

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



Ethiopian Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

By

Mengistu Temesgen (BSc)
(EFETP)

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

June, 2018
Addis Ababa

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Advisor(s): -

1. Dr. Abiy Girmay (MD, MPH, PhD)
2. Dr. Adamu Addisie (MD, MPH, PhD)

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Approval by Examining Board

Chairman, School Graduate Committee

Advisor

Examiner

Examiner

Acknowledgment

I would like to thank and appreciate my mentors Dr. Abiy Girmay and Dr. Adamu Addisie for their continuous support and guidance through execution of all my outputs.

I also want to Thank and appreciate the help and cooperation of Regional health bureau, zonal health departments, woreda health office and health facilities during Surveillance Data Analysis, Health Profile, Outbreak Investigation, Surveillance System Evaluation.

Finally I would like to acknowledge Ethiopian Public Health Institute (EPHI) for their financial and logistic support.

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List of Abbreviations

- IgM..... Immunoglobulin M
- CRS..... Congenital Rubella Syndrome
- RRT..... Rapid Response Team
- SAM..... Severe Acute Malnutrition
- TB..... Tuberculosis
- WHO..... World Health Organization
- PHEM..... Public Health Emergency Management
- EPHI..... Ethiopian Public Health Institute

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Executive Summary

The Ethiopian Field Epidemiology Training Program is a two year post graduate training program. The training is provided in collaboration with Addis Ababa University, School of Public Health, Ministry of Health and Ethiopian Public Health Association. The program designed to work 75% of the time in service and 25% theory, it is learning by doing. For the partial fulfillment of master's in public health in field epidemiology, this summary compiled two year residency outputs; surveillance data analysis, surveillance system evaluation, health profile, outbreak investigation, manuscript and Protocol /proposal for Epidemiologic Research Project.

The document is organized in eight chapters; chapter one deals about outbreak investigation. During the residency period it has been conducted two outbreak investigation; Dengue fever outbreak investigation which was conducted a case control study in Dire Dawa Administration. Chapter two deals about outbreak of Typhoid fever which was conducted in Somali region, Afder zone, Hargele district which is a descriptive study.

Chapter Three explains about surveillance data analysis which was conducted Amhara region on rubella disease. The analysis was made from the year 2007-2016 and it address the burden of Rubella disease in the Amhara region by place, person and time moreover trends and seasonality of the disease. Chapter three is about Evaluation of Malaria Surveillance System in North Gondor zone, Amhara region. In this chapter purpose and objective of surveillance system, progress towards the objective and also attributes of the surveillance system was discussed.

Chapter four is about health profile of Tiyo woreda, Arsi zone, Oromia region. In this chapter health and health related data of the woreda presented.

Chapter five is manuscript on Dengue fever outbreak investigation. Abstract on surveillance data analysis of rubella disease was presented on chapter six. The abstract was presented as oral presentation on 1st Ethiopian Field Epidemiology scientific conference.

Chapter seven Project proposal entitled Prevalence of Severe Acute Malnutrition and Its Associated Factors of Children among 6-59 months age group in Tiyo woreda, Arsi zone, Oromia Region. The proposal intended to do descriptive cross-sectional study.

Chapter 1:- Outbreak Investigation of Dengue Fever in Dire Dawa Administration, a Case Control study, Ethiopia from July, 13/17 To August, 10/2017

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Abstract

Introduction: - Dengue is a severe flue like illness, it is caused by dengue fever virus serotype I to IV. It is transmitted to humans through the bites of infected mosquitos a vector called female Aedes Aegypti. Infection with dengue confers immunity to infection. We received a report of acute febrile illness from Dire Dawa Administration health bureau on July 5/2017. A team deployed to investigate and confirm the unusual occurrence of outbreak, (a single suspected or confirmed case of dengue fever considered as outbreak the threshold is zero), identify risk factors and implement control measures.

Methods: - After lab confirmation of dengue fever at national level by PCR, we conducted a descriptive followed by unmatched case control Study in the ratio of 1:2 (20 cases and 40 controls) which are all active cases during study period from July, 13/17 to August, 10/2017 using structured questionnaire. The data were entered in Epii info 7.0 and analysis made by using SPSS version 20.0 was used to analyze the data and multivariable logistic regression was conducted to assess risk factors for Dengue Fever.

Result: - A total of 106 cases with no deaths identified during the outbreak. Most 73(69%) were males and the rest females. 12 samples were collected & sent for confirmation in EPHI and 8 of them confirmed as DEN II. Age group of 15-44 years were more affected (73%) with median age 29 years ranging from 2 years to 80 years.

In multivariable logistic regression the following variables, Female sex AOR = 0.10; 95% CI (0.01- 0.77), LLINs ownership AOR = 0.07, 95% CI (0.01 - 0.75), House sprayed AOR= 0.1 95% CI = (0.02- 0.71) have significant association.

Conclusion: - Dengue Fever virus is circulating in Dire Dawa, affecting the productive age groups.

Keywords:-Dengue fever, Dire Dawa, outbreak, Risk factors.

Introduction

Dengue is a severe flue like illness, it is caused by dengue fever virus serotype DEN I to DEN IV. It is transmitted to humans through the bites of infected mosquitos a vector called female Aedes Aegypti. Infection with dengue confers immunity to infection with the same dengue serotype, but aside from short-lived protection does not prevent infection with other serotypes. (1)

Dengue affects infants, young children and adults which is characterized by fever, headache, muscle and joint pains, pain behind the eyes, nausea, vomiting and rash. (1)

Some infections result in Dengue Hemorrhagic Fever (DHF) and in its severe form Dengue Shock Syndrome can threaten the patient's life primarily through increased vascular permeability and shock.(1)

In recent years dengue fever has become a major international health problem affecting tropical and sub-tropical regions around the world - especially urban and peri-urban areas. The geographic distribution of dengue, the frequency of epidemic cycles, and the number of cases of dengue have increased sharply during the last two decades. In addition, the frequency of a potentially lethal complication of dengue, called dengue hemorrhagic fever has begun to occur on a regular basis in countries where only dengue occurred previously. (2)

Today globally about 2.5 billion people, or 40% of the world's population, live in areas where there is a risk of dengue transmission. Dengue is endemic in at least 100 countries in Asia, the Pacific, the Americas, Africa, and the Caribbean. The World Health Organization estimates that 50 to 100 million infections occur yearly, including 500,000 DHF cases and 22,000 deaths, mostly among children. (3)

In Ethiopia Dengue had never been reported previously till the occurrence in Dire Dawa Administration from October – December 2013. During this period 11,000 suspected cases were reported and out of which 40 cases were confirmed by national laboratory with serotype II.

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After the 1st occurrence Dengue outbreak were appeared in Somali and Afar Region in January 2014.

The current outbreak were reported to Ethiopian Public Health Institute from Dire Dawa Administration Health bureau/PHEM/ with a report of unusual increment Acute febrile illness which were malaria negative cases with symptoms of fever, severe headache, back and joint pain and the region suspect for dengue fever and requite for investigation and response.

Based on the request a team from the Ethiopian Public Health Institute prepared and deployed to the area to confirm the existence of the outbreak, identify the etiology, risk factors and finally to implement control and prevention measures.

Objectives

General Objective

- ✚ To Investigate, Describe, Identify Risk Factors Associated with Dengue Fever outbreak and undertake appropriate public health control measures in Dire Dawa Administration.

Specific Objectives

- ✚ To verify the existence of Dengue Fever outbreak in Dire Dawa Administration.
- ✚ To describe the magnitude and distribution of the outbreak in terms of person, place & time.
- ✚ To conduct environmental assessment
- ✚ To identify risk factors and undertake prevention and control measures for the outbreak
- ✚ Recommend corrective actions for preventing further epidemics in the area.

Methods and Materials

Study Area: - The study was conducted in Dire Dawa city which is located at a distance of 515 km far from Addis Ababa to East. It is located at between 9⁰ 27 N and 9⁰ 49 S longitude and between 49⁰ 38 E and 42 19 W with an altitude between 960 - 2,500 meter asl. Climate is warm and dry with low level of precipitation. The mean annual air temperature is 25.4 0c (18.2- 34 0c).

The total population were 466,000, Male 234,000, Female 232,000. Urban population male 147,000, female 146,000, rural male 87,000 female 86,000. The city has 9 urban and 38 rural kebeles, 2 government hospitals, 4 private hospitals, 2 military hospitals, 15 Health centers, 31 Health posts.

Study Period: - The study was conducted from July 13/2017 till August 10/2017

Study Design: - We conducted a descriptive study followed by unmatched case-control in ratio 1:2 (20 cases and 40 controls)

Sample Size: - we interviewed 20 cases and 40 controls from health facilities in Dire Dawa city from July 13/17 to August 10.17.

Sampling: - Standard PHEM case definitions were used to detect Dengue Fever case. Suspected Dengue fever is any person infected with an acute febrile illness with 2 or more of the following: headache, retro-orbital pain, arthralgia, rash, hemorrhagic manifestations, leukopenia.

All cases that fulfilled the case definition were included in the study.

Controls were a person having no signs and symptoms of dengue fever based on the case definition in same locality with cases.

Case Definition

Suspected Case of Dengue Fever

Any person with fever of 2 -7 days and more of the following a headache, arthralgia, myalgia, rash, or bleeding from any part of the body an acute febrile illness (fever, severe headache and/or diarrhea) with a negative malaria test.

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

Controls

Any person in the area without signs or symptom of the disease.

Laboratory Investigation

To confirm the existence of dengue fever a total of 12 serum samples were collected from malaria negative patients and transported to the national reference laboratory for PCR investigation.

Environmental Investigation

We assessed the general living environment of cases and controls. In addition to this we assessed the possible mosquito breeding sites within the community and nearby rivers.

Data Collection Method

OPD registration book of the health centers, Hospitals were reviewed retrospectively to observe if similar outbreak had recently occurred. Active case search was conducted in all health facility using line listing of suspected cases. A structured questionnaire was used to interview both the case and control groups.

Data analysis

The collected Data entered in Epi info version 7 and analysis made using SPSS version 20 for bivariate and logistic regression to assess risk factors for dengue fever and Microsoft excels for descriptive data analysis. Results were displayed with tables and graphs and it was interpreted using Odd ratio, P value <0.05 and 95% confidence interval.

Ethical consideration

An official letter written from Ethiopian Public Health Institute (EPHI) to Dire Dawa Health bureau to conduct the investigation and the regional health bureau inform for all health facilities and army hospitals. Informed verbal consent was obtained from participants before interview and all agreed to participate in the study.

Result dissemination

The results of this study will be distributed to AAU/ School of public health department of field epidemiology training program, Ethiopian Public health Institute (EPHI), Dire Dawa regional health bureau in hard copy and soft copy.

Result

Outbreak Description

A total of 106 acute Febrile illness cases with no deaths were identified during the outbreak period, of which 73(69%) were male and the rest were females. A team from Ethiopian Public Health Institute (EPHI) deployed to investigate and start investigation on 13/7/2017 in collaboration with regional PHEM.

The index case were not identified, because we can't determine the onset of the disease and we took the possible index case as the 1st case treated at the health facility.

For confirmation of the existence of the outbreak, 12 Samples were collected for serologic test and sent to EPHI lab. and 8 of them were positive for dengue fever with positivity rate of 67%, confirmed by RT PCR at EPHI laboratory, with dengue serotype II. A single suspected or confirmed case of dengue fever considered as outbreak. i.e the threshold is zero.

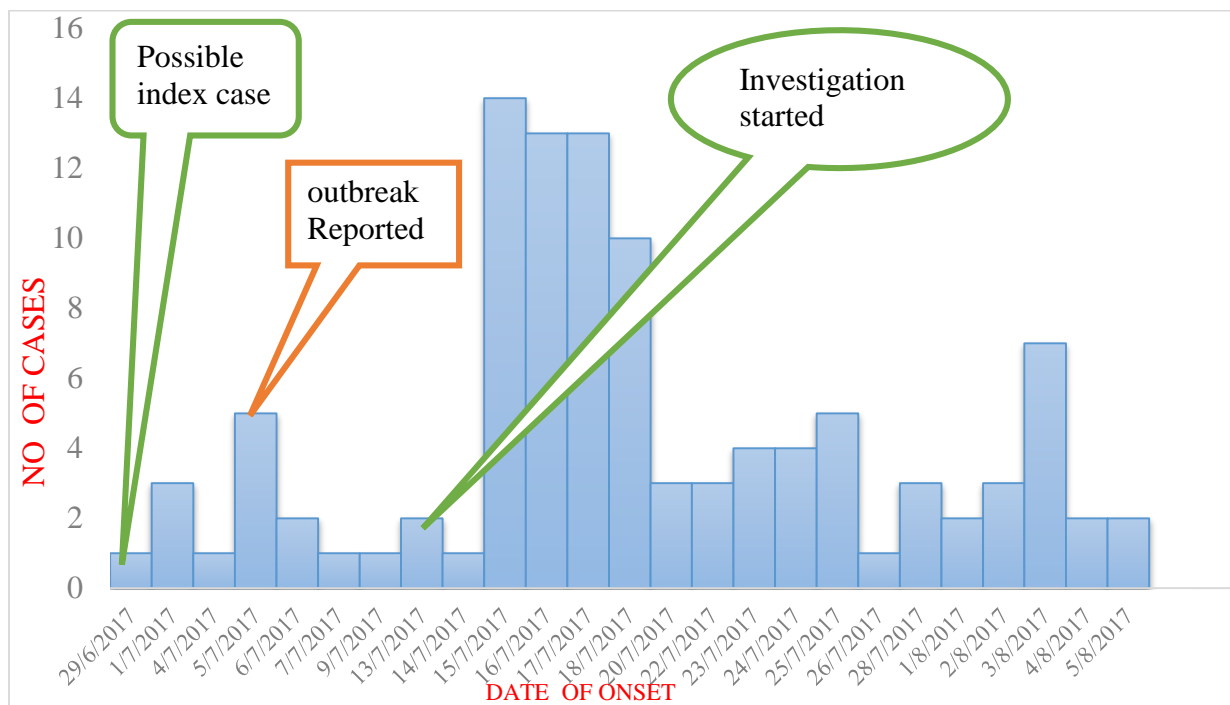


Figure 1:- Dengue Fever cases by Date of onset, Dire Dawa, August, 2017

The reported cases ranges from 29/6/2017 to 5/8/2017 and no case reported after August 8/2017, finally the outbreak is under control due to community awareness and environmental management activities.

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From all reported cases in both sex categorized age group were from 15-44 years was more affected (73%) The median age of the cases were 29 years with range of 2 years to 80 years.

The crude attack rate was 106/262,661 which is 0.4/100,000 population.

Table 1 :- Age and Sex Category of Dengue fever Cases, Dire Dawa, August, 2017

Age category	Sex			Total population		Crude AR/100	Age specific AR/100		Remark
	Male	Female	Total	Male	Female		Male	Female	
0 – 4	3	2	5	13,186	12,310	1.9	0.02	0.02	
5 – 14	13	3	16	28,786	28,494	0.03	0.45	0.1	
15 – 44	52	25	77	76,719	67,877	0.53	0.68	0.37	
45 ⁺	5	3	8	17,301	17,988	0.23	0.29	0.17	
Total	73	33	106	135,992	126,669	0.40	0.54	0.26	

One fourth of 27(25.5%) cases were reported from Dilchora hospital followed by the military hospital 25(24%). 19(18%) of cases were treated as inpatient and the rest were outpatient.

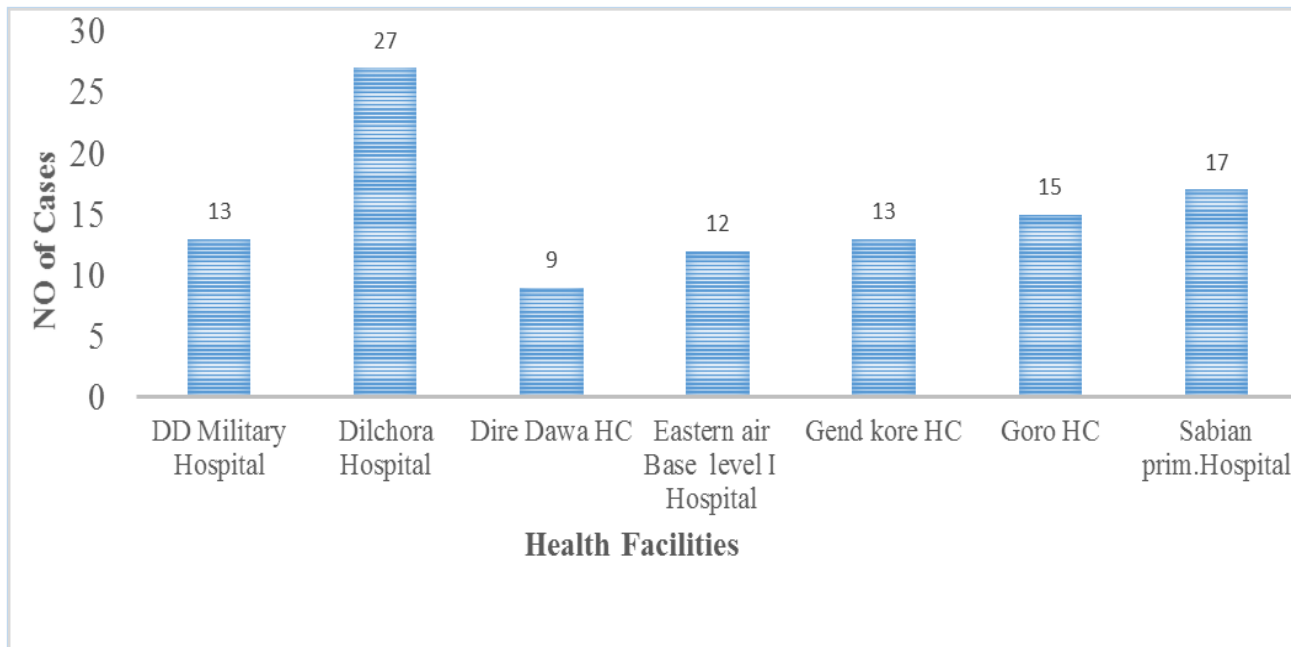


Figure 2:- Dengue Fever Cases by Health facilities, Dire Dawa, August, 2017.

