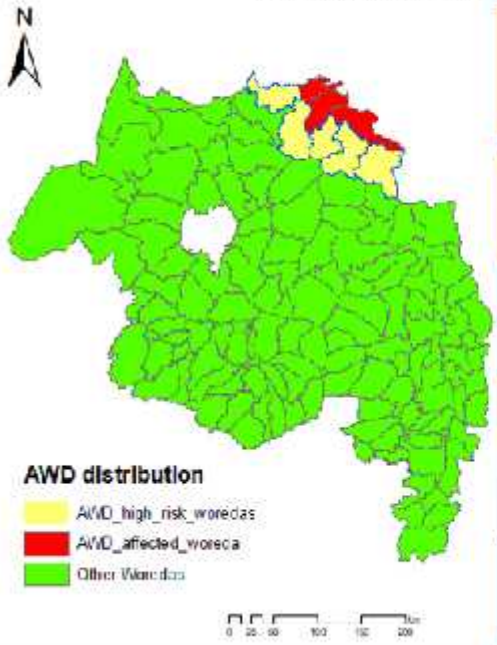
Suspected AWD outbreak situational update



AWD started on 19/8/2011

The region Notified Suspected AWD cases on 21/8/2011

On 21/8/2011 number of reported suspected AWD cases
Abergelie: 24 cases
-2 deaths
Tselemt: 20 Cases
-2 deaths

Up to date number of reported Suspected AWD cases and deaths

S/N	Woreda	Cluster/Kebele	# of Cases	#of Deaths
1	Abergelie	Debie	83	3
2	Tselemt	Bottle	55	4
2	Beyeda	Liwary Kebele	3	0

Suspected AWD cases in Beyeda woreda were reported on 22/8/2011. Total Deaths: Five (4 community deaths and one facility death).

Suspected AWD Cases Update

➢ Major Activities Done:

○ Abergelie Woreda:

- Woreda RRT moved to affected cluster.
- Zonal RRT also went to the affected cluster.
- 2 CTC established at Kebela and Mahiber gotts also Debie HC used for referral.
- Logistics distributed to woreda from RHB (including CTC tent and Cholera bed).
- Team assigned from region to investigate the outbreak.

○ Tselemt Woreda:

- Woreda RRT moved to affected cluster.
- Regional team deployed for the investigation
- One CTC established at Bettel HC.
- Logistics distributed to Woreda from RHB

Beyeda Woreda:

- Woreda RRT moved to affected cluster.
- CTC established in the affected kebele.

M/Sayint Woreda
Suspected AWD the Lab result Shows Negative

CASE INVESTIGATION FORM – Human Anthrax

Amhara Public Health institute, PHEM directorate

COMPULSORY NOTIFICATION (PLEASE COMPLETE ALL INFORMATION IN FULL)

IDENTIFICATION Patient's Address: Region: ________

Zone________ Woreda__________ Kebele: __ House number/village_______ Name of Reporting Health Facility___________________

Name of Patient Father's name Grand Father

Date of birth __/__/__ Age years: _____ Months: ______ Sex ☐

If DOB Unknown M=Male F=Female

NOTIFICATION/ INVESTIGATION

Notified by_______________ who is the notified? CV=Community volunteer; HEW=Health extension; CHW= other health worker; O= Others _______

Date HF notified District/zone: Date Case Investigated started:

___/___/___ ___/___/___

Date of exposure to disease (eg. contact during lambing, others/specify) ___/___/___

CLINICAL FEATURE

Date of Onset (DD/MM/YYYY) __/__/____ Date of HF visit (DD/MM/YYYY): __/__/_____

Which form of Anthrax

Inhalation ☐ Gastrointestinal/ Oropharyngeal ☐ Cutaneous ☐ Injection ☐

Tick the appropriate box

Symptom	Y	N	U	Symptom	Y	N	U
Anorexia				Hypoxia			
Cyanosis				Malaise/fatigue			
Fever				Cellulitis			

Additional Comments ______________________________

HOSPITAL ADMISSION INFORMATION

Hospital Name: ___________________ Referring physician: _____________

Contact number for physician: ____________ Date of admission: _____________

EXPOSURE HISTORY

Indicate appropriately (Y=yes; N=no; U=unknown)

Exposure to livestock/ wild mammals their body fluids? Y ☐ N ☐ U ☐ Specify animal ------

Animal's disposition? Live ☐ Dead ☐ Both ☐ Date of exposure---/---/---------

Describe exposure: Consumed or contact raw meat ☐ Exposure to animal products (wool, hide) ☐

Is there others Exposed to the same environment, animal, or objects as suspected anthrax case? Yes ☐ No ☐

Did animal been examined for Anthrax? Y ☐ N ☐ U ☐

Date of examined: ___________________________

TREATMENT

Antimicrobials given for illness? Y ☐ N ☐

If yes, antimicrobials used for treatment of anthrax-------------------start date---/---/---end date---/---/-------

Did you took Treatment as well? Y ☐ N ☐ If No, why?

Additional comments: _______________

LABORATORY SUBMISSION

Type of specimen	Collection date	Date of submission	Result(specify species

Any additional findings: ________________________________

INVESTIGATOR:

Name ______________________ Title: ____________________

Health facility: ___________ Address: ____________ Phone: _

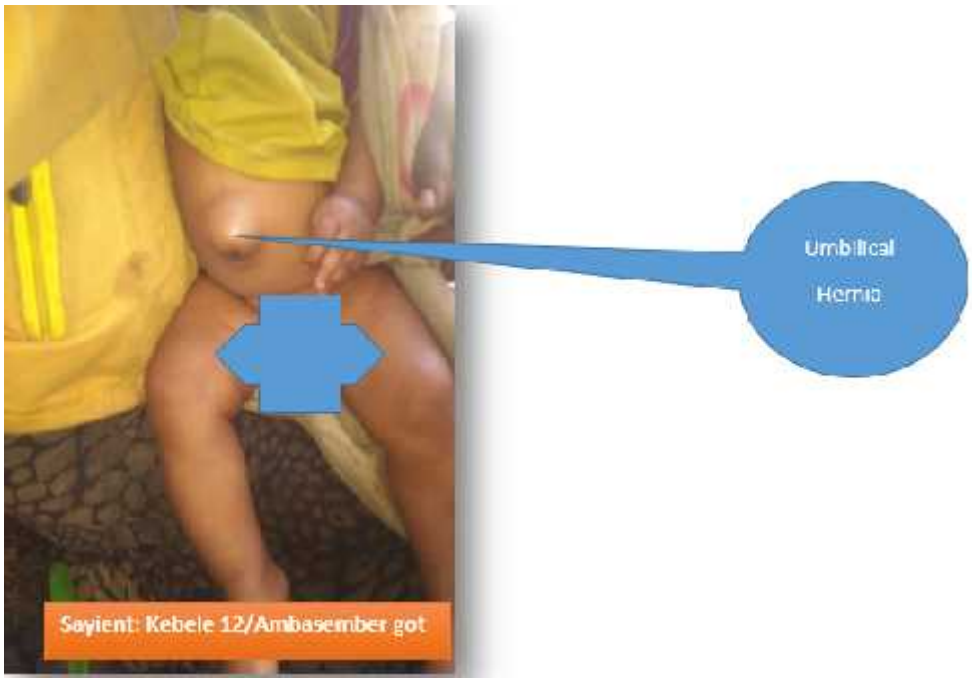
PLEASE SEND A COPY OF THIS COMPLETED FORM IMMEDIATELY TO:

Regional PHEM Directorate, Amhara Region Public Health Institute, PHEM, Bahir Dar, Ethiopia

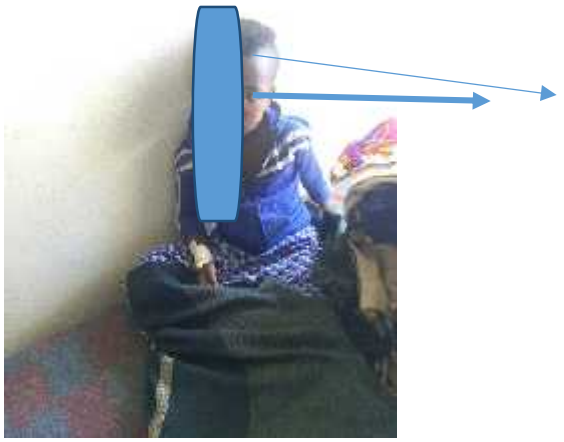
Chapter 9 : Annex

9.1. Annex Picture

Annex 1: Pertussis picture



Annex.2: human anthrax case picture



Annex 3: Questionnaire for pertussis outbreak investigation

Investigators: _____Date _____ID NO_____

Respondent: Patient Family member (Mother, Father: Brother or sister or other relatives close to patient.)

Respondent's status. Case Control

A. socio demography:

1. Age _____sex_____

2. Address: Woreda _____, Kebele_____, Got_____

3. Occupation: _____

4. Religion A. Orthodox B. Muslim C. Protestant D. Others

5. Level of education cases or control

1. N/A 2. Unable to read and write 3. KG 4.Primary 5. Secondary 6. College and above

6. Educational level of the mother/care giver

1. Not able to read and write 2. Primary 3.Secondary 4. College and above

7. Educational level of the father/care giver

1. Unale to read and write 2. Primary 3. Secondary 5. College and above

8 Total number of family members who live in the house ----------

9. Is there any person affected by the diseases in the family 1? Yes 2. No

10. If yes how many in number----------

B. Clinical manifestations

1. Do you/ your child have any of the following clinical features?

1. Paroxysmal cough 2. Whooping 3. Post- tussive vomiting 4. Apnea 5. Cyanosis 6. Others Symptoms_____

2. Date of on set: _____date/month/year

3. Date seen at health facility------/-----/------

C. complications:

Is there any of the following present?

Edema of face?	1. Yes	2. No	3. Not mentioned
Sub Conjunctival hemorrhage?	1. Yes	2. No	3. Not mentioned
Weight loss	1. Yes	2. No	3. Not mentioned
Pneumonia	1. Yes	2. No	3. Not mentioned
Seizure	1. Yes	2. No	3. Not mentioned
Hernia	1. Yes	2. No	3. Not mentioned
Was participant hospitalized?	1. Yes	2. No	3. Not mentioned

If yes, duration (in days) of hospitalization: _____

D. Possible source of exposure:

1. Has the participant been exposed to a person(s) with a cough lasting at least two (2) weeks with at least one of the following? Inspiratory “whooping”, post-tussive vomiting (vomiting immediately after coughing and without other apparent causes, paroxysms (fits of coughing) 1. Yes 2. No
2. Has the participant been exposed to a person with a possible case of pertussis (Case as ascertained by field worker based on mother/s, or other lay person/s, declaration)? 1. Yes 2. No

If 1, 2 or 3 above is yes:

Date of suspected expossure: ____ / ____ / ____

Relationship of contact case:———————————

E. **Treatment received:**

1. Was Erythromycin/ Azithromycin prescribed? 1. Yes 2. No

2. Prescribed for how many days? _____

3. Was any other antibiotic prescribed? 1. Yes 2. No

If yes, specify? _____

Prescribed for how many days? _____

F. Immunization History

1. Did he/she/you vaccinated against pertussis? 1. No 2.Yes 3. Unknown

2. If yes; could you tell me the date of vaccination (see immunization card _____

3. Number of dose received: _____

4. If your answer is no for question 1 what is the main reason that you/your child not vaccinated

1. The health facility is far

2. I do not know the time of vaccination day

3. The vaccine will hurt me /my child.

4. The vaccine does not prevent pertussis other specify ----------

5. Were / was he/she/you ever been sick with such diseases? 1. No 2. Yes

6. If ye s when? ----------

7. Do you know about mode of transmission 1.yes 2. No

Prevention and control methods for pertussis? 1. Yes 2. No

F. House condition

1. Number of rooms----------

2. Does the house have windows? 1. Yes 2. No

3. If Yes, specify direction of windows ——————

9.2.2. Questionnaire of Anthrax outbreak investigation

Annex 4: Human Anthrax Outbreak Checklist/questionnaire

No.	Question	Coding Class
1.	**Demography(case &control)**	
1.1	Status	1. Case 2. Control
1.2		
1.3	Responder	_____
1.4	Address	Region_____ Z Kebele _____
1.5	Age	_____ Year
1.6	Sex	1.Male 2.Female
1.7	Occupation of the patient(circle the relevant answer)	1. Farmer 2.Merchant 5. House wife 6.Unem 9.Private Employee 1(12.Other_____
1.8	Family Occupation *(*Circle alltherelevantanswer)	1.Farmer 2.Merchant 5. House wife 6.Unem 9.Private Employee 1(12.Other_____
1.9	What is your marital status?	1. Single 2. Married 3
1.10	Level of Education	1.Illiterate 2.Read and 3.Elementary school(1
2.	**Knowledge of Anthrax(case and control)**	
2.1	Have you ever heard about anthraxdisease?	1.Yes 2.No
2.2	Do you know modes of transmission for Anthrax?	1.Yes 2.No 3.Don't kr
2.3	Ifyes how?	1. Through direct cont 2.Through consuming 3.Through inhalationo 4. All
2.4	Wheredidyougofirstwhenyou get sick?	1. Go to health facility 5.Other(specify) ____