Concerning the residence of cases, all cases are from urban setup. The highest cases were Reported from kebele 03, 52(49%), followed by kebele 04, 20(19%).

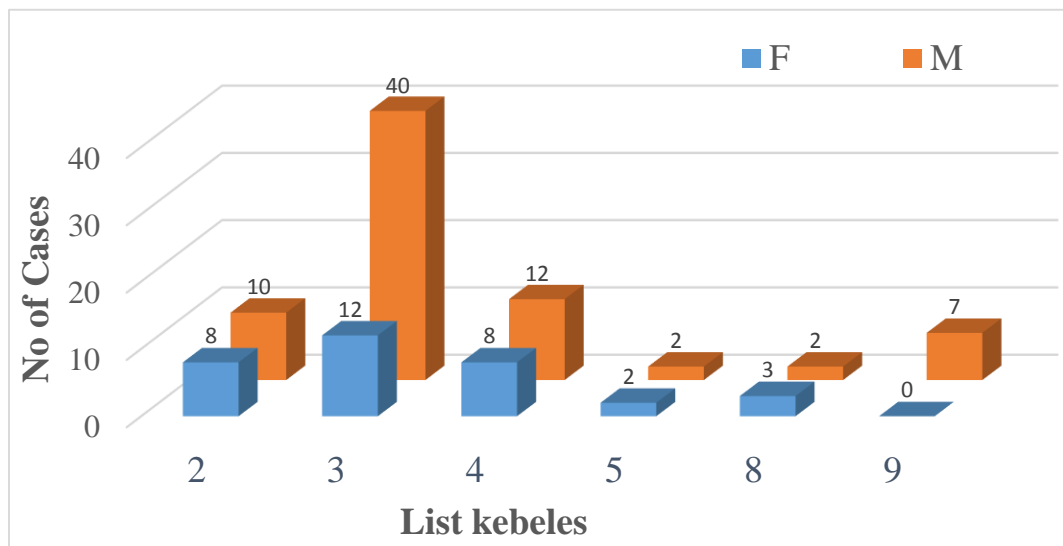


Figure 3:- Dengue Fever Cases by Kebeles, Dire Dawa, August, 2017

Analytic study

In bivariate analyses, 10 variables were initially screened and 5 variables were found to be associated with being a case or control i.e. ($p < 0.20$), which include, Sex, Not using nets, Aedes mosquito observed around home, House sprayed, Contact History, Dressing style.

No association found between the following variables; Age group, knowledge to dengue fever p.value; 0.452, 95% CI= (0.5 - 4.5), presence of stagnant water p.value; 0.282, 95% CI= (0.49- 10.14) and presence of container at home area p.value; 0.576, 95% CI=0.45 - 4.17). (Table 1)

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Table 2:- Results of bivariate analysis of the possible factors associated with the increased risk of dengue infection.

Variables	Category	Case(n=20)	Control (40)	COR(95% CI)	P.V
Age group	>44 yrs.	1(5%)	3(7.5%)	1	
	15-24 yrs.	10(50%)	11(27.5%)	2.7(0.2-30.7)	0.404
	25-34 yrs.	5(25%)	14(35%)	1.1(0.1-12.8)	0.956
	35-44 yrs.	4(20%)	12(30%)	1.0(0.1-12.6)	1.000
Knowledge	Poor	9(45%)	14(35%)	1.5(0.5 - 4.5)	0.452
	Good	11(55%)	26(65%)	1	
Sex	Male	18(90 %)	21(52.5 %)	1	
	Female	2(10 %)	19(47.5 %)	0.1(0.02 - 0.60)	0.004
ITN ownership	Yes	15(75%)	36(90%)	0.33(0.078 - 1.415)	0.125
	No	5(25%)	4(10%)	1	
Presence of stagnant water	Yes	4(20%)	4(10%)	2.25(0.49 - 10.14)	0.282
	No	16(80 %)	36(90%)	1	
Presence Water container around home	Yes	13(65%)	23(57 %)	1.37(0.45 - 4.17)	0.576
	No	7(35%)	17(43 %)		
Aedes mosquito observed around home	Yes	8(40%)	6(15 %)	3.8(1.1 - 13.1)	0.0309
	No	12(60%)	34(85 %)	1	
House sprayed	Yes	3(15%)	16(40%)	0.3(0.1 - 1.1)	0.0497
	No	17(85%)	24(60%)	1	
Contact History	Yes	8(40%)	5(12.50 %)	4.66 (1.27 - 17.04)	0.014
	No	12 (60%)	35(87.50 %)		
Dressing style	Trousers/body full dree	4(20%)	3 (7.50 %)	3.08(0.61 - 15.39)	0.155
	Short and t-shirts	16(80%)	37(92.50 %)		

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In multivariate analysis six variables were identified and three variables were association, such as being Female sex AOR = 0.10; 95% CI (0.01- 0.77) was protective factor and LLINs ownership AOR = 0.07, 95% CI (0.01 - 0.75) was independent risk factor.

House sprayed also a protective factor AOR= 0.1, 95% CI = (0.02- 0.71). Households who sprayed chemical was 2 times lesser likely (protected) to be bitten by mosquitoes.

Table 3:- Results of Multivariate Analysis of the possible factors associated with the increased risk of dengue infection.

Variables	Category	AOR	95% C.I.	P-Value
Sex	Female	<u>0.1022</u>	<u>0.01-0.77</u>	<u>0.0268</u>
	Male	<u>1</u>		
LLINs Owner ship	Yes	<u>0.0784</u>	<u>0.01-0.75</u>	<u>0.0274</u>
	No	<u>1</u>		
Presence of Aedes mosquito around the house	Yes	3.2873	0.56-19.18	0.1860
	No	1		
House sprayed chemical	Yes	<u>0.1163</u>	<u>0.02-0.71</u>	<u>0.0199</u>
	No	<u>1</u>		
Contact History	Yes	2.5673	0.48-13.86	0.2730
	No	1		
Dressing style	Trousers/body full dress	1.2632	0.16-9.79	0.8231
	Short and T-shirts	1		

Activities done during the outbreak and Response

- The team of Ethiopian Public Health Institute and Regional health biro were coordinated and made Active Case search, daily situation monitoring, control and prevention were done in all health facilities and kebeles.
- Health education and community awareness done on disease transmission, prevention and control.
- A broacher about dengue fever prepared in Amharic and distributed for health facilities, kebeles and community.
- House to house visiting done for 176 households by the team and health extension workers in order to search mosquito breeding site/risk factors.
- Distribution of line list, leaflet and guidelines to all health facilities.
- Day to day line list of cases at health facility and reports were received daily.
- All suspected and confirmed cases were managed by supportive treatment.
- We identified water caring containers like flower growing plastics, used tires, forests near houses, unempting water containers, were some of risk factors/favorable for breeding mosquito.

Discussion

In this outbreak reported cases were males which are more affected with in age group of 15-44 years. This finding agree with the study dengue fever outbreak North Kampala in 2012-2013 and a study in Eritrea from 2005-2015.

Being female is a protective factor because mostly females stay home and males work outside of home areas like in agricultural areas.

People who did use mosquito nets were more likely to be protective as compared to those who did not use mosquito nets (P.Value = 0.0274 ; 95% CI: 0.01- 0.75). House sprayed also a protective factor p.value, 0.0199 95% CI = (0.02- 0.71). Households who sprayed chemical was 2 times lesser likely (protected) to be bitten by mosquitoes. These findings were similar with the study in Pakistan from 2010 – 2011 and a study in Vietnam 2009-2010.

Insignificant association between presence of a member in the family who suffered from dengue fever (p-value = 0.273); dressing style (wearing body full dress/trousers or wearing half sleeves shirts (p-value= 0.823) and these finding were also similar with the study in Pakistan from 2010 – 2011.

The type dengue sero-type in 2013 were dengue 2 and the current also the same serotype. This show that it is endemic in Dire Dawa. However, epidemic Dengue Fever caused by all four genetically related but antigenically different serotypes are present in Africa since 1980, with 22 countries have local transmission, which is laboratory confirmed.

Conclusion

- ✓ There is an increase of Dengue fever outbreak which is circulating in Dire Dawa since 2013, affecting the productive age groups.
- ✓ From the report more of cases were males with age group of 15-44years.
- ✓ Cases were treated as inpatient, so fear of dengue hemorrhagic fever.
- ✓ More cases were reported from kebele 03 due to water bodies like unempty containers
- ✓ No detection of dengue fever at the regional level.
- ✓ High rate of lab positivity rate of dengue fever.
- ✓ House to house chemical spraying is essential to prevent the vector.

Recommendation

- Effective vector control program in the region should be established since there is no entomologist to study the behavior of species.
- Community awareness to empty water caring containers.
- The national lab strengthen the regional lab to detect dengue fever.
- Chemical spraying of houses specifically high risk kebeles like kebele 03.

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Annex 1. Questionnaire for Dengue Fever

No	Question	Coding Classification	Go To
1. Demographic Information			
	Kebele _____	House No _____	
1.1	Respondent ID	_____	
1.2	Sex	1.Male 2.Female	
1.3	Age	_____Years	
1.4	Marital Status	1. Single 2. Married 3. Divorced 4. Widowed 5.NA	
1.5	Educational status	1. Illiterate 2.Primary school 3. Secondary 4. College/University	
1.6	Ethnicity	1. Somali 2. Amhara 3. Oromo 4. Tigre 5. Other(specify)	
1.7	Occupation	1. Student 2. Daily laborer 3. House wife 4. Merchant 5.Farmer 6.Other(specify)-----	
1.8	Number of family members?	_____	
2. Clinical Information			
2.1	Respondent Classification	1. Cases 2. Controls	If Control skip to 4.1
2.2	Date of Onset	dd/mm/yyyy _____	
2.3	Sign and symptoms	1.Fever 2. Headache 3. Chill 5. Nasal Bleeding/bleeding from any part of the body 6. severe muscle and <u>joint</u> <u>pain</u> 7. Rash	

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No	Question	Coding Classification	Go To
		8. Restlessness/lethargy 9. Abdominal pain, Nausea/vomiting 10.Other(specify) dd/mm/yyyy _____	
2.4	Date seen at health Facility		
2.5	Treatment	Antibiotics _____ Antiviral _____ Antipyretics _____ Antimalarial _____ Other supportive treatment	
3. Laboratory Specimens			
3.1	Is sample taken for dengue Fever?	1. Yes 2. No	
3.2	Date sample collected?	_____/_____/_____	
3.3	Types of test done	1.RDT <input type="checkbox"/> +ve <input type="checkbox"/> - 2.ELISA Ve 3 RT-PCR <input type="checkbox"/> +ve <input type="checkbox"/> - Ve <input type="checkbox"/> +ve <input type="checkbox"/> - Ve	
3.4	Is malaria BF/RDT done?	1.Yes <input type="checkbox"/> +ve <input type="checkbox"/> - 2.No Ve	
4. Knowledge towards Dengue fever			
4.1	Do you hear about Dengue fever?	1.Yes 2.No	
4.2	If yes, what do you think the cause of Dengue fever?	1.Virus 2.Bacteria 3.protozoa 4.other_____ 5. Don't know	
4.3	Is Dengue fever Contagious?	1.yes 2.No 3. I Don't know	
4.4	If yes, how it transmit?	1.By mosquito 2. Air droplets 3.House fly 4.Other_____ 5. Don't know	
4.5	At which time mosquito bites people?	1. Night	

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No	Question	Coding Classification	Go To
		2. Day	
		3.Sunrise/sunset	
		4. I Don't know	
4.6	Does water required for mosquito to breed?	1.Yes	
		2.No	
		3. I Don't know	
4.7	Do you know symptoms of dengue fever?	1.Yes	
		2.No	
4.8	If yes what are the symptoms?	1.Fever	
		2. Headache	
		3. bleeding	
		4. Rash	
		5. Other(specify)_____	
5. Exposure			
5.1	Do you have LLINs?	1.Yes	
		2.No	
5.2	If Yes, do you use LLINs while sleeping?	1.Yes	
		2.No	
5.3	When did you get the last LLINs?	_____ Year	
5.4	Who use LLINs always?	1.Children	
		2.Women	
		3. All use equally	
5.5	Is there any water holding container in/around the house?	1. Yes	
		2. No	
5.6	Is there Aedes Mosquito larvae identified in the water containers in/around the house? Observe	1.Yes	
		2.No	
5.7	Are you usually around your home in the morning from 8-10am?		
5.8	Are you usually around your home in the afternoon from 4-6pm?		
5.9	Is there any stagnant water around your village?	1.Yes	
		2.No	
5.10	If Yes, approximately distance of stagnant water from your house?	1.less than 100m	
		2.more than 100m	
5.11	Is your house sprayed?	1.Yes	
		2.No	
5.12	When was the last time that your house sprayed?	1.One month ago	
		2.Two months ago	

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No	Question	Coding Classification	Go To
		3, Three months ago	
		4. More than three months	
5.13	Is there any river around your village?	1.Yes 2.No	
5.14	If Yes what is the name of the river?	_____	
5.15	Approximately distance of the river from your house?	1.less than 100m 2.more than 100m	
5.16	Is there any person diseased in your family?	1.Yes 2.No	
5.17	If Yes, how many family members become ill?	_____	
5.18	Did you have close contact with person with same complaint within the last 1 to 2 weeks?	1.Yes 2.No	
5.19	Did you have travel history within the last two weeks?	1. Yes 2. No	
5.20	If, yes to where?	_____	
5.21	Do you use air conditioning or window and door screens?	1.Yes 2.No	
5.22	Do you use mosquito repellents on your skin?	1.Yes 2.No	
5.23	Do you use mosquito repellent in your house?	1. Yes 2. No	
5.24	What kind of clothes you usually wear	1. Short and T-shirts 2. Trousers/ body full dress	

Thank you for your cooperation

Chapter 2 :- Outbreak Investigation of Typhoid Fever in Somali region, a Descriptive study, Ethiopia from March 6/2017 till March 20/2017.

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Abstract

Introduction:- Typhoid fever is a systemic infection caused by Salmonella Typhi is a communicable disease.

In Ethiopia in 2012, 24,030,746 patients visited health facilities for treatment. Of these cases 3% were typhoid fever patients and it was in the top ten list of morbidity. Among the total deaths 2% deaths caused by typhoid fever.

This study was carried out by the request of Somali Regional Health Bureau for investigation of the situation Ethiopian Public Health Institute (EPHI) deployed team comprised of two members on 6 March, 2017 and to investigate the existence of the outbreak, to identify risk factors with the outbreak and take public health control measures, in Somali region, Afder zone, Hargele district.

Methods:- we conduct a descriptive study were conducted from march 6 to march 20/2017 and data analysis made by using Microsoft excel data sheet and presented with descriptive epidemiology.

Result: - The threshold of typhoid fever is unusual increase of the cases or doubling of cases on subsequent weeks. Accordingly no case reported before this outbreak.

A total of 414 cases with 22 deaths (CFR= 5.3%) were identified during the outbreak. Most 242(59%) were females and the rest males. Four kebeles were affected with the outbreak. 90% of reported cases use the same source of water supply (Birka).

Conclusion: - Most of the community members affected by the contaminated water supply which were contaminated by different animals. Fencing and treating the water sources is essential and Community awareness to treat water at household level is mandatory.

Key words, Typhoid Fever, Outbreak, Risk factors, Hargele

Introduction: - Typhoid fever is a systemic infection caused by *Salmonella typhi* is a communicable disease.

Typhoid fever remains a major public health problem in the third world countries, especially in severe health problem in developing countries including our country. The disease is unique to human, characterized by malaise, fever, headache, abdominal discomfort (constipation or diarrhea), transient rash, splenomegaly, hepatomegaly, slow heart rate, cough, vomiting, hypotension and leucopenia, the most common major complications are intestinal hemorrhage and perforation.(1)

Infection with *Salmonella enterica* serotype *Typhi* causes an estimated 20 million cases of typhoid fever and 200,000 deaths annually worldwide. In the United States, typhoid fever is now a rare disease, with about 400 laboratory-confirmed cases reported per year. (2)

In Ethiopia in 2012, 24,030,746 patients visited health facilities for treatment. Of these cases 3% were typhoid fever patients and it was in the top ten list of morbidity. Among the total deaths 2% deaths caused by typhoid fever (3).

This study was carried out by the request of Somali Regional Health Bureau for investigation of the situation Ethiopian Public Health Institute (EPHI) deployed team comprised of two members on 6 March, 2017 and investigate the outbreak and carried out to access the disease burden in Somali region, Afder zone, Hargele district.

Objectives

General objective

- ✚ To investigate the existence of the outbreak, Identify Risk Factors Associated with the outbreak and undertake appropriate public health control measures in Somali region, Hargele district.

Specific Objectives

- ✚ To verify the existence of Typhoid Fever outbreak in Somali region, Afder zone, Hargele district.
- ✚ To describe the magnitude and distribution of the outbreak in terms of person, place & time.
- ✚ To conduct environmental assessment(to take environmental samples like water/food)
- ✚ To identify risk factors and undertake prevention and control measures for the outbreak
- ✚ Recommend corrective actions for preventing further epidemics in the area.

Methods and Materials

Study Area: - The study was conducted in Hargele woreda, Afder zone, Ethio Somali region, which is located at a distance of 1400 km far from Addis Ababa and 766km from Jigjiga.