No.	Question	Coding Class
2.5	How do youthinkpeopleget Anthrax?	1.Contactwithpersonsi 2.Direct Contactwitht 3.Throughconsumingu 4.Through inhalationo 5.Bad attitude of othe 6.Other(Specify)____
2.6	Who do you think can be affected by Anthrax?	1.Children ofaged less 2.Children ofaged less 3.Women ofanyages 4.All people exposed t
2.7	Howdoyouthink Anthraxcanbe Prevented?	1. Preventing oneself 2.By eatingcookedmea 3. By regularly Vacci 4. Byprotectingthemse 5. Properly disposing 6.Practicing good Pers 7.Idon't know 8. Other(Specify) ___
3. Risk factor of Anthrax(case &control)		
3.1	Isthereanysickpersonwhogetsillwithin7daysaftereatingmeatofsickanimalsorclose contactwithanimalsthathavebleedingfromnose,mouthandanus(suspectedhumancaseof anthrax)inthefamily?	1. Yes 2.No 3. I don'
3.2	Ifyes (QuestionNumber 3.1),number ofsick person	_____
3.3	Did the animal dwelling separated from the humandwelling?	1.Yes2.No3.Don't kn
3.4	If yes (Question Number 3.3), how muchdistance farfrom humandwelling.	_____
3.5	Did the house have Window?	1. Yes 2.No
3.6	How many windows?	_____
3.7	Whatisthetypeofhumanlivingroomfloor?	1. SoilSealedbydung2 specify_____

No.	Question	Coding Class
4.	**General history ofcurrentillness(House-to-House Interview)(CasesOnly)**	
4.1	Date of onset illness (when did you first feel sick?)	
4.2	Did you experience any of the following symptoms?1.Yes 2.No (if yes, circle all the relevant answers)	
4.3	a.Headache	1. yes 2.no 3.I don't know
4.4	b. fever	1. yes 2.no 3.I don't know
4.5	c. chill	1. yes 2.no 3.I don't know
4.6	d .loss of appetite	1. yes 2.no 3.I don't know
4.7	e. Nausea	1. yes 2.no 3.I don't know
4.8	f. vomiting(non bloody	1. yes 2.no 3.I don't know
4.9	g. Diarrhea(non bloody)	1. yes 2.no 3.I don't know
4.10	h. Diarrhea(bloody)	1. yes 2.no 3.I don't know
5.Exposure History		
5.1	Do your occupation associated with animals or agriculture?	
5.2	If yes (Q. no 5.1)	
5.3	Do you havecattle's/Domestic animals?	
5.4	Regularly have taken vaccination?	
5.5	If yes (Question Number 5.4), how many times annually and when last Vac.?	
5.6	IfNo(QuestionNumber5.5),describewhy?	
5.7	Istheresickanimals suspectedwithanthrax(deadorslaughteredinyourlocality/area)?	
5.8	If yes Q.5.7 haveyoucontactwithanyproductsofdead/slaughteredanimalofsuspected/confirmed anthraxcases?	
5.9	If yes (QuestionNo5.8), date of theanimaldied.	
5.10	Who disposed the dead animals/carcass?	
5.11	How the dead animals/ carcass disposed?	
5.12	Where the animals/ carcass disposed?	
5.13	Did the dead/slaughtered animals vaccinatedbefore?	

No.	Question	Coding Class
5.14	If yes (Question Number 5.13), how many times/annually	
	The following questions relate to the2 weeksprior to onsetofillness: (for case only)	
5.15	Haveyoubeeninvolvedinanyactivitiesthatmightexposewoundstosoile.g.gardening,renovation, camping, outdoor sports, recreati activities, etc., inthe 2 weeks prior to illness?	
5.16	Haveyouhadanycontactwithlivestock/bodyfluidsoflivestockinthe2weekspriortoillness?	
5.17	Haveyouhadanycontactwithanimalproductssuchasuntreatedanimalhair,wool,hides,or animal skin drums in the2 weeks priorto illness?	
5.18	Haveyoueatenundercookedfleshoranyproductsofsuspectedanthraxaffectedslaughteredcattleorotheranimalproductsinthe2weekspri illness?	
5.19	Haveyouparticipatedindisposing/slaughteringthesuspectedanimal?	
5.20	If yes Q.5.19 which activities involved?	
5.21	Where slaughtered?(Describearea)	
5.22	Ifmunicipalslaughteringplace,doespostmortem&antemortemexaminationdone?	
5.23	Isthereriverdownwardfromtheslaughteredordisposeddeadanimal?	
5.24	Ifyes(QuestionNumber5.23),howfarslaughteredareafromthesurroundingriver(in meter/km)?	
5.25	Was there rain after the animal slaughtered?	
5.26	Haveyoufetchedwaterafterthedeathorslaughteringofanthraxaffectedanimalfromthe specified river?	
5.27	Have you travelled away from home or overseas in the 2 weeks prior to illness?	
	Section6. Visithealth facility forTreatment and Hospital Admission History(case only)	
6.1	Didyou visithealth facility fortreatment?	
6.2	If yes, did youget treatment?	
6.3	Final outcome oftreatment	
6.4	Wasthe patient hospitalized?	
6.5	Ifyes,datehospitalized	

No.	Question	Coding Class
6.6	Patient status	
6.7	Date died or discharged	
6.8	Please give details of any other signs associatedwithlocalizedlesion	
6.8	ifany Additional Comments,	

9.2.3 Acute flaccid paralysis/AFP/Surveillance

Annex 5: Questionnaire for acute flaccid surveillance system evaluation

Zonal Level Questionnaire

1. **identification**
- Date data collection in E.C_____in G.C _____
- Name of Zone _____
- Respondent_____Phone___
- Interviewer_____

2. **Socio Demographic information**

- Total population of Zone _____ Male _____Female_____
- Urban _____ Male _____Female_____
- Rural _____Male _____Female_____
- Children < 15 years of age _____ Male _____Female_____
- Total Kebele_____Urban _____ Rural_____
- Total population under surveillance _____Male _____Female _____
- Number of Traditional healer_____estimated population visited_____
- Number of holy water_____ estimated population visited_____

3. **General Availability of a national surveillance manual**
- Is there any national manual for surveillance (PHEM Guideline) at this site? Yes No
- If “yes” list all avail guide line at the site:
- _____,_____,_____,_____,_____,_
- Is there any standard reporting format for surveillance at this site? Yes No
- If “yes” list all avail guide line at the site:
- _____,_____,_____,_____..
- Is there any standard case definition surveillance at this site? Yes No
- If “yes” list all avail guide line at the site:
- _____,_____,_____,_____,_____

4. **Case detection and registration**

1. Do you have guideline of: AFP Yes No scabies Yes No?
2. Do you have a standard case definition of?

AFP Yes No Scabies Yes No Amharic PHEM guide line Yes No

5. Case reporting

1. Which communication material did you have?

E-mail Wired phone Mobile Radio Fax Other----------

2. Did you have address of Zonal PHEM officers? Yes No, health center PHEM focals? Yes No.

3. How frequently are you communicating 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

I don't know exactly

5. How is your facility communicating the Zonal/HC PHEM officers in case of immediately reportable diseases? By e-mail 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 addressing Important issues at community level that have arisen through the surveillance system? Yes No

7. If answer for Q 6 is yes, to whom did you send? ----------

8. If you faced any problems on communication and reporting, list them----------

9. Mention the alternative solutions that you take to tackle the problems you mentioned above?

10. Have you lacked appropriate surveillance forms and records at any time during the last 6months (rumor log book, weekly, case based, investigation,… forms)? Yes No

11. How do you report to higher level?

Mail Fax Telephone Radio Electronic Other

12. Strengthening reporting: How can reporting be improved? _____

6. Data analysis

1. Have you been trained on surveillance system? Yes No

A) when? ------ b) For how long? ---C) by whom_____

4. Did you have computer on your office? Yes No

5. Did you have computer on your department (PHEM unit)? Yes No

6. What is the data entry and compilation instrument? Manual Computer other_____

7. Did you have computer skill on Ms word Ms excel MS power point

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

9. If answer for Q 8 is yes, did you describe data by time place person

10. Did you have denominators for data analysis? total population male female U5

11. if Q8 is yes Please indicate the frequency of your data analysis.

Weekly every two week Monthly Quarterly Every 6 month annually No regular time

12. Did you notify the results of your analysis to the higher level PHEM? Yes No
13. If answer for Q 12 is No, what is the reason?
Lack of knowledge Shortage of time less attention given Shortage of materials
Analysis is not familiar Negligence Other----------
14. Did you perform trend analysis? Yes No
(Observe the presence of line graph of cases by time, number of cases and deaths by sex and age)
15. Do you have an action threshold for any of the Country priority diseases? Yes No
16. If yes for Q 15, what is it (Ask for at least 2 priority diseases, AFP and Scabies)?

7 Epidemic preparedness

1. Have you been trained on:
AFP management Yes No Scabies management Yes No
2. Did you have plan for epidemic response and preparedness? Yes No
3. Did you have emergency stocks of drugs and supplies? Yes No
4. If answer for Q 2 is No, how did you control epidemics? ___
5. Have you experienced shortage of drugs, vaccines and supplies in 2009 EFY? Yes No
6. Did you establish epidemic management committee? Yes No
7. Did the epidemic management committee have regularly scheduled meeting time?
Yes No
If yes observe documents 8. Did you establish Rapid response team? Yes No
9. Did the Rapid response team have regularly scheduled meeting time during epidemics? (chek if yes)
Yes No No epidemic occurred
10. Did you have case management protocol for epidemic prone diseases? Yes No
11. Was there a budget for epidemic response? Yes No
12. Was there any Challenges on epidemic response and preparedness in 2009 EFY? Yes No
13. If answer for Q
11 is yes, a) list the challenges_____
b) What measures did you take to tackle the challenges? _____

8. Epidemic response

1. Outbreak investigation
a. Is there any outbreak occurred in your district in 2009 EFY? Yes No
b. If answer is yes, how money times_____
c. If answer for 1a is yes, did you investigated in Yes No
d. Did you have outbreak investigation check list? Yes No Not applicable
2. If answer for Q1c is No, how did you know possible factors for the outbreak? ----
a. Has the health office implemented prevention and control measures based on local data for at least one epidemic prone disease? Yes No

9. Supervision and Feedback

1. Were you supervised by higher level (regional, zonal or Woreda) officers in 2009 EFY?

Yes No (observe at least one feedback report)

2. If answer yes, how many times in 2009EFY? ----------

3. Had you received feedback from higher level supervisors in 2009 EFY? Yes No

4. If answer is yes, how many feedbacks did you received in 2009 EFY? --------

5. Had you faced any challenge on supervision and feedback in 2009 EFY? Yes No

6. If answer is yes Q5) list the challenges._____

b) List the measures that you take to tackle the challenges._____

7. Has this district health office conducted meetings with the community members in the past six months? Yes No (Observe the minutes or report of at least 1 meeting between the health facility team and the community members within the six months)

8. If yes, how many times? _____ _

10. Resources

Does the district health office have the following logistics?

Electricity Bicycles Motorcycles Vehicles

11. Data management

1. Stationery Calculator Computer Software Printer

2. Communication: Tel. service Fax Radio call, internet/connection

3. Information education and communication materials:

Posters Megaphone Flipcharts Image box TV set Generator Screen Projector Other:____

Questionnaire for level of usefulness and each attributes of the Surveillance System

12. Level of Usefulness

Does the surveillance system help?

1. To detect outbreaks of these selected priority diseases early? Yes No
2. To estimate the magnitude of morbidity and mortality related to these diseases, including identification of factors associated with these diseases? Yes No
3. To permit assessment of the effect of prevention and control programs? Yes No
4. To observe (confirm) interventions and diseases trends analyzed? Yes No

13. Describe each Attributes of the Surveillance System

A. Simplicity:

1. Is the case definition of selected priority diseases easy for case detection by all level health professionals? AFP Yes No Scabies Yes No

2. Does the surveillance system help to record and report data on time? Yes No

3. Do you feel that additional data collected on a case are time consuming? Yes No

4. How long it takes to fill the AFP and scabies format/line list? <5 minutes 5 15minutes ≥15 minutes

B. Flexibility:

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? Yes No

2. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes No

C. Data Quality (Completeness of the reporting forms and validity of the recorded data):

1. Are the data collection formats for these priority diseases **clear** and **easy** to fill for all reporting sites? Yes No

2. Percent of the reporting sites trained? _____/_____/_____%

3. Percent of the reporting sites supervised regularly? _____/_____/_____%

Observe: Review the last months report of these diseases

3. Average number of unknown or blank responses to variables in each of the reported forms? __

4. Percent of reports which are complete (that is with no blank or unknown responses) from the total 3 months report? _____

5. Total weekly reports received from health centers and health posts (including late reports, from WHO Week 12- Week 23, 2016) [**01/001/20010-01/01/2010]**

WHO Epid._Wk, 2018	No of HCs	No of HCs that report	No of HPs expected to report	No of HPs that report	No of Other HF expected to	No of Other HF reported	WHO epid. Wk, 2016	**No of HCs**	**No of HCs that report**	**No of HPs**	**No of HPs that**	**No of Other HF expected to report**	**No of Other HF reported**

D. Acceptability:

a. Do you think all the reporting agents accept and well engaged to the surveillance activities?