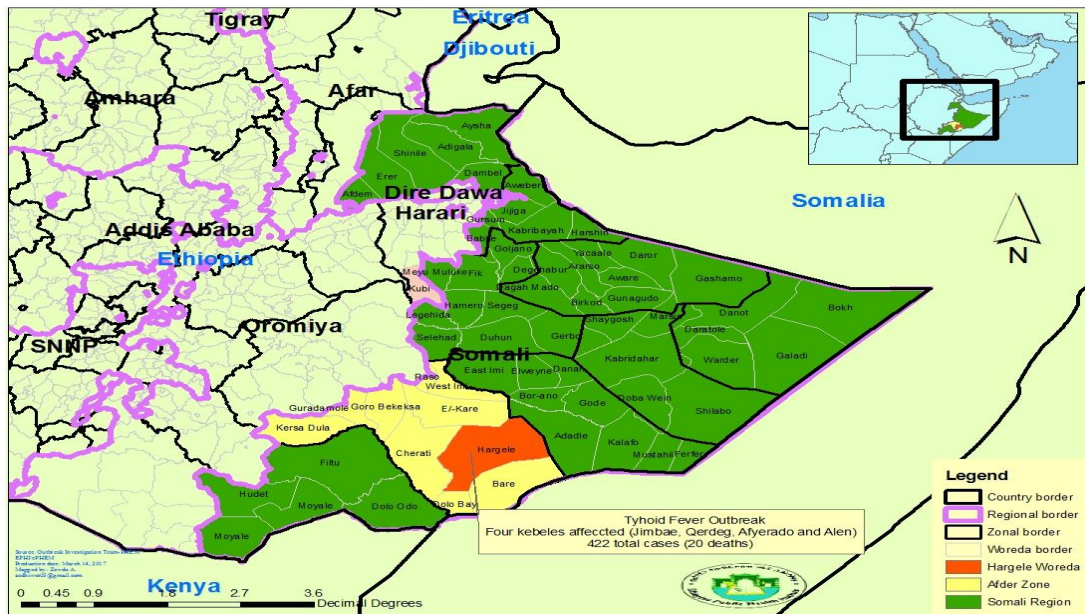


Figure 4:- Administration map showing Typhoid fever Outbreak Affected woreda, somali, Ethiopia, March 2017

The district has 20 kebeles (4 urban and 16 rural) with total population of 99,781 (49,891 Male and 49,890 Female). Regarding to the health facilities of the district, the district has one Primary hospital, 2 Health centers, 25 Health Posts and 3 Drug venders. In the district there are 65 health workers found in the district.

Study Period: - The study was conducted from March 6/2017 till March 20/2017

Study Design: - We conducted a descriptive retrospective study.

Sampling: - Standard PHEM case definitions were used to detect Typhoid fever:-

Suspected case definition

Any person with gradual onset of remittent fever (rising in step ladder fashion) in the 1st week, headache, arthralgia, anorexia, constipation and abdominal pain.

All cases that fulfilled the case definition were included in the study.

Data Collection Method

OPD registration book, medical card of individual patient in health centers, Hospital were reviewed to observe if the cases were treated based on case definition. Active case search were conducted in all health facility and kebeles for other similar cases in the community.

Data analysis

Data were analyzed using Microsoft excels for descriptive data analysis. Results were displayed with tables and graphs.

Ethical consideration

An official letter was written from Ethiopian Public Health Institute (EPHI) to Somali region health bureau to conduct the investigation and the regional health bureau to zonal and woreda.

Result dissemination

The results of this study will be distributed to AAU/ School of public health department of field epidemiology training program, Ethiopian Public health Institute (EPHI), Somali Regional health bureau in hard copy and soft copy.

Result

Outbreak Description: - An outbreak of unknown cause was identified by Health Extension worker and notified to Hargele district health office on 09 February, 2017. The cases were presented with a complaint of vomiting of ingested matter, high grade fever, headache, arthralgia, nausea, vomiting, fever, constipation and abdominal pain.

They all have history of drinking water from the same water source that was distributed by Islamic Relief by trucking system. None of the case had history of attending any gathering ceremony, contact with individuals with the same complaint and did not have any travel history. The majority of cases were reactive for Widal test.

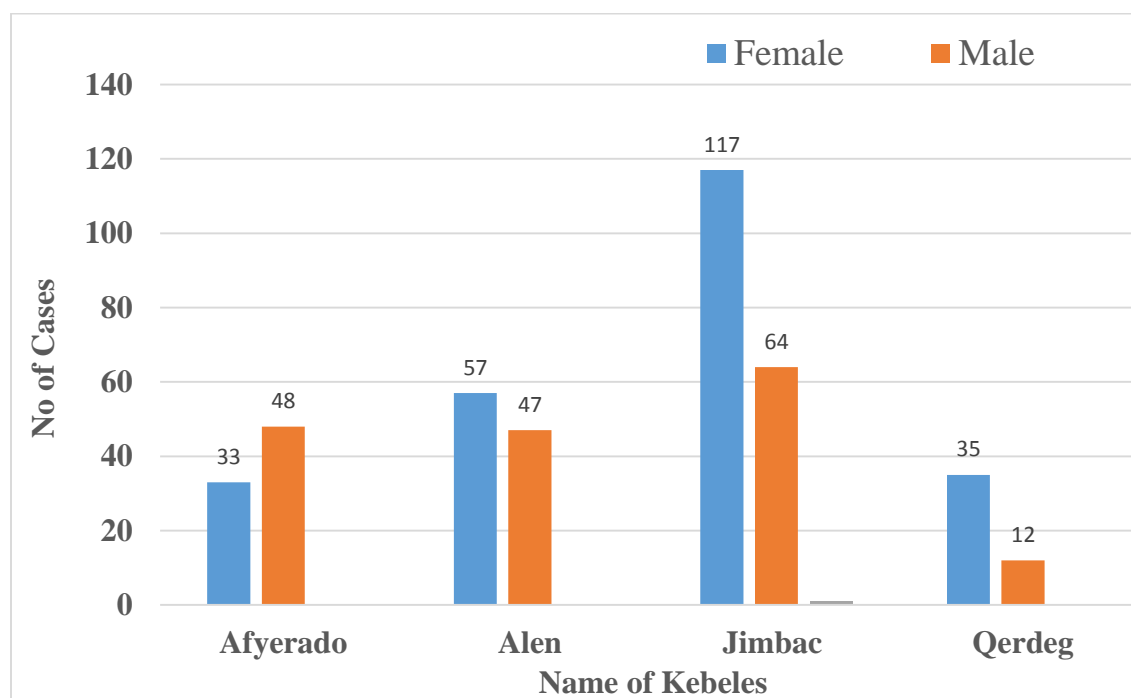


Figure 5:- Typhoid Fever Outbreak Cases by Kebeles, Somali, Afder, Hargele district, March 2017.

A total of 414 (242 female and 172 male) individuals were affected by the outbreak with 22 deaths (CFR=5.3%) probably attributed to the outbreak. A total of four rural kebeles were affected namely: Jimbae, Qerdeg, Afyerado and Alen. The highest number of cases, 43% (182/422) and deaths of 55% (12/22) were reported from Jimbae kebele.

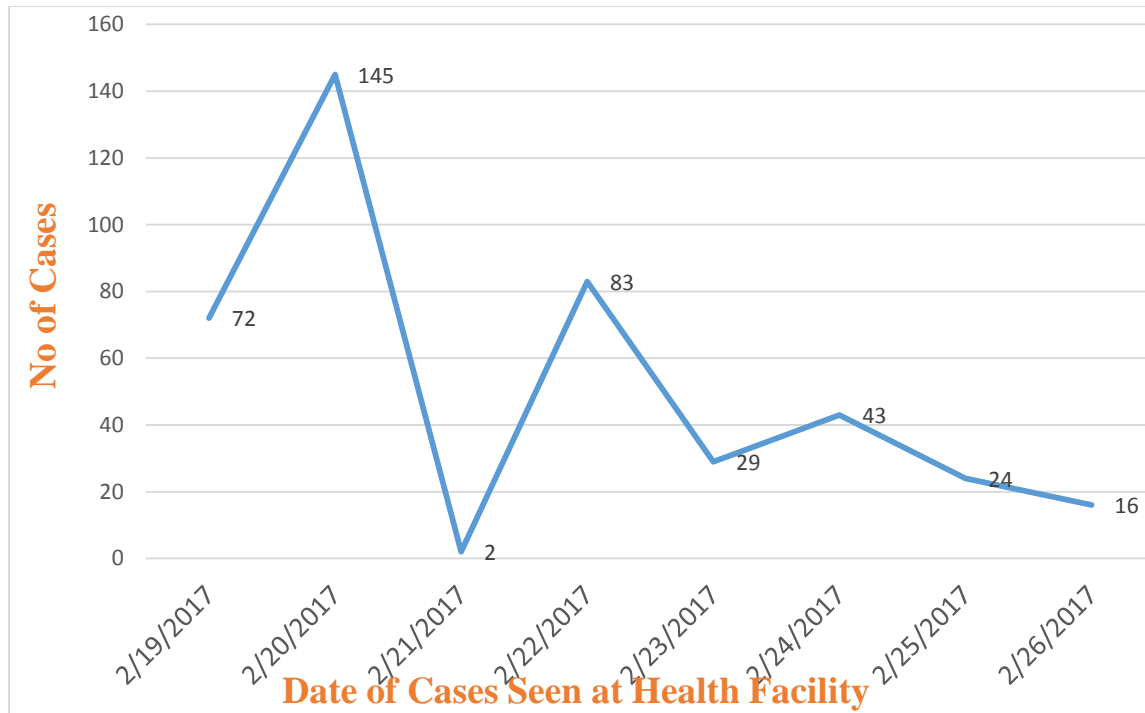


Figure 6:- Date of Cases seen at health facility, Somali, Afder, Hargele, March 2017

Most of the cases were seen at the health facility in the 2nd date (20/2/2017) of the occurrence of outbreak followed by the 4th date. The occurrence of outbreak were sharply increasing and subsequently decrease and finally ended on 26/2/2017, due to the community do not use the specified water sources.

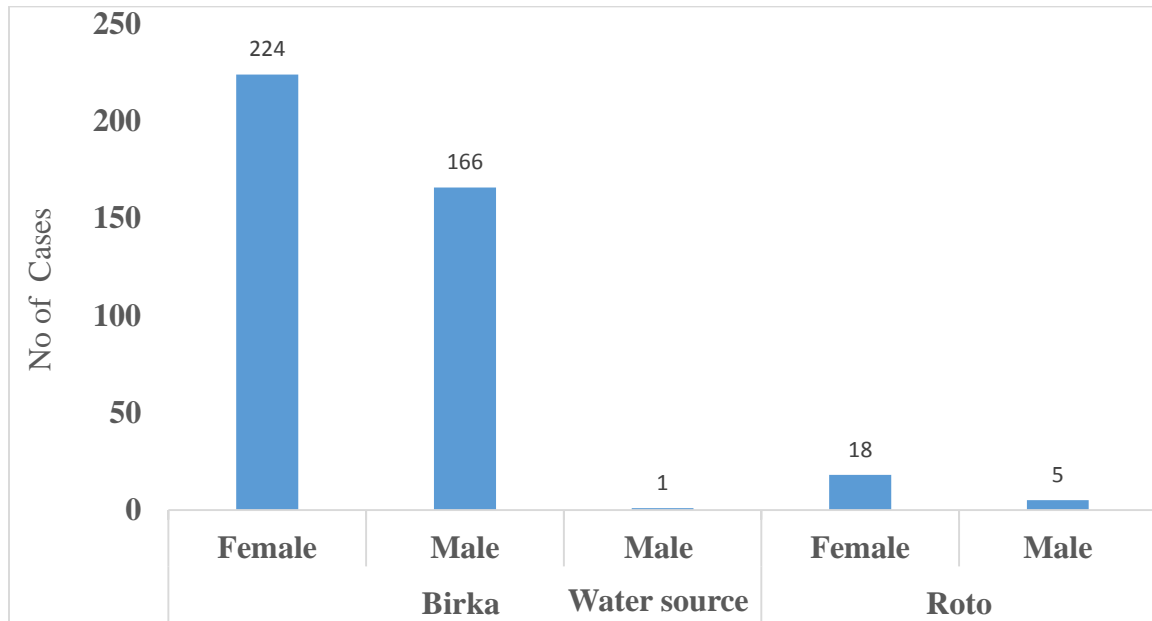


Figure 7:- Water Supply source, Somali, Afder, Hargele, March 2017

The source of water supply the community use almost above 90% use from the same source (Birka).

Concerning the clinical finding of cases, most of them with have had headache, arthralgia, nausea, vomiting, fever, constipation and abdominal pain.

Other Activities done

- ✓ Water samples were collected from different points and sent for micro bacteriological analysis at EPHI national lab and the result were the samples have coliform (fecal contamination) and E.coli were identified from all water samples, which is an indicator for the presence of other waterborne micro-organisms such as Salmonella, Campylobacter and Shigella Species.
- ✓ For culture we sent three stool samples and tested at EPHI microbiology laboratory but the samples were not grown on culture for bacterial pathogens most probably due to patients were on antibiotics for five days prior to sample collection.
- ✓ The disease is clinically verified as Typhoid Fever Outbreak.
- ✓ There were no new cases for the last two weeks, i.e. the outbreak has contained.

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- ✓ Active case searching and social mobilization activities are done through the affected kebeles.
- ✓ Dam water sources were disinfected before distribution by the regional water authority and the community.
- ✓ Day to day follow up at all kebeles were done by the team.
- ✓ All other health posts and health centers were alerted for the situation.
- ✓ Distribution from Hargele Dam water source was prohibited and water in the storage point (“Birka”) in the community and households were discarded not to be consumed and the Islamic relief local NGO distribute safe water by trucking system.
- ✓ Bishangari was distributed for household water treatment.

Table: - Result of water samples collected at different sites of Hargele district, March 2017.

	Sample collection sites					
	Hargele Dam Corner A	Jinbac kebele Birka water source	Hargele Dam Corner B	Jinbac kebele	Hargele Dam Corner A	Acceptable Limit
Heterotrophic plate count	*TMC	*TMC	*TMC	*TMC	*TMC	
Coliform Count (MPN/100ML)	>180	>180	>180	>180	>180	
Fecal Coliform count (MPN/100ML)	>180	>180	>180	>180	>180	<i><1MPN/100M L</i>
E.coli	Present	Present	Present	Present	Present	Absent
V. cholera	Not Isolated	Not Isolated	Not Isolated	Not Isolated	Not Isolated	Absent
Potability	Bacteriologically Not Potable	Bacteriologically Not Potable	Bacteriologically Not Potable	Bacteriologically Not Potable	Bacteriologic ally Not Potable	

N.B: *TMC: Too much bacterial colonies to count

Discussion

Most of the cases have had the same clinical finding presented with a complaint of vomiting of ingested matter, high grade fever, headache, arthralgia, nausea, vomiting, fever, constipation and abdominal pain.

Almost more than 90% of cases use the same source of water supply (Birka) which makes them common. The majority of cases were reactive for Widal test.

A total of four kebeles were affected by the outbreak with a total of 414 individuals and 22 deaths (CFR=5.3%) probably attributed to the outbreak.

Most of the cases were treated in health facility level. The occurrence of outbreak were sharply increasing and subsequently decrease and finally ended on 26/2/2017, due to the community use alternative water sources.

Most of the community members do not treat water at house hold level, this also difficult to keep the water clean.

The water samples collected and tested for microbiological analysis show significant contamination with coliform (fecal contamination) and E.coli, which is an indicator for the presence of other waterborne micro-organisms such as Salmonella, Campylobacter and Shigella Species. The disease is clinically verified as Typhoid Fever Outbreak.

Conclusion

Most of the community members affected by the use same source of water supply.

All of the cases show the same clinical finding and the disease is clinically verified as Typhoid Fever Outbreak.

Most of the community members do not treat water at house hold level, this also difficult to keep the water clean.

Microbiological water sample analysis show significant contamination of water supply by different species of microorganisms.

Most of the cases were treated in health facility level. The outbreak is ended due to the community use alternative water sources.

Recommendation:

- ✚ Community health education about water treatment at household level and hygiene measure should be strengthened by the woreda health office and health facilities.
- ✚ Regular water quality testing should be done at risk places, like household, dam, Birka...
- ✚ Disinfection of water sources at regular basis should be done.

Reference

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Chapter 3. Rubella Surveillance Data Analysis of Amhara Region, Ethiopia from 2007 to 2016.

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Abstract

Introduction: Rubella is a mild self-limited viral illness which shares similar symptoms of rash and fever with measles infection. Rubella usually occurs during childhood, but infection occurring just before conception and during early pregnancy may result in miscarriage, fetal death, or congenital defects of newborns known as Congenital Rubella Syndrome (CRS). In Ethiopia, though Rubella is not part of the integrated disease surveillance, negative samples from case based measles laboratory surveillance were undergo test for rubella. This data analysis was conducted to describe the distribution of cases by person place, time and make recommendation.

Methods: Ten years data (2007- 2016) of Rubella disease which was reported through measles case based surveillance system for laboratory confirmation of Measles and turned out negative were collected from January 15 to February 15/2017 from measles data base of Ethiopian Public Health Institute in one line the type of laboratory procedure followed to detect IgM of rubella.

Result: - From a total of 4,024(52.4%) were tested for rubella specific IgM antibody and 594 (14.8%) were positive, 3,128 (77.7%) were Negative and 302 (7.5%) were Indeterminate result. Among the positives, 300 (50.5%) were females and 29 (10%).

The status of Rubella case load vary from 2007 to 2016 and the highest pick in 2013 and lowest in 2009. Annually, increments in the number of cases were observed from March to April.

Conclusion: - The disease is widely distributed throughout all zones of Amhara region. For further understand the burden and epidemiology of Rubella sentinel surveillance should be established in Amhara region.

Key words: - Measles, Rubella, Surveillance.

Introduction

Rubella is a viral illness caused by the family toga virus of the genus Rubi virus which shares similar symptoms of maculopapular rash and fever with measles infection; however up to 50% of rubella infections are subclinical and are sometimes misdiagnosed as measles or scarlet fever. Children usually develop few or no constitutional symptoms, but adults may experience a 1–5 day prodrome of low-grade fever, headache, malaise, mild coryza, and conjunctivitis. Post auricular, occipital and posterior cervical lymphadenopathy is characteristic and precedes the rash by 5–10 days. Humans are the only known host for rubella. (1)

Rubella is transmitted from person to person by droplet or direct contact which replicates in the mucus (nose and throat) of infected persons and spreads by direct contact with susceptible hosts through droplet sprays (nasopharyngeal secretions) during coughing and sneezing and also congenital rubella syndrome (CRS) is transmitted vertically(trans placental) from an infected pregnant woman to her fetus occurring before 20 week of gestation with an average incubation period of 16 to 18 days and infectivity is between seven days before and seven days after the onset of the rash. The infection is vaccine preventable. Both vaccine and natural infection result in life long immunity (1).

The highest risk of CRS is found in countries with high rates of susceptibility to rubella among women of child bearing age. Rubella occurs worldwide in non-vaccinated population with varying incidences of outbreaks (1, 2).

Rubella is of greatest danger to the unborn fetus. Up to 90% of infants born to mothers infected in the first trimester will develop the physical anomalies referred to as congenital rubella syndrome (CRS). CRS is characterized by any of a number of complications and findings, including blindness, heart defects, deafness, behavioral disorders, mental retardation, growth retardation, bone disease, enlarged liver and spleen, thrombocytopenia, and purple skin lesions.(3)

WHO reports reveal that a minimum of 100,000 cases of CRS occur annually worldwide, which makes rubella a leading cause of preventable congenital defects. The Congenital Rubella Syndrome burden is highest in South East Asia approximately 48% and African regions approximately 38% (2).

The importance of rubella derives not from acquired disease, which is usually mild, but from the potentially devastating effects on the fetus that can occur when a pregnant woman is infected with rubella, especially if the infection occurs early in pregnancy. Rubella virus can be transmitted vertically from mother to fetus, causing the spectrum of congenital anomalies that define Congenital Rubella Syndrome. (3)

Statement of the Problem

Rubella has similar clinical presentation with suspected measles case which is fever and rash. However rubella is milder than measles and also 20-50% of rubella infection do not have rash, as a result, measles case based surveillance system may not detect all rubella cases. The public health importance of rubella is due to the teratogenic effects when rubella infection is acquired in the early months of pregnancy. Rubella infection of the fetus can result in fetal death or in the birth of an infant with serious congenital birth defects. (1)

The widespread circulation of rubella virus in Africa was confirmed through the measles case-based surveillance system and documented by several sero prevalence studies. Prevention of rubella through vaccination is largely unavailable in Africa despite the >80% routine measles vaccination coverage achieved by more than one-third of countries in the region. As of October 2010, only 2 countries (Mauritius and Seychelles), in the region have introduced rubella vaccine into their national immunization program. (8)

In Ethiopia information on rubella and congenital rubella syndrome (CRS) epidemiology is very limited and it is not notifiable disease with no surveillance system established. However currently rubella cases were detected through case-based laboratory surveillance system, designed to detect measles and the case definition of Measles has provided an opportunity for detection of rubella specific IgM antibody among persons with rash illness who are Negative and Indeterminate for measles IgM and support the diagnosis and the documentation of Rubella cases in our setup. (4).

The congenital rubella syndrome (CRS) is an important cause of blindness, deafness, congenital heart disease, and mental retardation. Rubella is vaccine preventable disease; the vaccine is available since 1969. However rubella vaccine has not yet been introduced in to Ethiopia, the absence of this vaccination in infants and young children helps the continuous circulation of the disease and exposure of pregnant women to the disease. Besides, information regarding Rubella and CRS is very limited and the WHO Measles and Rubella Laboratory Network has recommended the collection of rubella genotypic data to support the global control and elimination program(CDC,2005).Therefore, to carry out this study is essential to describe the epidemiology of rubella in Amhara regional state and provide information for policy makers to take appropriate action.

Literature Review

Rubella virus infection is transmitted by respiratory droplets and causes a generally mild disease characterized by a rash and fever, primarily in children. However, infection in women during early pregnancy may cause fetal death or congenital rubella syndrome (CRS) in the infant. CRS is a significant cause of deafness, blindness, congenital heart disease, and mental retardation; although precise burden of disease is unknown, it is estimated that 110,000 CRS cases occur each year in developing countries (11)

WHO recommends that countries without rubella vaccination programs should assess the burden of rubella and CRS. Integrated case-based surveillance with laboratory testing to detect measles and rubella is recommended in countries with an established measles elimination or rubella control goal. In Africa, several countries have conducted subnational rubella sero prevalence surveys; however, none has established routine surveillance for CRS and little is known about rubella in Africa (11)

A report on rubella antibody prevalence in tropical Africa showed wide variations in seropositivity in women of child-bearing age in different countries. In The Gambia, Ethiopia, Upper Volta and Uganda, 93% or more had acquired antibody by the age of 14. In Nigeria, Ghana and Togo, however, 25-50 % of women of child-bearing age were without antibody. Rubella infection was widespread and endemic on the African continent, that means outbreaks were occurring without recognition and that there were probably many more cases of CRS than those reported.(7)

A study conducted about the Rubella Epidemiology in Africa in the Pre-vaccine Era, from 2002–2009, data from measles case based surveillance collected and reported by 40 African countries shows that Rubella sero positivity ranged from 68% – 98%, and varied by age group. During 2002–2009, 180,284 suspected measles cases were reported; of these, 105,625 had a specimen sent for laboratory testing to detect rubella-specific IgM antibody. Among those tested, 25,631 cases (24%) were confirmed as rubella, 70,218 (66%) had Negative test results, 4677 (4%) had Indeterminate test results, and 5099(5%) were unknown with pending results. (8)

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A study conducted in South west Nigeria shows, 10,354 suspected measles cases were investigated following blood specimen collection for confirmatory laboratory testing and 8046(77.7%) were tested for rubella-specific IgM antibodies. Of the 8046 cases tested, 438 (5.4%) were laboratory-confirmed as rubella, 7310(90.9%) were negative and 262 (3.3%) were Indeterminate results. The distribution of cases ranged in age from 3 months to 56 years, with a median age of 4 years. The majority (87.3%) of cases were individuals < 15 years of age and 40.9% were Females. The seasonal variation were from January-April, May-August and September-December. (12)

A study conducted in Democratic Republic of Congo (DRC) on Epidemiology of Rubella Infection showed that from 2004 – 2013 time period 11,733 serum samples were analyzed for the presence of rubella IgM and 2,816 (24%) were positive for rubella IgM, 8,447(71.9%) were negative, and 470(4%) had indeterminate results for rubella IgM, the number of rubella IgM positive cases increased from 73 in 2004 to 766 in 2013. (14)

A study in Ethiopia conducted from 2009-2015 shows that a total of 28,284 samples were received and tested for measles IgM antibody. Of these samples, 17,066 were Negative and indeterminate samples tested for rubella virus specific IgM and 2,615 (15.3%) were positive for rubella IgM, 12,904(75.6%) Negative and 1547(9%) indeterminate results and the findings of Amhara region in the same period of time were from total of 3099 collected samples, 500 were positive, 2312 Negative and 287 were indeterminate results. (11)

Amhara region administratively divided into 11 zones and further sub-divided into woredas and kebeles and the 2nd most populous next to Oromia region in the country. In the region the epidemiology of Rubella not compiled and reported before. Therefore this study describes the epidemiology of rubella disease from the case based surveillance system of measles in terms of person, time and place of the region specifically and recommends public health intervention action to be taken.

Objective

General Objective

To analyze the data and describe the magnitude of Rubella by Time, place and Person over the period of 2007 to 2016 in Amhara Region, Ethiopia.

Specific Objective

- ✚ To analyze and interpret the surveillance data in terms of time
- ✚ To analyze and interpret the surveillance data in terms of place
- ✚ To analyze and interpret the surveillance data in terms of person
- ✚ To make recommendations based on the findings

Methods and Materials

Study Area: - Rubella surveillance data analysis of Amhara regional state based on the report of measles case based specimens sent to the EPHI (National level) for laboratory confirmation of measles and become Negative and Indeterminate for measles.

Study Period: - Ten years from 2007- 2016 rubella surveillance data, samples collected from Amhara regional state health department were analyzed and interpreted from January 15/2017 till February 15/2017.

Study Design: - Descriptive retrospective cross sectional study, to assess the trend of rubella in Amhara region.

Study Unit: - All case based reported specimens sent for measles and registered on the national data base which are Negative and Indeterminate result for measles but positive, Negative, Indeterminate for rubella.

Sample Size: - All Negative and Indeterminate cases for measles were tested for rubella on the data base were included, by extracting data from measles data base.

Data Analysis and Presentation

Data Cleaning: - Before data analysis, data were checked and reviewed for consistency and completeness and incomplete data were excluded like missed age, sex, status of rubella.

Data Analysis: - Data were analyzed using micro soft excel data sheet (pivot table) by extracting the data from measles data base system. Data consistency were assured throughout data collection, entry and analysis.

Data Presentation: - Data were presented using descriptive statistics (Graphs, tables, charts, percentages).

Ethical Consideration: - An official letter were written to EPHI from Addis Ababa University School of public health in order get the necessary documents and do the surveillance data analysis part and the data were secondary data generated from routine case-based surveillance as part of Integrated Disease Surveillance System and Response and did not have contact with any of the human subjects.

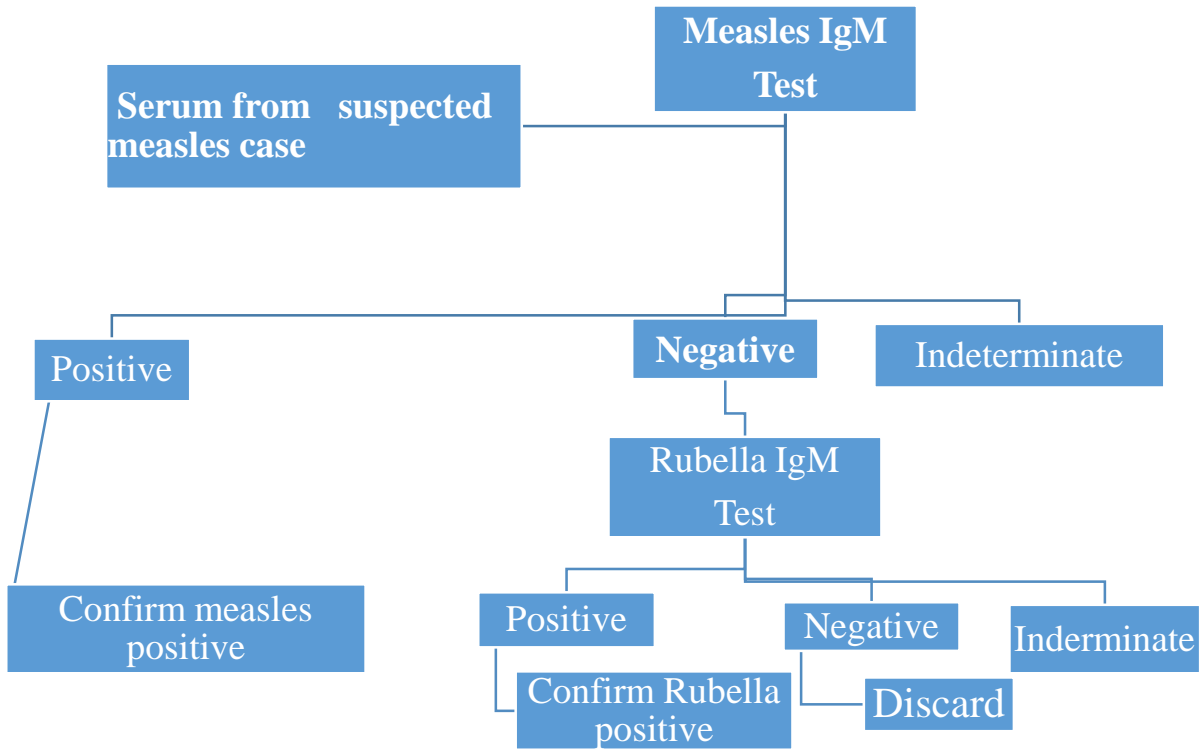


Figure 8:- Laboratory Testing of Rubella Serum Specimen Procedure

Result

1.1. Analysis and Interpretation of Rubella Data by Time: - From the year 2007- 2016 a total of 7,673 case based suspected measles cases were investigated with blood specimen obtained for confirmatory laboratory testing of measles at National level. Of these, 4,024(52.4%) were tested for Rubella specific IgM antibody and 594(14.8%) were positive, 3,128(77.7%) were Negative and 302(7.5%) were having Indeterminate result. Line listed for measles on data base were not included (5,982 cases) (Table 1).

Table 4: Laboratory Result for Rubella IgM Antibody Testing of Suspected Measles Cases, Amhara Region, 2007– 2016

Suspected Measles cases		Rubella IgM Tested			IgM Positive		IgM Negative		Indeterminate
Year	No	No	%	No	%	No	%	No	%
2007	415	272	6.8	31	11.4	226	83	15	5.5
2008	508	425	10.6	38	8.9	364	85.6	23	5.4
2009	612	446	11	14	3.2	418	93.7	14	3.1
2010	1164	477	11.9	26	5.5	412	86.4	39	8.2
2011	745	218	5.4	16	7.3	178	81.7	24	11.0
2012	785	478	11.9	83	17.4	342	71.5	53	11.1
2013	1,114	784	19.5	297	38	400	51	87	11.1
2014	1,094	305	7.6	33	10.8	242	79.3	30	9.8
2015	551	234	5.8	14	6	205	87.6	15	6.4
2016	685	385	9.6	42	10.9	341	88.6	2	0.5
Total	7,673	4,024	100	594	14.8	3,128	77.7	302	7.5

Note: positivity rate = the number of IgM positive /Rubella IgM tested *100

The reported cases of Rubella from measles case based report were vary from year to year. This show rubella were occurred in epidemic pattern.

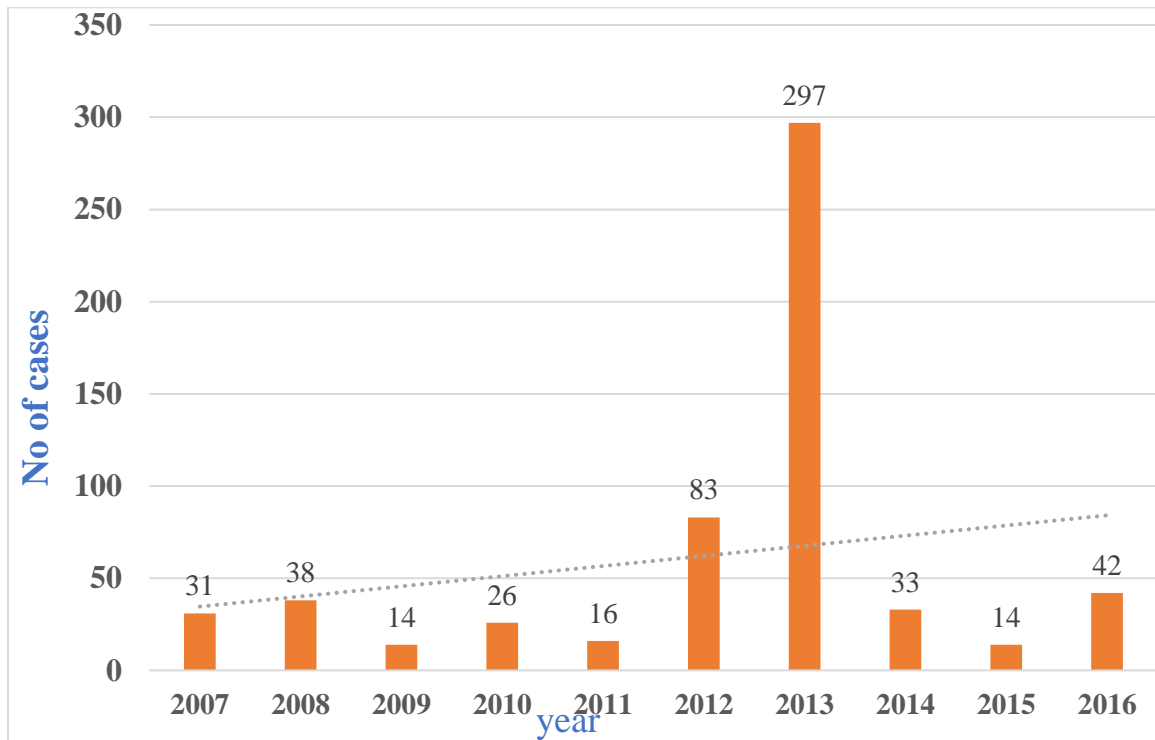


Figure 9:- Trends of Rubella Confirmed Cases, Amhara, 2007- 2016

1.2. Analysis and Interpretation of Rubella Data by Person: -

Most reported cases were in the age category of 5-14 years in both sex and decline as age increases.

10% of reported cases were in the reproductive age group. This show if they exposed during pregnancy the may develop congenital Rubella syndrome (CRS).