Yes No

b. If yes, how many are active participants (of the expected total)? _____

c. If No, what is the reason for their poor participation in the surveillance activity?

Lack of understanding of therelevance of the data to be collected

No feedback or recognition given by the higher bodies for their contribution

Reporting formats are difficult to understand

Report formats are time consuming Other_____

E. Predictive Value Positive (PVP):

1. What is the positivity rate of AFP and scabies in your district in the 2018?

Total suspected AFP cases examined _____

Confirmed cases_____ probable _____epidemiological linked_____posible

2. What is the number of people screened for scabies in your district in 2018?

3. Was there any case of AFP in 2008 EFY in your district? Yes No Case

F. Representativeness:

1. What is the health service coverage of the district? _____(#) _____%

2. Do you think, the populations under surveillance have good health seeking behavior for these diseases? 1. Yes 2. No 3. Unknown

3. Who do you think is well represented/ benefited by the surveillance data?

The urban the rural Both what is the reason? _____

4. was the surveillance system enabled to follow the health and health related events in the whole community? Yes No

G. Timeliness

1. Percent of sites that reported on time each reporting period to the next higher level during the past 3 months? (Use national deadlines)

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

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

H. Stability:

a. Was the new BPR restructuring affected the procedures and activities of the surveillance of these diseases? Yes No

b. Was there lack of resources that interrupt the surveillance system? Yes No

c. Was there any time /condition in which the surveillance is not fully operating? Yes No

14. Strength and Weakness

1. How do you work with other departments and other sectors? _____

2. What are the strengths of the surveillance system? _____

3. What are the weaknesses of the surveillance system? _____

Questionnaire for health centers

1. Identifiers:

Region _____ Zone _____Woreda _____

Health facility: _____ Date: _____ Interviewer: ____ Respondent: ____

2. General

Total pop._____ Male _____ Female_____ Rural pop._____

Urban pop._____ Total Kebeles __ urban _____ rural _____ H.Ps_____

No of malarious kebeles_____ Total population at risk for Malaria _____

3. Availability of a national surveillance manual

a. Is there national manual for surveillance at this site?

Malaria guideline Yes No SAM guideline Yes No AWD guideline Yes No

4. Case detection and registration

1. Does your health facility have a register for Malaria, SAM and AWD? Yes No

2. Does the health facility correctly register cases filling of the clinical register during the previous 30 days? Yes No

3. Do you have a standard case definition for?

AFP Yes No Scabies Yes No AWD Yes No

5. Case confirmation

1. Do you have stool cup for sample of AFP at this facility? Yes No
2. Which communication material did you have? E-mail Wired phone Mobile Radio Fax Other----------
3. Did you have address of Woreda PHEM officers? Yes No
4. How frequently are you communicating with the Woreda PHEM officers on emergencies and other daily activities? Daily Weekly Every 2 week Monthly Quarterly Every 6 month Yearly Others----------
5. When are you expected to send weekly report to the Woreda PHEM unit? Monday Tuesday Wednesday Thursday Friday Saturday Sunday I don't know exactly

6. How is your facility communicating the Woreda PHEM officers in case of immediately reportable diseases? By e-mail 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 addressing Important issues at community level that have arisen through the surveillance system? Yes No

8. If answer for Q 7 is yes, to whom did you send? ----------
9. If you faced any problems on communication and reporting, list them----------
10. Mention the alternative solutions that you take to tackle the problems you mentioned above
11. Have you lacked appropriate surveillance forms and records at any time during the last 6 months (rumor log book, epidemic reporting, weekly, case based, investigation…?

a. Yes b. No c. Unknown d. Not applicable, if yes list all

12. Observe that the last monthly report agreed with the register for 3 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])

Obs AFP Y/ N/ U/ Obs Scabies Y/ N/ U

13. How do you report to higher level?

Mail___ Fax __Telephone ___ Radio ___ Electronic___ other __

14. Strengthening reporting: How can reporting be improved? _____

6. Data analysis

1. Is there assigned focal person for surveillance activities? Yes No

If No for Q 1 how do you do surveillance activities? _____

3. If answer for Q1 is yes, have you been trained on surveillance system? Yes No

If yes, when---------- For how long ---------- by whom_____

4. Did you have computer on your health facility? Yes No
5. What is the data entry and compilation instrument? Manual Computer other_____
6. Did you have computer skill on: MS Word MS excel MS power point
7. Did you analyze data of the surveillance system? Yes No
8. If answer for Q 7 is yes, did you describe data by time place person
9. Did you have denominators for data analysis? Total population male female U5
10. Please indicate the frequency of your data analysis.

Weekly every two week Monthly Quarterly Every 6 month annually

No regular time

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

12. If answer for Q 13 is No, what is the reason?

Lack of knowledge Shortage of time less attention given Shortage of materials

Analysis is not familiar Negligence Other----------

13. Did you perform trend analysis? Yes No

(Observe the presence of line graph of cases by time, number of cases and deaths by sex and age)

14. Do you have an action threshold for any of the Country priority diseases? Yes No

15. If yes for Q 14, what is it (Ask for at least 2 priority diseases)?

AFP_____ No. of cases_____

scabies_____ No. of cases_____

7. Epidemic preparedness

1. No. of health personnel trained on: AFP mgt_____ Scabies mgt_____

2. Do you have plan for epidemic response and preparedness? Yes No

3. Do you have emergency stocks of drugs and supplies? Yes No If yes, specify_____

4. If answer for Q 2 is No, how did you control epidemics? ____

5. Had you experienced shortage of drugs, vaccines and supplies in 2008 EFY? Yes No

6. Do you establish epidemic management committee? Yes No

7. Do the epidemic management committee have regularly scheduled meeting time? Yes No

8. Do you have case management protocol for epidemic prone diseases? Yes No

9. Was there a budget for epidemic response? Yes No

10. Any challenges on epidemic response and preparedness in 2009 EFY? Yes No

11. If answer for Q 10 is yes, a) list the challenges_____

b) What measures did you take to tackle the challenges? ____

8. Epidemic response

1. Outbreak investigation:-

a. Is there any outbreak occurred in your cluster 2009 EFY? Yes No

b. If yes, what was the outbreak? _____how money times? ____

c. If yes, how many of them were investigated in 2009EFY? _____

d. Did you have outbreak investigation check list? Yes No

e. If answer for Q1a is No, how did you know possible factors for the outbreak? __

2. Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease? Yes No

3. Did they achieve acceptable case fatality rates?

(Obs. that the health facility achieved an acceptable case fatality rate for most recent outbreak)

9. Supervision and Feedback

1. Were you supervised by higher level (regional, zonal or Woreda) officers in 2009EFY?

Yes No

2. If answer yes, how many times in 2009EFY? ----------

3. Had you received feedback from higher level supervisors in 2009 EFY?

Yes No (observe at least one feedback report)

4. If answer is yes, how many feedbacks did you received in 2009 EFY? --------

5. Had you faced any challenge on supervision and feedback in 2009 EFY? Yes No

6. If answer is yes a) list the challenges._____

b) List the measures that you take to tackle the challenges.