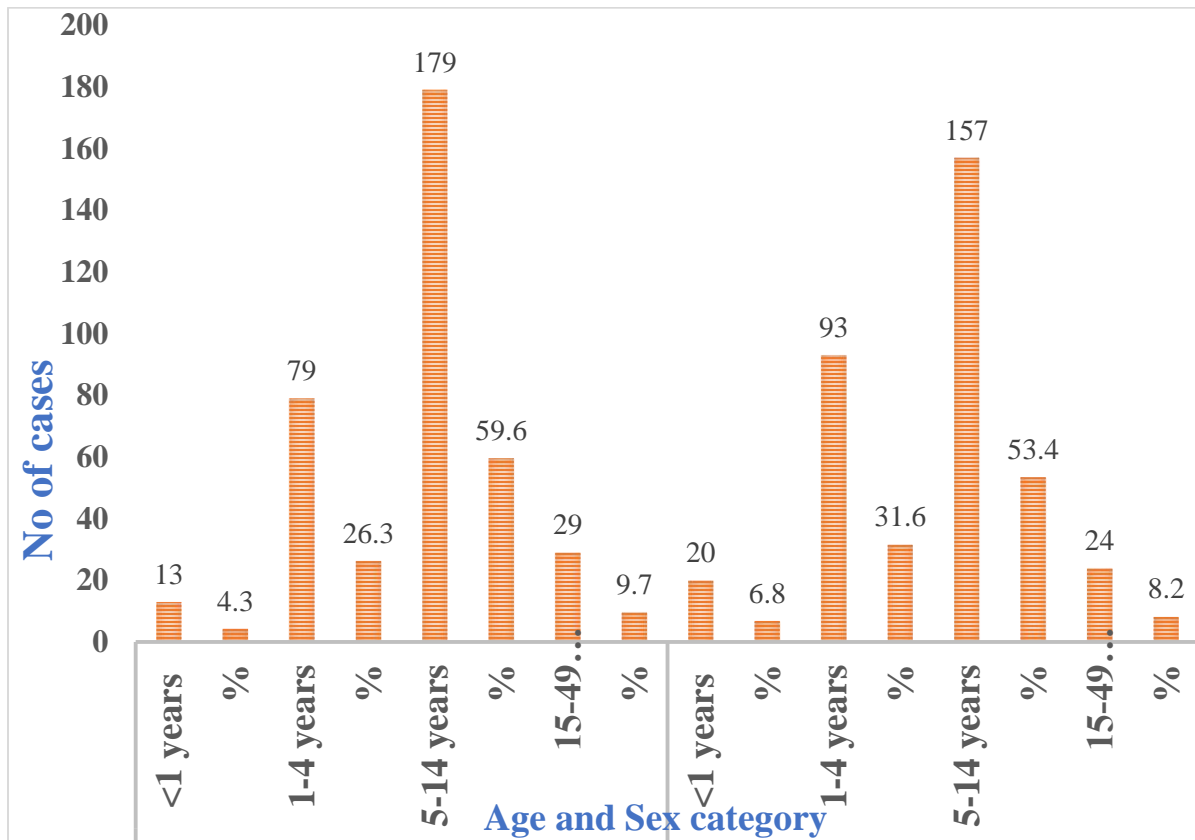


Figure 10:- Distribution of Rubella IgM Confirmed Cases by Age Category, Amhara, 2007- 2016

1.3. Analysis and Interpretation of Rubella Data by Place: - During the time from 2007 to 2016 the most of the reported cases were from South Wello, East Gojjam and North Gondor respectively. The least reported zones were Wag Himra and Gondor Town.

Table 5:- Rubella IgM Confirmed Cases by Zones, Amhara, 2007-2016.

Year	Rubella IgM Positive by Zones of Amhara Region												Total
	Awi	Bahir Dar	East Gojjam	Gonder Town	North Gonder	North Shewa	North Wello	Oromia	South Gonder	South Wello	West Gojjam	Wag Himra	
2007	2	10	1	0	10	1	3	1	0	3	0	0	31
2008	0	9	5	0	1	1	2	1	1	11	7	0	38
2009	0	2	2	0	4	0	0	0	0	4	2	0	14
2010	0	2	3	0	6	6	1	1	4	3	0	0	26
2011	0	0	2	0	1	2	3	1	1	6	0	0	16
2012	1	4	14	0	10	7	3	6	13	17	8	0	83
2013	13	11	72	7	21	12	14	12	31	62	38	4	297
2014	1	0	3	0	1	1	5	11	1	5	5	0	33
2015	1	0	1	0	2	3	2	4	0	0	1	0	14
2016	0	0	0	0	20	11		3	0	5	2	1	42
Total	18	38	103	7	76	44	33	40	51	116	63	5	594

Regarding the cases residence of location classified by urban and rural setting were available for all rubella confirmed cases and majority of cases were from rural with 421(71%) and 173(29%) of cases were from Urban areas.

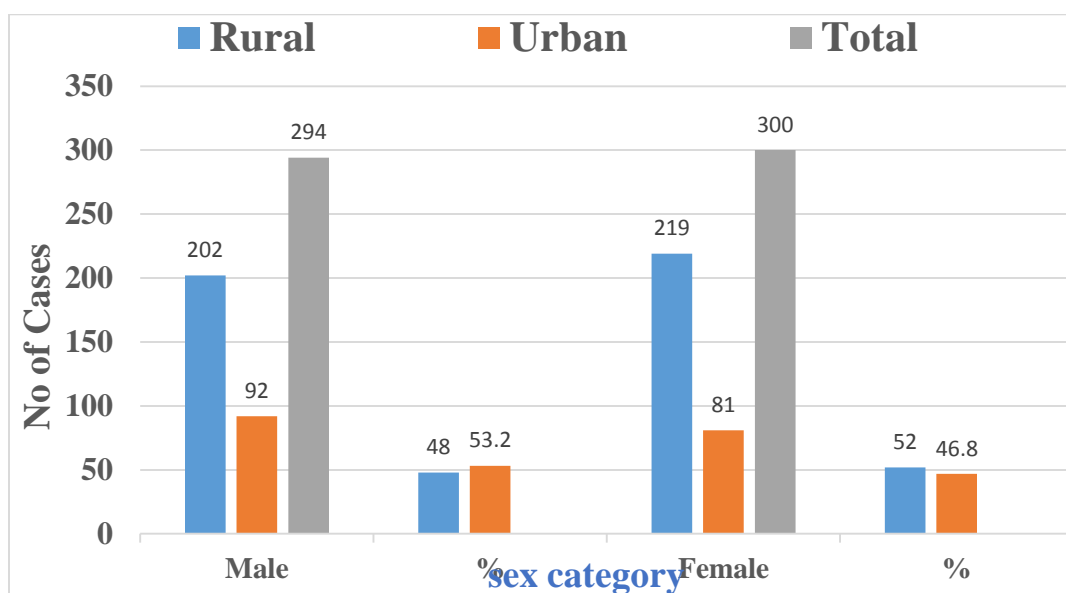


Figure 11:- Rubella IgM Confirmed by Place of Residence, Amhara, 2007- 2016

Discussion

During the ten years period a total of 4,024 (52.4%) were tested for rubella specific IgM antibody and 594(14.8%) were Positive 3,128(77.7%) were Negative and 302(7.5%) were having Indeterminate result. This finding were differ from the study conducted in Africa in the pre-vaccine era 2002 - 2009 and similar with the study in Ethiopia from 2009 -2015. (8, 10, 11).

During the ten year period among confirmed 521(87.7%) were <15 years and 300(50.5%) were females with 29(9.7%) were reproductive age group (15-49 years). This finding were similar to study conducted in Ethiopia 2004 -2009 and also similar to study in Democratic Republic of Congo. However this might give an indication for the possible risk of CRS in Ethiopia but there is data limitation to describe the burden of CRS in the country. (10, 14)

The reported cases of Rubella from measles case based report were vary from year to year. This show rubella were occurred in epidemic pattern.

The detection of Rubella from measles case based report were vary from year to year. Rubella were occurred in epidemic pattern in subsequent years. This study similar finding with a study conducted in Ethiopia from 2009-2015.

Regarding the cases residence of location classified by urban and rural setting were available for all rubella confirmed cases and majority of cases were from rural with 421(71%) and 173(29%) of cases were from Urban areas. This may be because of lack of health infrastructure and awareness of families to child health. This findings were similar to study conducted in Ethiopia from 2004-2009. (10).

These result should be considered with several limitations, Rubella cases were detected through a surveillance system designed to detect measles and the case definition used to detect measles cases which is fever and rash and at least one of the three symptoms and signs (cough, coryza, and conjunctivitis) were used to identify rubella cases but 20- 50% of cases with rubella infection do not develop rash therefore this cases might be missed, in addition based on Measles guideline specimen is not collected from all suspected measles case during an outbreak.

Conclusion

Rubella is primarily common in young children's below the age of 15 years. Most of the rubella report were from South Wello, East Gojjam and North Gondor respectively.

Congenital Rubella syndrome (SRS) were not analyzed due to absence of data on the measles data base.

Line listed of measles cases were not included due to lack of variables like classification of case.

Recommendation

- No separate Data to know the epidemiology of Rubella in our country, need of separate reporting system.
- Line listed cases were not known whether they are rubella or not, so to ensure mixed epidemic of rubella and measles we have to samples from all.
- Sentinel surveillance is need in the region more to know the burden.
- The measles case based surveillance system cannot show the burden of Rubella in the region.
- Separate surveillance system or system integrated with measles but with more sensitive to catch both measles and rubella cases is essential.

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Chapter 4. Evaluation of malaria surveillance system in North Gondor Zone, Amhara Region. March 15 - 30/2018

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Abstract

Introduction: - Malaria is a leading health problem in Sub-Saharan Africa. In Ethiopia, malaria is one of the leading causes of morbidity and mortality and it is endemic in most parts of the country with an altitude less than 2,000 meter. Amhara region is one of malaria affected region and North Gondor zone (East Dembia and Gondor Zuria woreda are among malaria affected woredas and the surveillance system had never been evaluated. Therefore, this evaluation carried out to determine whether the objectives of the surveillance system are being met.

Objective: - To assess key attributes of malaria surveillance and to evaluate the surveillance system is meeting its objective and identify possible gaps for improvement in the surveillance system of malaria in North Gondar Zone.

Methodology:-The evaluation was carried out in two woredas of 18 purposively selected health facilities. A cross sectional descriptive study design was employed from March, 15-30/2018. Information on system attributes were collected using semi structured questionnaire. The surveillance system was evaluated according to CDC guideline for surveillance system evaluation.

Result: - All health facilities analyzed malaria data using malaria monitoring chart which detect change in malaria cases and determined malaria morbidity and mortality. Completeness and timeliness were 95% and 97% respectively. The positive predictive value was 58.6%.

Conclusion: The malaria surveillance system is able to detect change in malaria cases and outbreak. The surveillance system is simple, flexible and acceptable to health facilities. But it is not stable and the positive predictive value should be improved.

Key words: Malaria, Surveillance System, Evaluation, North Gondar Zone.

Introduction:- Surveillance, a core function of public health practice, is defined as “the ongoing, systematic data collection, analysis, interpretation of health data, timely information dissemination to those who need to know and act upon that information, application of information to public health programs which is essential to the planning, implementation and evaluation of public health practice for action to reduce morbidity, mortality, improve health of the community and providing a basics for research and so on.(1, 2)

Disease surveillance is essential for early detection of outbreaks, epidemics and pandemics in order to initiate timely response and also it is essential to evaluate or monitor progress of ongoing interventions targeted for disease reduction.

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 and the system focus on how well the system operates to meet its purpose and objectives(1)

Malaria is a life threatening parasitic disease transmitted by mosquitoes. The parasite transmitted from person to person through the bite of female anopheles mosquito which is the most prevalent in Africa. The agent transmitted was found a one celled parasite called plasmodium species. (5)

There are four types of human malaria, Plasmodium falciparum is the most widespread in sub Saharan Africa while P.Vivax, P.Ovale and P.malariae infections are less common and geographically restricted (4).

About 90% of all malaria deaths in the world today occur in Africa south of the Sahara. This is because the majority of infections in Africa are caused by Plasmodium falciparum, the most dangerous of the four human malaria parasites. It is also because the most effective malaria vector the mosquito Anopheles Gambiae is the most widespread in Africa and the most difficult to control. An estimated one million people in Africa die from malaria each year and most of these are children under five years old (4).

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Malaria is Africa's leading cause of under-five mortality and contribute to 10% of the continents overall disease burden. It accounts 40% of public health expenditure, 30-50% of inpatients admissions and up to 50% of outpatient visits in the area with high malaria transmission. (5)

Malaria is a leading public health problem of sub Saharan Africa. In Ethiopia it is one of the leading causes of mortality and morbidity and it is endemic in most parts of the country with an altitude less than 2,000 meter.

In Ethiopia malaria is highly seasonal in many communities but may have nearly constant transmission in some other areas. Peak malaria transmission occurs between September and December in most parts of Ethiopia after the main rainy season from June to August and second minor malaria transmission period from April to June, following a short rainy season from February to March. (6)

Amahara region has many malaria affected areas and North Gondor zone (East Dembia and Gondor Zuria woreda are among malaria affected woredas and the surveillance system had never been evaluated. Therefore, this evaluation carried out to determine whether the objectives of the surveillance system are being met.

Rationale of the study

A well-functioning disease surveillance system is critical to measure the burden of a disease/ health-related event, identification of populations at high risk and new or emerging health concerns to the health system, in providing evidence-based information for planning, implementation, monitoring trends in the burden of a disease and evaluation of public health intervention programs to prevent and control disease, injury, or adverse exposure, evaluate program performance, prioritize the allocation of health resources, describe the clinical course of disease; and stimulate for epidemiologic research(1,3).

The purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively. Public health surveillance systems should be evaluated periodically, to assess the quality, efficiency, efficacy, usefulness and gap of the existing system to improve the surveillance system. (1)

Malaria is the leading causes of morbidity and mortality in Amhara region and the main health problem. In North Gondar Zone the number of malaria and were higher than other zones of the region and second top ten disease of health facilities of the zone in this year. Specifically East Dembia and Gondar zuria woredas. In addition in both woredas the Surveillance system had not been evaluated previously. Therefore, this study was conducted to evaluate the functionality of the surveillance system and to identify the gap for better improvement of the surveillance system.

Objectives

General objective

The aim of this study was to assess key attributes of malaria surveillance and to evaluate the surveillance system is meeting its objective and identify possible gaps for improvement in the surveillance system of malaria in North Gondar Zone.

Specific objectives

- To assess core surveillance activities such as case detection, reporting, analysis and Response in North Gondar Zone.
- To evaluate the attributes of the surveillance system of malaria in North Gondar Zone.
- To assess the usefulness of surveillance system in early detection of diseases and outbreaks and decreasing morbidity and mortality.
- To identify gaps in the malaria surveillance system and forward recommendations for improvement.

Methods and Materials

Study Area and Population

The study was conducted in Amhara region, North Gondar zone. The zone is located in North East part of Amhara Regional State. The zone has a total population of 3,439,837 and 14 woredas of which the study was conducted in two woredas (East Dembia and Gondar Zuria woredas). These woredas were selected for their accessibility and burden of malaria cases.

Study Design and Period

A cross sectional descriptive study design was employed from 15 March to 30/2018.

Sample Size and Sampling Technique

From the region North Gondar zone was selected based on burden of malaria cases compared with other zones of Amhara region. Then with the zonal health office two woredas (East Dembia and Gondar Zuria woredas) were selected based on the burden of malaria cases and accessibility of health facilities.

From East Dembia, woreda health office, 1 primary hospital, 3 Health centers, 3 Health posts and from Gondar zuria woreda health office, 4 Health centers, 4 Health posts were selected.

Study units

The study units were zonal and woreda health offices and health facilities. A total of 18 study sites were included in the study, which includes governmental 1 primary hospital, 7 health center, 7 health posts, 2 woreda health offices and 1 zonal health office were included in the study.

Data collection method and procedure

Primary data was collected using a semi-structured questionnaire, discussions and observation check-list and interviewed surveillance officers and malaria/Anthrax focal persons and health institution PHEM focal. Secondary data sources such as surveillance report, completeness and timeliness, supervision report, written feedbacks, preparedness plans were also reviewed.

The CDCs updated guidelines for evaluating public health surveillance system 2001 was used as a framework for the evaluation to achieve the stated objective of the study.

Data analysis

The collected data were entered and analyzed using Microsoft Office Excel 2007.

Ethical clearance

An official letter was written from Ethiopian Public Health Institute to Amhara region PHEM and the region wrote to the zonal health office and from zonal to respected woredas and the woreda to health post level for their participation.

Operational Definitions

Terms used in the evaluation were as follows:-

- ✚ **Case detection:** is the process of identifying cases and outbreaks.
- ✚ **Case registration:** is the process of recording the identified cases.
- ✚ **Case/outbreak:** Confirmation: refers to the epidemiological and laboratory capacity for confirmation.
- ✚ **Reporting:** Refers to the process by which surveillance data moves through the surveillance system from the point of generation.
- ✚ **Epidemic preparedness:** Refers to the existing level of preparedness for potential epidemics.
- ✚ **Stakeholders:** The organizations or individuals that generate or use surveillance data for promotion of health, prevention and control of diseases.
- ✚ **Usefulness:** Refers to the relevance of the system in terms of feeding information for action.
- ✚ **Simplicity:** The simplicity of a public health surveillance system refers to both its structure and ease of operation as a 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.
- ✚ **Data quality:** Is the completeness and validity of the data recorded in the public health surveillance system.
- ✚ **Stability:** Refers to the reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system.
- ✚ **Acceptability:** - Reflects the willingness of individuals and institutions to participate in the surveillance system.
- ✚ **Sensitivity:** refers to the capacity of the system to detect true cases or outbreaks through trends in the surveillance data.

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- ✚ **Positive predictive value:** Is the proportion of reported cases that actually have the health-related event under surveillance.
- ✚ **Representativeness:** Is the ability of the system to describe health events accurately in terms of time, place and person.
- ✚ **Timeliness:** Is the ability of the system to trigger appropriate action in time.
- ✚ **Completeness:** Proportion of all expected data reports that were submitted to public health surveillance.

Result

Amhara Region North Gondar zone surveillance system of 18 health facilities were assessed. The main focuses of the evaluation was the core activities, supportive functions and quality components of the surveillance system.