7. How many meetings has this health facility conducted with the community members in the past six months? (Observe the minutes or report of at least 1 meeting between the health facility team and the community members within the six months)

10. Resources

Does your PHCU has the following Logistics?

Electricity_._____ Bicycles_____ Motor cycles_____ Vehicles

Does the HC have scabies drugs? Yes No

If no reason_____

If yes list drugs_____

11. Data management

1. Stationery Calculator Computer Software Printer
2. Communication: Tel. service Fax Radio call
3. Information education and communication materials:

Posters Megaphone Flipcharts Image box TV set Generator Screen Projector Other:____

Questionnaire for Level of Usefulness and each Attributes of Surveillance System

12. Level of Usefulness

1. Does the surveillance system help?

a. To detect outbreaks of these selected priority diseases early? Yes No

b. To estimate the magnitude of morbidity and mortality related to these diseases, including identification of factors associated with these diseases? Yes No

c. To permit assessment of the effect of prevention and control programs? Yes No

(Observe interventions and diseases trends analyzed)

13. Describe each Attributes of Surveillance System

A. Simplicity:

1. Is the case definition of the priority diseases easy for case detection by all level health professionals? AFP Yes No Scabies Yes No

2. Does the surveillance system help to record and report data on time? Yes No

3. Do you feel that additional data collected on a case are time consuming? Yes No

4. How long it takes to fill the format?

Less than five minute 5-15minutes Greater than15 minutes

5. How long does it take to have laboratory confirmation of Malaria?

Less than five minute 5-15minutes Greater than15 minutes

B. Flexibility:

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? Yes No

2. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes No

3. Is the system easy to add new variables? Yes No

4. Is the surveillance system easy to integrate with other systems? Yes No

C. Data Quality (Completeness of the reporting forms and validity of the recorded data)

1. Are the data collection formats for these priority diseases clear and easy to fill for all reporting sites? Yes No

2. Are the reporting site trained/ supervised regularly? Yes No

(Observe: Review the last months report of these diseases)

3. Average number of unknown or blank responses to variables in each of the reported forms __

4. Percent of reports which are complete (that is with no blank or unknown responses) from the total reports _____

5. Percent of sites that reported each reporting period to the next higher level during the past 3 months? Observe Number of reports in the last 3 months compared to expected number

Weekly: ___/___ ___times the number of sites

Immediately: ___/___times the number of sites

D. Acceptability:

a. Do you think all the reporting agents accept and well engaged to the surveillance activities?

Yes No

b. If yes, how many are active participants (of the expected total)? ___

c. If No, what is the reason for their poor participation in the surveillance activity?

Lack of understanding of the relevance of the data to be collected

No feedback or recognition given by the higher bodies for their contribution;

Reporting formats are difficult to understand

Report formats are time consuming

Other_____

d. Were all the health professionals aware about the surveillance system? Yes No

(If yes how they aware) _____

Do interview health professions

E. Predictive Value Positive (PVP)

1. Was there any case of AFP in 2009/2010EFY in your health facility? Yes No

2 IF yes what is the slide positivity rate of AFP sending to national lab.

3. What is the total number of under 15 years screened for AFP in your PHCU in the past 4/5 years?

What is the total number screened for scabies in your PHCU in 2010 years

F. Representativeness:

1. Do you think, the populations under surveillance have good health seeking behavior for these diseases? Yes No

2. Who do you think is well represented/ benefited by the surveillance data?

The urban the rural Both what is the reason? _____

3. was the surveillance system enabled to follow the health and health related events in the whole community? Yes No

G. Timeliness:

1. Percent of sites that reported on time each reporting period to the next higher level during the past 3 months? (Use national deadlines)

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

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

H. Stability:

a. Was the new BPR restructuring affected the procedures and activities of the surveillance of these diseases? Yes No

b. Was there lack of resources that interrupt the surveillance system? Yes No

c. Was there any time /condition in which the surveillance is not fully operating? Yes No

14. Strength and Weakness

1. What are the strengths of the surveillance system? _____

2. What are the weaknesses of the surveillance system? _____

Health Post Level Questionnaire

Identifiers:

Assessment team: _____ Type of health facility: _____

Date: _____ District: Interviewer: _____

Respondent: _____ Name of health facility:

General

Total pop._____ Male _____ Female_____

Rural pop._____ urban pop._____

Kebele status (Urban/Rural) _____

1. Malarious Kebele? Yes No

2. Total pop. At risk for Malaria_____

3. Availability of National surveillance Manual: Is there national manual surveillance at this site? For AFP Yes No Scabies Yes No

3. Case detection and registration

1. Is there a clinical register book at the HP?

For Malaria Yes No SAM Yes No AWD Yes No

2. Do you have standard case definition?

For AFP Yes No Scabies Yes No

4. Data reporting

1. Have you faced lack of appropriate surveillance forms at any time during the last 6 months?

Yes No

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

Observe Weekly: _____

Observe Immediately: ____

3. How do you report to next level?

Mail Fax Telephone Radio Electronic Others (specify)_____

5. Data analysis

Does the HP Performing trend analysis? (Observe analysis by PPT)

AFP Yes No Scabies Yes No

6. Epidemic response

1. Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease? (Observe documents) Yes No

7. Feedback and supervision

1. How many written feedbacks has the health facility received in 2009/10EFY? _

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

8. Training

Have you been trained in disease surveillance and epidemic management?

Yes No

If yes, specify when_____, where_____, how long_____, by whom? _

9. Resources

Does the HP have the following Logistics? Electricity Bicycles

Does the HP have stool cups? Yes No

Does the HP have scabies drugs? Yes No

If no scabies drug at HP, specify the absent_____

10. Data management

Does the HP have the following Logistics?