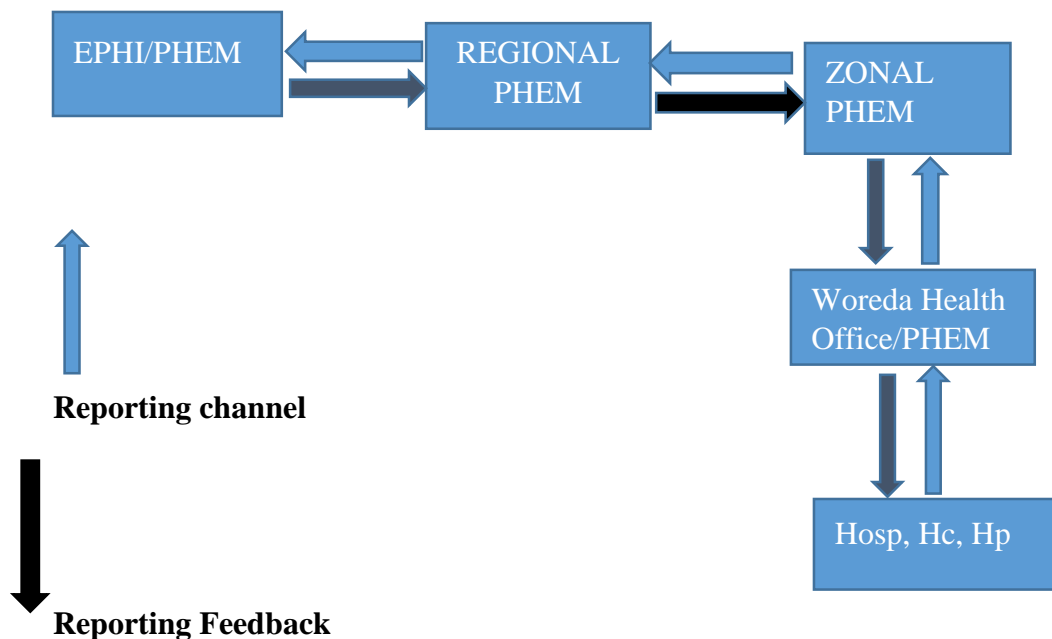


Figure 12:- Flow Chart of the Surveillance Reporting System and Feedback of North Gondar zone

Importance of the Surveillance System of Malaria

In North Gondor from total land mass around the 3/4 is malarious area and about 78% of the zonal population is at risk of infection. Zonally from July 2017 to March 2018, a total of 294,871 cases were tested for malaria. Of these, 172,749(59%) were confirmed malaria and the rest 122,122 (39%) cases were screened and treated clinically. From the total malaria 2,878(1.7%) cases were admitted and treated as inpatient.

Population under Surveillance

The population under surveillance were all population in the selected hospital, health centers and health posts. Community participation on surveillance system and detection of disease were through health extension program.

Case Detection, Registration and Data Reporting

In all visited health facilities the standard case definition of malaria were available and diagnoses using the standard case definition. But line list were present only at woreda and zonal level. In health posts community case definition were available and posted in 71% of health posts. Health extension use surveillance guideline for detection of cases of malaria.

Case definition for Malaria

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

Confirmed: A suspected case confirmed by microscopy or RDT for plasmodium parasites.

All of the health facilities had clinical case registration log book and correctly register cases. Monthly reports of number cases submitted to next level coincides with clinical register log book.

A shortage of Weekly reporting formats were encountered in 5(28%) of health facilities within the last six month period.

In both woredas the reporting entities were Public health facilities, there is no private and NGO health facilities which report to woreda PHEM. The reporting rate within the past 12 months for Health center was 90% and for health post 85%. The reporting rate for the zone was 98%. Reports were sent to the next level through paper, telephone, mail and mobile texting.

Data Quality

Data quality was assessed for the completeness of surveillance data. The completeness key variables like total malaria, suspected malaria cases and type of species was assessed for missing of variables and it was 95%.

Data Analysis

In all visited hospital, health centers and health post malaria data were analyzed only in time basis using malaria monitoring chart by surveillance focal persons and health extension workers.

In woreda and zonal level data were analyzed by time and place and data were utilized to monitor action threshold which is crossing the normal line or doubling of cases compared to the same weak of the previous year for planning.

Epidemic Preparedness and Response

In both woredas and zone there is an epidemic preparedness plan. In health centers and hospital there is written case management protocol for malaria and no shortage of necessary drugs and supply for epidemic management.

All health facilities implemented malaria prevention and control measure based on surveillance data. Both woredas and zonal PHEM, have written emergency preparedness plan. Health centers and hospital have Rapid Response Team (RRT).

There was no outbreak of malaria encountered since last five years. In case of any emergency, the woreda, the zonal PHEM in collaboration with region mobilize budget for response activity.

Training

In all visited health facilities at least two staffs were trained on disease surveillance and epidemic management by Regional Health Bureau, zonal health office. But high turnover of trained staffs were seen in 4 health centers out of 7 health facilities, training is essential to strengthen the surveillance system.

Resources used to operate the surveillance system

All health centers have necessary laboratory equipment's for diagnostic purpose and health posts have Rapid Diagnostic Test (RDT).

One health center without electric service. Woredas, Health centers and hospital had electric service, motorcycle, telephone, stationary, computer, printer, no software for data analysis, no internet connection.

Concerning information education and communication all health facilities had no posters, flipcharts. Three health centers had generators, TV set, megaphone.

All of the health posts had no the above resources except stationary materials. Malaria and PHEM guideline were available in 4 health centers, woreda and zonal level. Integrated Refresher Training (IRT) manual were present in 4 health posts.

Surveillance system attributes

Usefulness

The surveillance system of Malaria help to detect outbreaks early and able to determine the magnitude of the disease for planning and intervention. The malaria monitoring chart which is posted in all health facilities shows weekly malaria cases with threshold detect epidemic.

Simplicity

In all health facilities the case definition, structure and ease of operation of malaria is known by all health facility professionals and simple, easy to understand for case detection.

Data collected on malaria was not time consuming. It took less than 10-15minutes to fill the format or paper based and register the cases.

Acceptability

The reporting agents accept and well engaged with the surveillance activities. The reporting of health posts is 85%, health centers 90% within the past 12 months. The case definition and reporting system/tools were acceptable by all health facilities.

Representativeness

The representativeness of the surveillance system was assessed by health seeking behavior for the disease and health service coverage.

In North Gondor Zone a total of 10 Hospital, 126 HC and 570 HP are available so the health service coverage is 93%. Malaria is the common disease and one of the ten top disease in the zone and the population has good health seeking behavior for the disease.

Sensitivity

Sensitivity in surveillance refers to the proportion of actual cases in a population that are detected and notified through the system. But this couldn't be measured as the total number of persons with the disease in the community was not ascertained.

Timeliness

Data of malaria is always ready for planning purpose and timeliness of weekly report sent to next level on time was 97%.

Completeness: The completeness assessed by missing variables like total malaria, in the reported data and completeness for health facilities were 85% and woreda and zonal were 95%.

Stability

No any new restructuring affect the procedures and activities of malaria surveillance. However weekly report collected by health post and health center and communicated to woreda is with own phone call. This phone charge not compensated by the system. When trained surveillance focal person in health center and hospital leave the position there will be difficulties in data collection and reporting. No allocated fund for surveillance except for outbreak response from government or non-governmental organizations.

Flexibility

The current reporting format used is more flexible to accommodate newly occurring health events. A change in the existing procedure of case detection, reporting and formats is difficult to adapt.

Feedback and supervision

In visited health facilities from woreda health office written feedback were given at least three times per last six months based on the data they provided and the written feedback was 60%. But there is inconsistencies and documentation problems.

At the zonal level supportive supervision to woredas were conducted four times within the past six months. The woredas had at least three supportive supervision for health facilities during the past six months. 60% of health centers and hospital have got supportive supervision three times from woreda health office and health centers supervise 40% of health posts twice per last six months.

Discussion

Surveillance is a systematic collection, analysis, and interpretation and dissemination of health and health related events for public health action. The main objective of the surveillance system is for early detection of outbreaks and take timely appropriate action. Accordingly North Gondar Zone met its objective.

A surveillance data should be analyzed by person, time and place and summarized using appropriate descriptive epidemiology. In visited health centers, hospital and health post the data is analyzed only by time to monitor epidemic with comparing to expected normal level of incidence. This may limit the health facilities not to prevent early and control activity in the area.

Feedback helps to improve quality of surveillance system. It is possible to give feedback by supervision, newsletter, bulletin etc. In the assessed woredas feedback were given to respective health facilities by letter and verbal as well as phone. The feedback was written to improve the reporting and some gap. But it has to include data analysis, trend of disease over time.

The feedback and supervision were inconsistency and not scheduled.

Concerning data quality the completeness and timeliness of reporting of the woredas and zone were in good condition and it is better from year to year.

Training is a key for improvement of surveillance system. In visited health facilities training were given for surveillance focal persons. But some of them were shifted to other activities or left the health facility.

Conclusion

The north Gondor zone malaria surveillance system is able to detect changes in malaria cases and outbreaks by doubling method and comparing cases through time of the same season.

Malaria data were analyzed/plotted weekly by malaria monitoring chart.

Generally, the surveillance system is simple, flexible and acceptable to all health facilities but it is not stable and the positive predictive value should be improved.

Recommendations

- ✓ Training should be given to all health facilities specifically for untrained surveillance focal persons on basic epidemiology.
- ✓ Information, Education, communication materials is needed in all health facilities.
- ✓ Consistent supportive supervision should be strengthened for quality of surveillance system.
- ✓ Community case definition should be available for those not have the case definition (29% of health facilities).

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Annex 4 malaria surveillance Evaluation Questionnaire

A. Health Office Level Questionnaire

Date_____ Region_____ Zone_____ District/town_____

Interviewer_____ Respondent_____

General

Location_____

Bordering areas: North_____ South_____ West_____ East_____

Latitude_____ Longitude_____ Altitude_____

Total population_____ male_____ female_____ <5

Health institution number:

Hospitals_____ health center_____ health posts_____ private
hospitals_____ private clinics_____ drug stores_____

Human power

General Practitioners_____ health officers_____ nurses_____ midwives
_____ supportive staff_____ surveillance officers_____

Health coverage_____

1. Availability of National Surveillance Guidelines

Observed presence of a national guideline for surveillance? 1. Yes 2. No

1. Case Detection and Registration

2.1.Observed presence of the standard case definition for malaria:

1. Yes 2. No

2.2.Observed the weekly reporting forms:

1. Yes 2. No 3. NA

2.3.Observed line list (general/customized for malaria outbreak):

1. Yes 2. No 3. NA

3. Data reporting

3.1. Is the central level responsible for providing malaria surveillance forms to the health facilities? 1. Yes 2. No

3.2. If yes, have you lacked appropriate surveillance forms at any time during the last 6 months?

1. Yes 2. No

3.3.If yes, list the form lacked_____

3.4. What are the reporting entities for the malaria surveillance system?

- a. Public health facilities 1. Yes 2. No
- b. NGO health facilities 1. Yes 2. No
- c. Military health facilities 1. Yes 2. No
- d. Private health facilities 1. Yes 2. No
- e. Others_____ (specify)

3.5. Number of weeks of malaria report sent to the upper next level in the last 3 months:_____

3.6.Number of malaria weekly reports received on time in the last three months:_____

3.7.How do you report malaria report to next upper level?

1. Mail 2. Fax 3. Telephone 4. Radio 5. Electronic 6. Other_____ (specify)

4. Data Analysis

4.1.Does the health office:

a. Describe malaria data by person?

Observed description of data by age and sex:

1. Yes 2. No

b. Describe malaria data by place?

Observed description of data by tables, maps

1. Yes 2. No

c. Describe malaria data by time?

Observed description of data by time:

1. Yes 2. No

d. Perform malaria trend analysis?

Observed line graph of cases by time:

1. Yes 2. No

e. Do you use threshold for malaria

1. Yes 2. No

f. Which threshold setting method are you using?

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1. Doubling method 2. Second largest 3. Others (specify)_____
- f. Who is responsible for the analysis of the collected malaria data?
- _____

g. How often do you analyze the collected malaria data?

1. Daily
2. Weekly
3. Every two weeks
4. Monthly
5. Quarterly
6. As needed

h. Do you have appropriate denominators for malaria?

Observed presence of demographic data (E.g. population by kebeles and age groups)

1. Yes
2. No

5. Outbreak Investigation

5.1. Have you ever encountered malaria outbreak in the last six months

1. Yes
2. No

5.2. If yes, how many of the malaria outbreaks were investigated in the last six months _____

5.3. Of the investigated malaria outbreaks in the last six months, percent in which findings were used for action _____ [Observe report]

6. Epidemic preparedness

6.1. Existence of plan for malaria epidemic preparedness and response

Observed a written plan of malaria epidemic preparedness and response:

1. Yes
2. No

6.2. Does the malaria EPRP have budget set-aside?

1. Yes
2. No

6.3. Existence of emergency stocks of drugs and supplies at all times in last six months

- | | | |
|-----------------------|--------|-------|
| 1 Chloroquine tablets | 1. Yes | 2. No |
| 2 Chloroquine syrup | 1. Yes | 2. No |
| 3 AL tablets | 1. Yes | 2. No |
| 4 AL dispersible | 1. Yes | 2. No |
| 5 Quinine tablets | 1. Yes | 2. No |

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- | | | | |
|----|---|--------|-------|
| 6 | Rectal Artisunate | 1. Yes | 2. No |
| 7 | Malaria epidemic monitoring charts | 1. Yes | 2. No |
| 8 | Quinine tablets | 1. Yes | 2. No |
| 9 | Quinine injection | 1. Yes | 2. No |
| 10 | Microscope slides and functional microscope | 1. Yes | 2. No |
| 11 | Slide's rack | 1. Yes | 2. No |
| 12 | Lancets | 1. Yes | 2. No |
| 13 | Safety box (to dispose of used lancets) | 1. Yes | 2. No |
| 14 | Timer | 1. Yes | 2. No |
| 15 | Giemsa stock solution | 1. Yes | 2. No |
| 16 | Immersion oil | 1. Yes | 2. No |
| 17 | Cotton wool | 1. Yes | 2. No |
| 18 | Alcohol denatured | 1. Yes | 2. No |
| 19 | First-line insecticide | 1. Yes | 2. No |
| 20 | LLINs | 1. Yes | 2. No |
| 21 | Temephos 50% EC | 1. Yes | 2. No |
| 22 | Spraying pumps and accessories | 1. Yes | 2. No |
| 23 | Rectal Artisunate | 1. Yes | 2. No |
| 24 | Artisunate injection (intravenous or intramuscular): requires 5 ml Normal Saline for final dilution | 1. Yes | 2. No |

6.4. Have you experienced a shortage of drugs and supplies during the most recent epidemic (or outbreak) 1. Yes 2. No

6.5. Existence of a standard case management protocol for malaria

Observed the existence of a written case management protocol for malaria

1. Yes 2. No

6.6. Is there a budget line for epidemic response?

1. Yes 2. No

6.7. Existence of epidemic management committee

Observed minutes (or report) of meetings of epidemic management committee:

1. Yes 2. No

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6.8.Is there rapid response team (RRT) for epidemics 1. Yes 2. No

7. Response to epidemics

7.1. Ability of the health office to respond within 48 hours of notification of most recently reported malaria outbreak:

Observed that the woreda/town/zone/region responded within 48 hours of notification of most recently reported malaria outbreak (from written reports with trend and intervention)

1. Yes 2. No 3. NA

7.2.Ability of the woreda epidemic management committee to evaluate its preparedness and response activities:

Has epidemic management committee evaluated its preparedness and response activities during the recent malaria outbreak (Observe written report to confirm)?

1. Yes 2. No 3. NA

8. Feedback

8.1.Existence of a report or bulletin that is regularly produced to disseminate surveillance data:

How many weekly bulletin or reports has the health office produced in the last six months?

Observed the presence of a report or bulletin that is regularly produced to disseminate surveillance data:

1. Yes 2. No 3. NA

8.2.Existence of feedback system

How many feedbacks were received from the higher level in the last six months? _____

Observed the presence of weekly feedback received from the higher level:

1. Yes 2. No 3. NA

How many feedbacks were provided to the lower level in the last six months?

Observed the presence of weekly feedback received from the higher level

1. Yes 2. No 3. NA

9. Supervision

9.1.Number of supervisory visit that was made in the last six months

How many supervisory visits have you made in the last six months? _____

Observed the supervisory report

1. Yes 2. No 3. NA

9.2. If No, the most usual reasons for not making all required supervisory visits

—

—

9.3. How many times have you been supervised by the higher level in the last six months?

—

Observed the supervisory report

1. Yes 2. No 3. NA

10. Training

10.1. What numbers of your subordinate personnel have been trained in? _____

10.2. Have you been trained in malaria surveillance?

1. Yes 2. No 3. NA

If yes, specify when, where, how long, by whom?

11. Resources

11.1. Does the woreda/town/zone/region health office has

A. Data management materials

- | | | |
|-----------------------|--------|-------|
| 1 Computer | 1. Yes | 2. No |
| 2 Printer | 1. Yes | 2. No |
| 3 Photocopier | 1. Yes | 2. No |
| 4 Data manager | 1. Yes | 2. No |
| 5 Statistical package | 1. Yes | 2. No |

B. Communications

- | | | |
|------------------------------|--------|-------|
| 1 Telephone service | 1. Yes | 2. No |
| 2 Fax | 1. Yes | 2. No |
| 3 Radio call | 1. Yes | 2. No |
| 4 Satellite phone | 1. Yes | 2. No |
| 5 Computers that have modems | 1. Yes | 2. No |

C. Budget line for emergency 1. Yes 2. No

D. Human power

- 1 Surveillance officer in number: _____
- 2 Malaria focal person: _____

E. Logistics

- 1 Bicycles Yes 2. No
- 2 Motor cycles Yes 2. No
- 3 Vehicles Yes 2. No

12. Surveillance Co-ordination

12.1. Existence of focal unit for surveillance

Is there a focal unit for surveillance? [Observe organogram to confirm]

- 1. Yes 2. No 3. NA

13. Opportunities for integration

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

14. Satisfaction with the surveillance system

14.1. Are you satisfied with the malaria surveillance system? 1. Yes 2. No

If no, how can the surveillance system be improved?

II. Questionnaire for attributes and level of usefulness

- a. Total population under surveillance _____
- b. What is the incidence of malaria in your area (2016)?
 - i. Cases _____ in 2016
 - ii. Deaths _____ in 2016

15. Level of usefulness

15.1. Does the malaria surveillance system help to detect outbreaks early?

- 1. Yes 2. No

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15.2. Does malaria surveillance system help to estimate the magnitude of morbidity and mortality related to the disease, including identification of factors associated with the diseases? 1. Yes 2. No

15.3. Does the malaria diseases surveillance system permit assessment of the effect of prevention and control programs? 1. Yes 2. No

Observe malaria interventions and diseases trends analyzed

1. Available 2. Not available 3. NA

III. Describe Each System Attributes

16. Simplicity

16.1. Is the case definition of malaria easy for case detection by all level health professionals?
1. Yes 2. No

If no mention difficult with malaria case definition-----

16.2. Do you feel that additional data collected on a case are time consuming? 1. Yes 2. No

16.3. How long it takes to fill the format? a. <5 minute b. 10-15minuts c. >15 minutes

16.4. How long does it take to have laboratory confirmation of malaria?

A. By RDT_____

B. By Microscope_____

17. Flexibility

17.1. Can the current reporting formats be used for other context (for elimination program) without much difficulty? 1. Yes 2. No

17.2. Do you think that any change in the existing procedure of malaria case detection, reporting, and formats will be difficult to implement? 1. Yes 2. No

Comment:

18. Data Quality (Completeness of the reporting forms/and validity of the recorded data)

18.1. Are the data collection formats for malaria clear and easy to fill for all the data collectors/ reporting sites? 1. Yes 2. No

18.2. Are the reporting site / data collectors trained/ supervised regularly? 1. Yes 2. No

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Observe: Review the last months report

Average number of unknown or blank responses to variables in each of the reported forms for malaria _____

Percent of reports which are complete (that is with no blank or unknown responses) from the total reports _____

19. Acceptability

19.1. Do you think all the reporting agents accept and well engaged to the surveillance activities?

1. Yes 2. No

If yes, how many are active participants (of the expected too)? _____

If No, what is the reason for their poor participation in the surveillance activity?

- A. Lack of understanding of the relevance of the data to be collected
- B. No feedback / or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities
- C. Reporting formats are difficult to understand
- D. Report formats are time consuming
- E. Other _____

20. Representativeness

20.1. What is the health service coverage of the area? _____%

20.2. Do you think, the populations under surveillance have good health seeking behavior for malaria/fever? 1. Yes 2. No

20.3. Who do you think is well represented by the surveillance data? 1. Urban 2. Rural

20.4. Are the private health facilities included in the surveillance? 1. Yes 2. No 3. NA

If No why? : _____

20.5. Are the NGO health facilities included in the surveillance? 1. Yes 2. No 3. NA

20.6. Are the military health facilities included in the surveillance? 1. Yes 2. No 3. NA

21. Timeliness

21.1. When do you report malaria report to the next level: _____

22. Stability

22.1. Was any new restructuring affected the procedures and activities of the malaria surveillance? 1. Yes 2. No

22.2. Was there lack of resources that interrupt malaria surveillance system? 1. Yes 2. No

22.3. Was there any time/condition in which the surveillance is not fully operating?

1. Yes 2. No

B. Health Facility (Hospital/Health Center/Clinic) Questionnaire

Type of the health facility: 1. Health Center 2. Hospital

Name of health facility _____

Date _____ (MM/DD/YYYY)

Region _____ Zone _____ Woreda _____

Interviewer's Name _____ Respondent's Name _____

1. National surveillance guidelines

1.1. Is there a national manual for surveillance at this health facility? 1. Yes 2. No

Observed national surveillance guidelines: 1. Available 2. Not available 3. NA

2. Case detection and registration

2.1. Does the health facility has a clinical register

Observed the existence of a clinical register 1. Yes 2. No

2.2. Does health facility correctly register cases?

Observed the correct filling of the clinical register during the previous 30 days

1. Yes 2. No 3. Not applicable

2.3. Does health facility has standardized case definitions for malaria

1. Yes 2. No 3. Unknown

2.4. Is malaria cased definition posted on the wall/visible site? 1. Yes 2. No

2.5. Observed the respondent correctly diagnosing malaria using a standard case definition 1. Yes 2. No

3. Case confirmation

3.1. Does the health facility have the capacity to collect specimens for malaria confirmation (blood?) 1. Yes 2. No 3. NA

3.2. Observed the presence of materials required to collect blood and process for malaria

3.3. Does the health facility have functional cold chain 1. Yes 2. No 3. NA

3.4. Does the health facility have transport media 1. Yes 2. No 3. NA

4. Data reporting

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- 4.1. Has health facility lacked appropriate surveillance forms at any time during the last 6 months?
1. Yes 2. No 3. unknown
- 4.2. Does the health facility have WRF at the time of the data collection? 1. Yes 2. No
- 4.3. Does the health facility have line list at the time of the data collection? 1. Yes 2. No
- 4.4. Does the line list have relevant variables? (observe) 1. Yes 2. No
- 4.5. Comparison of the number of malaria cases with the one reported on WRF:
- 4.5.1. Observed that the last monthly report agreed with the register for malaria?
1. Yes 2. No 3. NA
- 4.5.2. Number on Register for the last 30 days/one month_____
- 4.5.3. Number of malaria cases reported to the next level in the last 30 days/one month_____
- 4.5.4. If there is difference in register and reporting form for the same weeks, put the percent difference in number of cases_____?
- 4.6. How many times the health facility does reported weekly report in the last six months?

- 4.7. How many of the weekly reports in the last six months were reported by WRF to higher next level? _____
- 4.8. What is reporting means used by health facility to report the malaria data to next upper level?
1. E-mail, 2. Telephone, 3.Fax or radio 4. Other (specify)_____

5. Data analysis

- 5.1. Does the health facility analyze malaria data? 1. Yes 2. No
- 5.2. If yes, who is responsible for malaria data analysis? _____
- 5.3. At what time interval malaria data is analyzed? 1. Daily 2. Weekly 3. Bi weekly. 4 Others (specify)_____

Analysis by personal variables

- 5.4. Observed description of data by age and sex and other personal variables 1. Yes 2. No
3. NA

Analysis by place variables

- 5.5. Observed malaria data described by place (locality, village, work site etc)?
1. Yes 2. No 3. NA

Analysis by time variables

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5.6. Trend analysis: observed line graph of malaria cases by time? 1. Yes 2. No

1. Yes 2. No 3. NA

5.6. Have an action threshold set for malaria? 1. Yes 2. No

5.7. Which threshold are you using for malaria outbreak detection? 1. Doubling method 2. Second largest/third quartile 4. Others (Specify)_____

5.8. Do you have appropriate denominators for malaria data analysis? 1. Yes 2. No

Observed presence of demographic data at health facility

A. Total population 1. Yes 2. No

B. Population by age category 1. Yes 2. No

C. Population by sex, 1. Yes 2. No

D. Population by village, 1. Yes 2. No

6. Epidemic preparedness

6.1. Observed the existence of a written case management protocol for malaria? 1. Yes 2. No

6.2. Does the health facility has:

1 Chloroquine tablets 1. Yes 2. No

2 Chloroquine syrup 1. Yes 2. No

3 AL tablets 1. Yes 2. No

4 AL dispersible 1. Yes 2. No

5 Quinine tablets 1. Yes 2. No

6 Rectal Artesunate 1. Yes 2. No

7 Malaria epidemic monitoring charts 1. Yes 2. No

8 Multi-species RDTs 1. Yes 2. No

9 Bench aids for appropriate use of RDTs 1. Yes 2. No

10 Kebele maps with 1 km² grids 1. Yes 2. No

2.1. Does the health facility implemented malaria prevention and control measures based on surveillance data? 1. Yes 2. No 3. Unknown

2.2. Observed that the health facility achieved an acceptable case fatality rate for most recent outbreak 1. Yes 2. No 3. Unknown 4. Not applicable

2.3. Does the health facility have emergency preparedness and response plan (EPRP)?

1. Yes 2. No

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- 2.4. What is the anticipated malaria Attack rate (AR) for the EPRP? _____
- 2.5. Observe that the EPRP addresses both the plan for preparedness and response? 1. Yes 2. No
- 2.6. Does the health facility have rapid response team (RRT) 1. Yes 2. No

3. Feedback

- 3.1. Have health facility received a report or bulletin from a higher level during the last six months on the data they have provided? 1. Yes 2. No
- 3.2. If yes, how many feedback bulletin or reports has the health facility received in the last six months? _____
- 3.3. Observed at least one report or bulletin at the health facility from a higher level during the last six months on the malaria data they have reported
1. Yes 2. No 3. Not applicable
- 3.4. How many feedback bulletin or reports has the health facility provided to health posts in the past 6 months? _____
- 3.5. Observed at least one report or bulletin at the health facility provided to health post in the last six months on the malaria data they have provided
1. Yes 2. No 3. Not applicable
- 3.6. Has health facility conducted meetings with community members to discuss results of surveillance or investigation data in the last years? 1. Yes 2. No
- 3.7. How many meetings has the health facility conducted with the community members in the last six months? _____
- 3.8. Observed the minutes or report of at least one meeting between the health facility team and the community members within the last six months
1. Yes 2. No 3. Not applicable

4. Supervision

- 4.1. Has health facility supervised by upper level in the last six months? 1. Yes 2. No
- 4.2. If yes, how many times have you been supervised in the last six months? _____
- 4.3. Observed supervision report or any evidence of supervision in last 6 months
1. Yes 2. No 3. Not applicable
- 4.4. Has the supervisor from the next higher level reviewed malaria surveillance practices appropriate to this level? 1. Yes 2. No

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- 4.5. Observed supervision report or any evidence for appropriate review of surveillance practices
1. Yes 2. No 3. Not applicable

5. Training

- 5.1. Has the staff in the health facility trained on malaria surveillance and epidemic management?

1. Yes 2. No

- 5.2. If yes, how many of the health facility staffs were trained? _____

- 5.3. Specify?

When: _____

Where: _____

For how long: _____ the last training was given

6. Resources

- 6.1. Has the health facility have functional:-

- | | | |
|----------------|--------|-------|
| a. Electricity | 1. Yes | 2. No |
| b. Bicycles | 1. Yes | 2. No |
| c. Motorcycle | 1. Yes | 2. No |
| d. Vehicles | 1. Yes | 2. No |

- 6.2. Data management: Has the health facility have:-

- | | | |
|---------------|--------|-------|
| a. Stationery | 1. Yes | 2. No |
| b. Calculator | 1. Yes | 2. No |
| c. Computer | 1. Yes | 2. No |
| d. Software | 1. Yes | 2. No |
| e. Printer | 1. Yes | 2. No |

- 6.3. Communication: Has health facility have:-

- | | | |
|-------------------------------|--------|-------|
| a. Telephone service | 1. Yes | 2. No |
| b. Fax | 1. Yes | 2. No |
| c. Radio call | 1. Yes | 2. No |
| d. Computers that have modems | 1. Yes | 2. No |

- 6.4. Information education and communication materials: Has health facility have:-

- | | | |
|----------------------------|--------|-------|
| e. Posters | 1. Yes | 2. No |
| f. Megaphone | 1. Yes | 2. No |
| g. Flipcharts or Image box | 1. Yes | 2. No |

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- h. TV set 1. Yes 2. No
- i. Generator 1. Yes 2. No
- j. Screen Projector 1. Yes 2. No
- k. Other (specify) 1. Yes 2. No

7. Satisfaction with surveillance system

7.1. Are you satisfied with the malaria surveillance system? 1. Yes 2. No

7.2. If no, how can malaria surveillance systems be improved to bring satisfaction?

II. Questionnaire for attributes and level of usefulness

1. Total population under surveillance _____

2. What is the incidence of malaria in your area?

A. Cases _____ of last six months

B. Deaths _____ of last six months

2. Level of usefulness of malaria surveillance system

1.1. Does malaria surveillance system help to detect outbreaks early? 1. Yes 2. No

1.2. Does malaria surveillance system help to estimate the magnitude of morbidity and mortality related malaria, including identification of factors associated with the malaria?

1. Yes 2. No

1.3. Does the malaria surveillance system permit assessment of the effect of malaria prevention and control programs? 1. Yes 2. No

III. Describe Each System Attributes

1. Simplicity

1.1. Is the case definition for malaria easy for case detection by all level health professionals? 1. Yes
2. No

1.2. If no, mention difficulty with malaria case definition _____

1.3. Do you feel that data collected on malaria case are time consuming? Yes/No

1.4. How long it takes to fill the format? 1. <5 minute 2. 10-15minuts 3. >15 minutes

1.5. How long does it take to have laboratory confirmation malaria? _____

A. RDT _____

B. Microscope _____

2. Flexibility

2.1. Can the current malaria reporting formats can accommodate addition of new variables/indicators without much difficulty? 1. Yes 2. No

2.2. Do you think that any change in the existing procedure of malaria case detection, registration and reporting will be difficult to implement? 1. Yes 2. No

Comment: _____

3. Data Quality (Completeness of the reporting forms/and validity of the recorded data)

3.1. Are the data collection formats for malaria clear and easy to fill for all the data collectors/ reporting sites? 1. Yes 2. No

3.2. Has the reporting site / data collectors trained/ supervised regularly? 1. Yes 2. No

Observe: Review the last months report

Average number of unknown or blank responses to malaria variables in each of the reported forms _____

Percent of reports which are complete (that is with no blank or unknown responses) from the total reports _____

4. Acceptability

4.1. Do you think all the reporting agents accept and well engaged to the surveillance activities? 1. Yes 2. No

4.2. If yes, how many are active participants (of the expected to)? _____

4.3. If No, what is the reason for their poor participation in the surveillance activity?

- a. Lack of understanding of the relevance of the data to be collected
- b. No feedback / or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities
- c. Reporting formats are difficult to understand
- d. Report formats are time consuming
- e. Other _____

5. Representativeness

5.1. What is the health service coverage of the area? _____%

5.2. Do you think, the populations under surveillance have good health seeking behavior for fever? 1. Yes 2. No

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5.3. Who do you think is well represented by the surveillance data? 1. Urban 2. Rural

6. Timeliness

6.1. When do you report weekly malaria report to the next level? _____

7. Stability

7.1. Was any new restructuring affected the procedures and activities of malaria surveillance?

1. Yes 2. No

7.2. Was there lack of resources that interrupt the malaria surveillance system? 1.

Yes 2. No

7.3. Was there any time/condition in which the malaria surveillance is not fully operating?

1. Yes 2. No

C. Health Post Level Questionnaire

Region_____Zone_____Woreda_____

Date_____ (MM/DD/YYYY)

Name of health post_____

Interviewer's Name_____ Respondent's Name_____

1. National surveillance guidelines

1.1 Is there Integrated Refresher Training (IRT) manual? 1. Yes 2. No

1.2 If yes, observe: 1. Available 2. Not available

1.3 Mention the reason for which the IRT manual is not available

1. Not given

2. Taken by staffs

3. Become out of service

4. Others_____ (Specify)

2. Case detection and registration

2.1.Does the Health Post have clinical register? 1. Yes 2. No

2.2. If yes, Observe: 1. Available 2. Not available 3. NA

2.3.Observe filling of the clinical register during the previous 30 days to make sure it is correct

1. Yes 2. No 3. Not applicable

2.4.Does the Health post have community case definition for malaria? 1. Yes 2. No

2.5. If yes, Does the health post have posted the community case definition for malaria on the wall?

1. Yes 2. No

2.6. Does the HEWs correctly using the community case definition for diagnosis of malaria (observe that the cases listed on the register for the last one month fulfill the community case definition for malaria) 1. Yes 2. No

3. Data reporting

3.1. Does the health post have weekly reporting format pad (WRF-HEWs) at all times over the last six months? 1. Yes 2. No 3. Unknown

3.2. Observe for the current presence of WRF-HEWs 1. Yes 2. No

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- 3.3. Do the HEWs utilizing the WRF-HEWs for reporting 1. Yes 2. No
- 3.4. Number of malaria reports sent by health post to health center in the last six months_____ (Ask from HEWs)
- 3.5. Number of weeks in the last six months for which weekly report is sent by WRF-HEWs_____ (Observe copies of WRF-HEWs present at health post)
- 3.6. Number of weekly malaria report sent to the health center on Monday in the last six months_____
- 3.7. Comparison of the number of malaria cases registered on register book and reported to the health center in the last six months
- A. Number of cases registered on registration book for the last six months_____
- B. Number of cases reported to the health center in the last six months_____
- 3.8. What is the available means of reporting at the time of data collection? 1. Paper 2. Telephone. 3. Other_____ (specify)
- 3.9. Which of the above mentioned reporting means (Q3.8) are you using? 1. Paper 2. Telephone. 3. Other (specify)
4. Data analysis
- 4.1. Do you analyze malaria data? 1. Yes 2. No
- If Yes,
- Observe description of data by age and sex 1. Yes 2. No 3. Not applicable
- Observe description of data by place 1. Yes 2. No 3. Not applicable
- Observe description of data by time 1. Yes 2. No 3. Not applicable
- 4.2. Observe for the availability of malaria epidemic monitoring chart 1. Yes 2. No
- 4.3. If yes, do the HEWs utilizing malaria epidemic monitoring chart? 1. Yes 2. No
- 4.4. Is there any evidence of malaria outbreak on the epidemic monitoring chart? 1. Yes 2. No
5. Epidemic preparedness and response
- 5.1. Does health post have?
- 1 Chloroquine tablets 1. Yes 2. No
- 2 Chloroquine syrup 1. Yes 2. No
- 3 AL tablets 1. Yes 2. No
- 4 AL dispersible 1. Yes 2. No