Stationery_____ Calculator____ Telephone ___ Radio____ Mobile EHMIS___

11. Information education and communication materials

Posters Megaphone Flipcharts or Image box radio Other (specify):_____

3. Hygiene and sanitation materials: Spray pump Disinfectant

4. List protection materials __

Questionnaire for Level of Usefulness and each Attributes of Surveillance System

12. Level of Usefulness

1. Does the surveillance system help?

a. To detect outbreaks of these selected priority diseases early? Yes No

b. To estimate the magnitude of morbidity and mortality related to these diseases, including identification of factors associated with these diseases? Yes No

c. To permit assessment of the effect of prevention and control programs? Yes No

13. Describe Each System Attributes:

A. Simplicity:

1. Is the case definition of the priority diseases easy for case detection by HEWs? Yes No

2. Does the surveillance system help to record and report data on time? Yes No

3. Do you feel that additional data collected on a case are time consuming? Yes No

4. How long it takes to fill the format?

Less than five minute 5-15minutes Greater than15 minutes

5. How long does it take to have RDT diagnosis of Malaria?

Less than five minute 5-15minutes Greater than15 minutes

6. How long does it take to screen and diagnose SAM?

Less than five minute 5-15minutes Greater than15 minutes

B. Flexibility:

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? Yes No

2. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes No

C. Data Quality: (Completeness of the reporting forms and validity of the recorded data)

1. Are the data collection formats for these priority diseases clear and easy to fill? Yes No

2. Are the reporting site trained/ supervised regularly? Yes No

(Observe: Review the last months report of these diseases)

a. Percent of reports which are complete (that is with no blank or unknown responses) from the total reports sent from health posts in 2009 EFY (including late reports from WHO Week 12- Week 23, 2018)? **1/01/2009-01/10/2010]** expected_____ reported_____%_____

D. Acceptability:

a. Do you think all the reporting agents accept and well engaged to the surveillance activities?

Yes No

b. If yes, how many are active participants (of the expected total)? _____

c. If No, what is the reason for their poor participation in the surveillance activity?

Lack of understanding of the relevance of the data to be collected

No feedback or recognition given by the higher bodies for their contribution;

Reporting formats are difficult to understand

Report formats are time consuming

Other_____

E. Predictive Value Positive (PVP)

Total suspected NP-AFP examined _____

Confirmed o139----------01

3. Was there any case of AFP and scabies in 2009 EFY in your health facility? Yes No Case__ death__

F. Representativeness:

1. Do you think, the populations under surveillance have good health seeking behavior for these diseases? Yes No

2. Who do you think is well represented by the surveillance data?

The urban the rural both what is the reason? _____

3. was the surveillance system enabled to follow the health and health related events in the whole community? Yes No

G. Timeliness:

1. Percent of reports that reported on time each reporting period to the next higher level during the past 3 months? (Observe expected report vs timely reported from [**01/01/2001-10/01/2010**)

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

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

H. Stability:

a. Was the new BPR restructuring affected the procedures and activities of the surveillance of these diseases? Yes No

b. Was there lack of resources that interrupt the surveillance system? Yes No

c. Was there any time /condition in which the surveillance is not fully operating? Yes No

14. Strength and Weakness

1. What are the strengths of the surveillance system? _____

2. What are the weaknesses of the surveillance system? _____

Annex 6: Health profile checklist

Region_____Zone_____Woreda_____Respondant__
_____Interviewer_____

1. **Historical back ground of the area**
   1.1 Establishment time of the area as woreda_____
   1.2 Name of historical places_____
   1.3 Historical Nomination_____

2. Population and demography

2.1. Total population of the woreda_____Male_____Females____
2.2. M to F Ratio_____
2.3. Ethnic composition _____
_____
_____
2.4. Population density_____
2.5. Crude death rate_____
2.6. Under five mortality rate_____
2.7. Total live births _____
2.8. Under one year population_____
2.9. Under five year population_____
2.10. Independent population_____
2.11. Annual growth rate_____
2.12. Religion:
Orthodox_____
Muslim_____
Protestant_____
Catholic _____
Others_____

3. Geographic and climate condition

3.1 Area in Square km _____
3.2. Location of the woreda from capital of the region_____
3.3. Boundaries_____
3.4. Altitude of the area (in meters)_____
3.5. Latitude of the area (in meters)_____
3.6. Longitude_____
3.7. Annual Rainfall _____Main rainy season_____
3.8. Annual Temperature _____

3.9. Maximum temp_____
3.10. Minimum temp_____

4. Political and administrative organization

4.1 Total number of Kebeles_____
A/Urban____

B/Rural____

4.2 Number of Kebeles with transportation access_____

A/Asphalt road

B/

4.3 Number of Kebeles without transportation access _____

4.4 Number of Kebeles with electric power _____

4.5 Number of Kebeles without electric power_____

4.6 Number of kebeles with telephone service (cable based/wireless_____

4.7 Number of Kebeles without telephone service_____

4.8 How many supporting NGOs are in the area _____

4.9 Ruling political party _____

4.10 Bank_____

5. Productivity and income

5.1 main base of economy _____

5.2 part of the population (%) whose economic source is from

a) Farming _____

b) Animal production_____

c) Trade _____

d) Government employee (salary**)** _____

e) Others_____

5.3. Average annual income level_____

5.4. Productivity of the land/hectare _____quintal/hectar

5.5. Common crop products _____

_____

_____

_____

5.6. GDP (during harvesting season/ meher)_____quintal

5.7. GDP from irrigation_____quintal

5.8. Total GDP_____quintal

5.9. Employment rate_____Unemployment rate_____

6. WASH

A/Water supply

6.1. Safe water supply coverage_____

6.1. Source of water_____

6.2. Separate water source for human and animal

A/yes_____

B/no_____

6.3. Number of kebeles

With accessible water source_____

Without accessible water source_____

6.2. Number of pipe water supply_____

6.3. Is there treatment of water_____

6.4. Frequency of treatment_____

6.5. Source other than pipe water

Yes_____

No_____

6.6. Is the water source safe? (Fence, can cattle access the water)

B/latrine

6.8. percent of latrine coverage_____

A/Latrine with ….

B/Latrine without…..

6.9. Open field defecation (OFD) _____%

6.10. Number of public latrine in the woreda_____

C/Sanitation

6.11. Any campaign in the last year for environment hygiene_____

6.12. Any prepared site or container for disposal of solid waste in the town_____

6.13. Drainage system for liquid waste disposal_____

7. Education

7.1. Number of enrollment in elementary schools

Male_____

Female____

7.2. School dropout_____%

7.2. Number of enrollment in secondary schools

Male_____

Female____

7.3. School dropout_____%

7.3. Number of colleges/universities_____Total number of tudents_____

7.4. Number of teachers at elementary_____, secondary_____and colleges/universities_____

8. **Social situation:**

8.**1.** Number of libraries_____

8.2. Number of NGO working on public health_____

8.3. Number of youth clubs_____

8.2. Number of recreational area for youth_____

9. Health service institutions and infrastructure

S. NO	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	
7	Number of Pharmacies	
8	Number of Drug vendors	
9	Number of Diagnostic laboratories	
10	Hospital to population ratio	
11	Health center to population ratio	
12	Health posts to population ratio	
13	Physical health service coverage	
14	Number of institution providing service on OTP	Hospital_____ Health center____ Health post_____
15	Number of institution providing SC service	Hospital_____ Health center____ Health post_____

9.14. Top 10 diseases of morbidity and mortality in adult OPD:-

Morbidity cases			Mortality cases		
Rank	Diseases	%	Rank	Disease	%
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		

9.11. Top 10 Diseases of morbidity and mortality in under 5 OPD:-

Morbidity cases			Mortality cases		
Rank	Diseases	%	Rank	Disease	%
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		

10. **Health staff to population ratio:**

General Practioner (GP) _____

Health officers_____

Nurses_____

Medical lab_____ Pharmacy_____, Env'tal _____

Health extension workers_____

Other_____

11. Vital statistics and health indicators

S. No	Indicator	Rural	Urban	Total
1	Under 5 population			
2	Productive age female (15-49 years)			
3	Pregnant women			
4	Live births			
5	Total fertility rate			
6	birth rate			
7	Crude death rate			
8	maternal mortality rate			
9	Child mortality			
10	Under 5 mortality rate			
11	Infant mortality rate			
12	Dependency ratio			
13	Average household size			

12. Maternal health coverage

S.No	Type of service	Coverage (%)
1	Antenatal care (ANC) Coverage (%)	
2	Contraceptive acceptance rate (CAR (%))	
3	Post natal care (PNC) Coverage	
4	Proportion of delivery attended by skilled personnel	

13. Endemic disease

A) Tuberculosis

S. No	Cases	Number		
		male	female	total
1.	TB case detection rate			
2.	TB treatment success rate			
3.	TB treatment cure rate			
4.	Defaulters			

b) HIV/AIDS

HIV prevalence_____

HIV Incidence_____

VCT_____

PMTCT_____

ON ART_____

PITC_____

14. Disasters and Out Breaks Occurred, Immediately Reportable Disease

14.1 Were any disasters occurred in these years_____?

14.2 If Q.14.1 is yes list the name

_____

_____

_____

_____

14.3 Which of the above mentioned disaster(s) was (were) Happened more than once?

_____

_____

_____

14.4 How many out breaks occurred in the last 5 years_____

(List_____

_____

14.5 Which of the above mentioned outbreak(s) was (were) occurred more than once?

_____

_____

_____

15. **Nutrition, food shortage**_____

_____

____

Healtheducation_____
_____
_____
Health budget allocation
_____
_____Essential drugs and other supplies_____
_____
_____ 16.Discussion of the highlights and the main findings of the health profile assessment and description
_____
_____

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2. UcfhpR. o. Health Interview Survey. 2015.
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4. Department SGh. South Gondar zone health department, annual report. 2008.
5. World health statistics. monitoring health for the sustainable and development goal. 2016.
6. Tigray Rhbo. The Government of the National Regional State of Tigray. 2016.
7. Office FH. Fogera district health office annual health report. 2009/10.
8.Office Fh. Fogera district education office annual report. 2010.

Annex 7: Epi-Project proposal checklist

Questionnaire 2: Questionnaire for risk of exposure to rabies by the case's entourage

Identifying no.

Requested by

Data collector Name: .....**Telephone**: .....E-Mail.....

Date of consultation: l__ll__l / l__ll__l / l__ll__l

First name: …… **Family name**: ……..

Birth date: l__ll__l / l__ll__l / l__ll__l Sex: M F

Contact information

Region_____Zone_____District: ……Sub-City/Cluster/Kebele ……Got/village_____

Telephone (land line/mobile): …… /……

Patient

Current episode of exposure to rabies

Date of exposure: l__ll__l / l__ll__l / l__ll__l Approximate time: ……..…….

Site of exposure: District:……..Cluster/Sub_city/Kebele: ……..……

Exposure type 1: contact with the rabies index case

Contact from the patient

Bitten by the patient Resuscitation man oeuvres, especially respiratory

Participation in act generating aerosolization of the patient's respiratory secretions (aerosol therapy,

Laboratory personnel in contact with biological fluids

Anatomical Site: …….....

Number: Single Multiple If multiple, how many: …….

Exposure type 2: contact with a suspicious animal in the index case's entourage

Bite Scratch Licked Contact

Anatomical site(s):

…….....

Number: Single Multiple If multiple, how many: …….

Severity: Deep Superficial

General treatment of the current episode of rabies exposure

Local disinfection: Yes No Type: …….

Sutures: Yes No Number: ……

Antibiotics: Yes No Molecule: ...…….

Anti-tetanus vaccination: Current To be done

Did you got PEP yes No

If No, what is the reasons not yet got PEP

Distance of the treatment centers Shortage of PEP did not know the presence of PEP better traditional healer's lack of money

If Yes,

Specific treatment of the current episode of rabies exposure

1st injection: date: l__ll__l / l__ll__l / l__ll__l Batch #:…….. Reaction: …….

2nd injection: date: l__ll__l / l__ll__l / l__ll__l Batch #:…….. Reaction: …….

3rd injection: date: l__ll__l / l__ll__l / l__ll__l Batch #:…….. Reaction:

Protocol completed: Yes No

If No, reason for stopping: Medical decision (risk excluded by veterinarian) Lost-to-follow-up

Immunoglobulins: Yes No Name of product: …….

Site(s) of immunoglobulin injection(s): ……..……

Dose(s) of immunoglobulins injected: ……

Animal species at the origin of the exposure:

Dog Cat Bat Other

If another, species responsible: ……

Rabies vaccine status: Vaccinated not vaccinated Unknown

Date of validity of the anti-rabies vaccination: l__ll__l / l__ll__l / l__ll__l

Owner: Known Unknown

First name of Owner: …… Family name:

……..

Owner's address: Region: ……Zone……District: ……

Cluster/Sub-city: ……village/got: ……..……

Telephone (land line/mobile): ……/……

Veterinary examination to be scheduled: Yes No

1st visit: date: l__ll__l / l__ll__l / l__ll__l Result: ……..

2nd visit: date: l__ll__l / l__ll__l / l__ll__l Result: ……..

3rd visit: date: l__ll__l / l__ll__l / l__ll__l Result: ……..

Laboratory tests: Yes No Result: ……..

Remarks

Summary comments:_____

Date form completed: l__ll__l / l__ll__l / l__ll__l

Collector's signature …….

Supervisor/coordinators approval----------