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- 5 Quinine tablets 1. Yes 2. No
6 Rectal Artisunate 1. Yes 2. No
7 Malaria epidemic monitoring charts 1. Yes 2. No
8 Multi-species RDTs 1. Yes 2. No

- 9 Bench aids for appropriate use of RDTs 1. Yes 2. No

2.1. Is HEWs implementing malaria prevention and control measures by using local surveillance data? 1. Yes 2. No

2.2. Can you give me an example of evidence based decision you made by using malaria surveillance data? _____

3. Feedback

3.1. Are you getting feedback from health center or above level on malaria? 1. Yes 2. No

3.2. If yes, how often you got the feedback from health center? _____

3.3. How many feedback has the health post received in the last six months? _____ (Observe)

3.4. Do the HEWs have meetings with community? 1. Yes 2. No

3.5. If yes, is malaria prevention and control the agenda during the meeting? 1. Yes 2. No

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

3.7. Is the meeting minute available? (Observe) 1. Yes 2. No

4. Supervision

4.1. Has there been supervision on malaria from higher level? 1. Yes 2. No

4.2. If yes, how many times have you been supervised in the last six months by health center?

4.3. How many times have you been supervised in the last 6 months by woreda and above levels?

4.4. Observe for any supervision report or any evidence of supervision in last 6 months (regardless of the level providing supervision) 1. Yes 2. No 3. Unknown

5. Training

5.1. Have you received IRT? 1. Yes 2. No

5.2. If yes, when was the last time the IRT given? _____

5.3. If yes, how many of existing HEWs has received IRT? _____

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6. Resources

6.1. Does the Health post have functional electricity 1. Yes 2. No

6.2. Does the health post have any means of transportation 1. Yes 2. No

6.3. If yes, specify the available means of transport_____

6.4. Does health post had regular supply of stationeries in the last six months? 1. Yes 2. No

3. Unknown

7. Satisfaction with surveillance system

7.1. Are you satisfied with the malaria surveillance system?

1. Yes 2. No

7.2. If No, what should be introduced or modified to make better functioning surveillance?

8. Attributes and level of Usefulness

8.1.Total population under surveillance in the catchment areas of the health post_____

8.2. Does the current malaria surveillance provide estimation of the magnitude of morbidity and mortality from malaria in the community under surveillance? 1. Yes 2. No

8.3.Does the current malaria surveillance provide timely estimation of the malaria burden to enhance early prevention and control? 1. Yes 2. No

8.4. Does the current malaria surveillance permit assessment of effect of malaria prevention and control programs? 1. Yes 2. No

III. Describe Each System Attributes

9. Simplicity

9.1.Is the malaria community case definition easy for case detection by HEWs? 1. Yes 2. No

9.2.Do you think that extensive training is necessary to use malaria community case definition by HEWs? 1. Yes 2. No

9.3.Do you feel that additional data collected on a case are time consuming? 1. Yes 2. No

9.4.How long does it take fill information on register book for single malaria patient? A. <5 minute
B. 10-15minuts C. >15 minutes

9.5.How long it takes to fill format? A. <5 minute B. 10-15minuts C. >15 minutes

9.6.Do you report malaria data to other apart from catchment health center? 1. Yes 2. No

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9.7.If yes, to whom you report malaria data other than the catchment health center? _____

10. Flexibility

10.1. Do you think that any change in the existing procedure of malaria case detection, registration and reporting will be difficult to implement? 1. Yes 2. No

Comment:-

11. Data Quality: (Completeness of the reporting forms/and validity of the recorded data)

11.1. Are the data collection formats for malaria clear and easy to fill 1. Yes 2. No

11.2. Are the reporting site / data collectors trained/ supervised regularly? 1. Yes 2. No

Observe: Review the last months report

11.3. Average number of unknown or blank responses to for malaria variables in each of the reported forms _____

11.4. Percent of reports which are complete (that is with no blank or unknown responses) from the total report _____

12. Acceptability

12.1. Do you accept and well engaged in the surveillance activities? 1. Yes 2. No

12.2. If No, what is the reason for your poor participation in the surveillance activity?

- i. Lack of understanding of the relevance of the data to be collected
- ii. No feedback / or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities
- iii. Reporting formats are difficult to understand
- iv. Report formats are time consuming
- v. Other _____

13. Representativeness

13.1. What is the health service coverage of the area? _____ %

13.2. Do you think the populations under surveillance have good health seeking behavior for malaria? 1. Yes 2. No

13.3. Who do you think is well represented by malaria surveillance data? 1. Urban 2. Rural

14. Timeliness

14.1 When do you report weekly malaria report to the health center? _____

15. Stability

15.1 Was any new restructuring affected the procedures and activities of the malaria surveillance?

1. Yes 2. No

15.2 Was there lack of resources that interrupt the surveillance system?

1. Yes 2. No

15.3 Was there any time /condition in which the malaria surveillance is not fully operating?

1. Yes 2. No

Chapter 5. Health profile Assessment of Tiyo woreda, Arsi zone, Oromia, February 15 -30/2017

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Abstract

Introduction: - Health profile is a system of collecting and organizing or summarizing health and others health related events to describe health and others health related conditions, in order to identifying and prioritizing health problem, for planning, implementation and evaluation of intervention activities.

Methods:- Cross sectional descriptive study design were used and data necessary for health profile description was collected from woreda Health office and other health related sectors of the woreda from February 15/2017 to February 30/2017. After data collection and compilation, the data was processed by using Microsoft excel and presented with tables, percentages.

Result: - In 2008 in the woreda students enrolled in primary, secondary and preparatory schools were 94.5% and with female enrolment were 47.8% as comparing the plan. The dropout rate for males (1-12 grades) were 2.3% & Female 1.8%.

There were 4 health centers, 18 health post, 20 private health institutions were serving the community. One health center and health post were serving for 37,056 and 5,440 populations respectively. One Health Officer serving 18,516 population, 1 Nurse serving 3,831 population and 1 midwives' for 9,258 population.

The woreda safe water supply were 41% with the main source of spring on spot and ground water and communal water tap.

The immunization coverage most of antigens given were above the plan which is more than 100% but the dropout rate of penta 1 to penta 3 were 3.1% and penta 1 to measles were 15.0%.

The ten top leading causes of morbidity in outpatient department the most frequently occurred disease was acute febrile illness with unknown fever and accounts about 20.9% of total cases followed by acute upper Respiratory infection and Pneumonia.

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In the woreda from 23,145HH, only 58% of HHs had latrine, 50.2% HHs use solid waste disposal pit and Open Defecation Free (ODF) kebeles were ten.

In 2008 a total of 55 smear positive patients were identified and started anti-TB drug and 52 cured with detection rate of 59%. There was 1 registered leprosy patient.

In prevention and control measure of HIV/AIDS program a total of 2,058(12.3%) tests on VCT, 11,551(69%) PICT and 3143(16.8%) PMTCT were performed. ART service were available in all health centers and population on ART were 8, on pre ART 5 and 2 infants were enrolled in ART service. The number of peoples living with HIV/AIDS were 13.

In Nutritional screening program a total of <5 children weighted were 6,599(36.2%), 1104(16.7%) moderate mal nutrition, 672(10.2%) severe acute mal nutrition with admission of 39 cases.

Introduction

Health profile is a system of collecting and organizing or summarizing health and others health related events to describe health and others health related conditions, demographic, socio-economic, political, cultural and others aspect of a particular geographic areas of interest in order to identifying and prioritizing health problem, for planning, implementation and evaluation of intervention activities.

Health profile is a comprehensive compilation of information about a community which reflects the health of a given community. The information may include data already collected by the organizations or individuals (1).

Health Profile describe health and its determinants and are not static. Health Profiles are a continuous process that should be used both to reflect the present state and to monitor progress in the future. A series of profile will be needed both to monitor changes that may prevent the achievement of good health (2).

In Ethiopia communicable disease and nutritional deficiency is the main health problem of the country. Shortage and high turnover of human resource and inadequacy of essential drugs and supplies have also contributed to the burden. Despite major strides to improve the health of the population in the last one and half decades, Ethiopia's population still face a high rate of morbidity and mortality and the health status remains poor (2).

To improve the health status of the population the second Health sector Transformation plan is formulated and being on implementation from 2015/16 - 2019/20. To monitor progress towards HSTP to improvement in health status of the population, current and reliable information and use of information for making evidence based decision are very crucial. (3)

This health profile describes the health and health related information of Arsi zone Tiyo woreda of Oromia regional state. It encompasses compilation and interpretation of Demographic, Education and services like: water, Transport, economy, Agriculture and health status information of the woreda on the perspective of health.

Rationale

The planning and management of health services in developing countries often proceeds within an environment of inadequate information about the health status of the population served and the occurrence of important determinants of health. This is particularly the case at the district level where health services have traditionally underdeveloped and information systems lacking (3). In Ethiopia, particularly at the district level an organized health and health related indicator which determine the health status of the community is scarce and these contribute a gap in planning and taking evidence based information for action. In Tiyo woreda health profile was not done before and also there is no organized health and health related information. Therefore this health profile compiled health and health related information of the woreda for planning, prioritizing health and health related problems.

Objectives

General objective

To describe health and health related information of Tiyo woreda and to identify problems for priority setting.

Specific objectives

- ✓ To compile health and health related indicators of the Tiyo woreda.
- ✓ To convey the local burden of disease of the Tiyo woreda.
- ✓ To describe existing community health problem of the Tiyo woreda.

Methods and Material

Study Area

Tiyo woreda found in Oromia regional state of Arsi zone. It is located in the south East of Addis Ababa at 7^o 57 N 39^o 7 E Latitude and Longitude with elevation of 2,430 meters ASL. The woreda is about 175 Km far from Addis Ababa and have total of 111,100 populations.

The woreda contains 21 Kebles, of this 18 are rural and 3 urban. The woreda is bordered on the south by Munesa, on the west by Ziway Dugda, on the North East by Hitosa and on the south East by Digeluna Tijo. The administrative center of the woreda and Zone is Asella town, but all kebeles of the woreda are out of Asella town.

The total area of the woreda is 65,000 hectare, out of total area 65,000, 25,134 hectare are cultivated land and 2019 hectare covered by plantation.

The average annual temperature of the area is 800 mm. The woreda classified by 3 climatic zones namely dega (high land), weynadega (middle land) and kola (low land).

Study Design and Period

Descriptive cross sectional study design were used and the study was conducted from February 15/2017 – February 30/2017.

Sample size and sampling technique: - No need of sample size determination as well as sampling technique for health profile. Because the study conducted to document and show the woreda's health and other status for planning by gathering information from different concerned woreda offices.

Data Collection and Procedure

The health data was collected from Woreda health office as well as health related information was collected from different woreda administrative offices(water & energy office, Agriculture, finance, road and transport, education, trade and industry offices) of the year 2008. The main mechanism of data collection was reviewing available documents, annual reports and interview of woreda health professionals, experts by using structured questionnaire. Data analysis were done by using Microsoft office excels and the results were presented with tables, percentages.

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Data quality management: - Consistency of data was checked through data collection, data entry and analysis phases.

Ethical Clearance

Health and Health related information of Tiyo woreda was collected after obtaining official letter from Ethiopian Public Health Institute (EPHI) as well as permission obtained from Tiyo woreda concerned bodies during data collection.

Dissemination of the results: - The result will be communicated to all concerned bodies.

Result

Geography & climate

Tiyo district is one of the twenty five districts of Oromia region, Arsi zone and located 175 km from Addis Ababa on the direction of South east. The woreda is bordered on the South by Munesa, on the West by Ziway Dugda, on the Northeast by Hitosa, and on the Southeast by Digeluna Tijo. The administrative center of the woreda and Zone is Asella, but all kebeles of the woreda are out of Asella town.

The altitude of this woreda ranges from 1500 to 4170 meters above sea level; mount Chilalo is the highest point. It has three Climatic zones, which is 32% Kola, 20% Dega and the rest 48% is Weyina dega. It has on average 21 o^c annual temperature, maximum of 27 oC and minimum 14 o^c. In addition it has annual rain fall on average 800mm and ranges from maximum of 1200 mm and minimum of 400 mm and the district rainy season start from June and extend to October.

The total estimated area of the woreda is 638.44 square kilometers with land of 65,000 hectare. 25,134 hectare (38.7%) are cultivated and covered by cereals. 2019 hectare (3.1%) covered by forest.

A survey of the land in this woreda shows that 40% is arable or cultivable (32% was planted in cereals), 23.1% pasture, 8.7% forest, and the remaining 28.2% is considered swampy, mountainous or otherwise unusable.

Administrative & political structure:

Tiyo woreda has 18 rural and 3 urban kebeles. The administrative center of the district is Asella town. It is located at 7^o 57 N 39^o 7 E Latitude and Longitude with elevation of 2,430 meters above sea level. All sectors of the district are found in Asella town.

In Tiyo woreda around 152 small scale industries, including 60 grain mills, 2 flour factories and 84 registered business center. Of these, no wholesalers, 16.2% and 32.4% of them were retailer and service provider respectively. There were 15 Farmer Associations with 13,704 members and 9 Farmers Service Cooperatives with 426 members.

Tiyo woreda has 30km of dry-weather and 166.1 km all-weather road which connect localities. About 41% of the total population has access to drinking water.

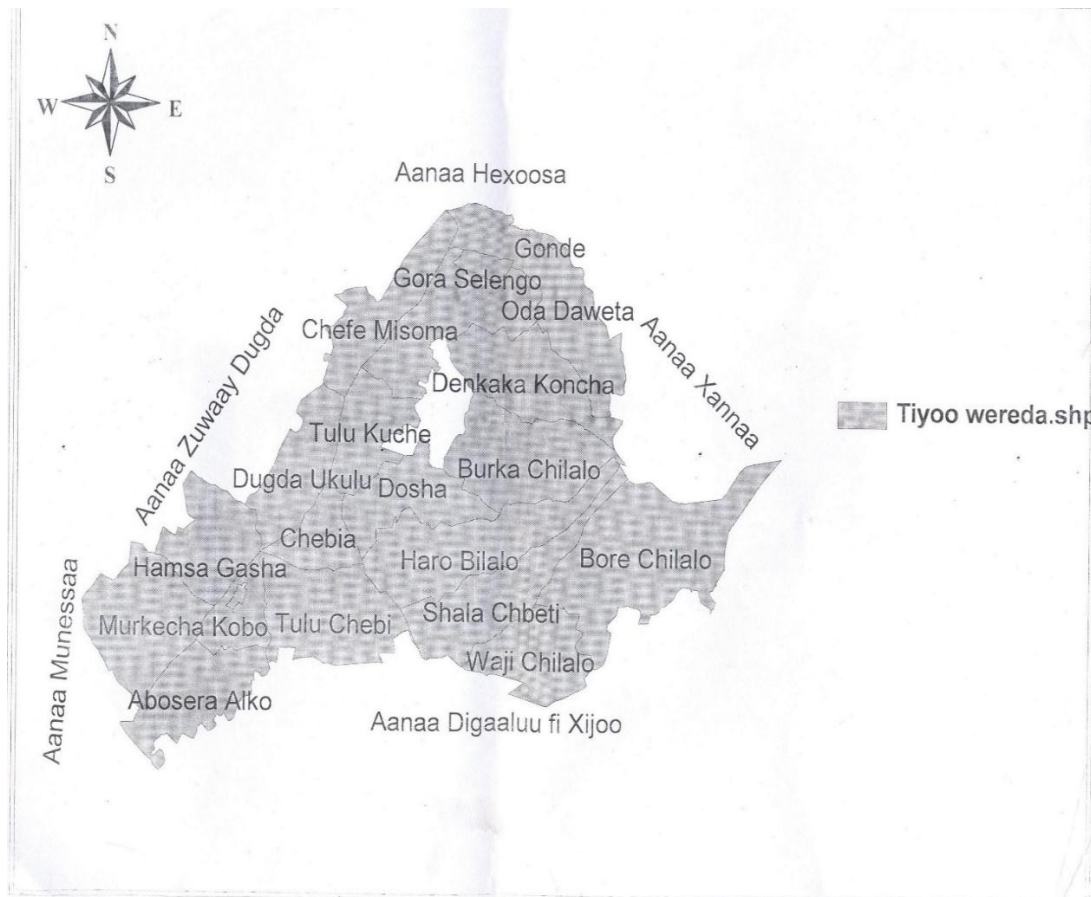


Figure 13:- Map of Tiyo Woreda, Arsi,zone, Oromia,2008 Ec.

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According to information taken from woreda health office, Tiyo woreda had a population of 55,622 Male and 55,478 Female with total of 111,100 with annual growth rate of 2.9%. Male to female ratio is about 1:1 which is similar with regional and national ratio. Of those total population, 101,628 (91.5 %) were living in 18 rural kebeles and the rest 9,472(8.5%) were living in 3 urban kebeles of the woreda. Of these total population, women of reproductive age group (women 15-49 years of age) constitute 18.63% and 47.6% of the population were under 15 years of age.

There are more than 5 different ethnic group's composition in Tiyo woreda. From the total population Oromo accounts 53.9% of the population, Amhara 37.6%, Sodo Gurage 3.4%, Silte 2.73% and other ethnic groups made up 2.24%. Afaan Oromo language is the official language in the woreda. However, from the total population Afan Oromo was spoken as a 1st language by 76.4%, Amharic by 10.24% and the remaining were other language speakers.

From population living in Tiyo woreda about 53.8% of the population were Muslim, 44.7% were Orthodox and the rest 1.5% were Protestant and other religion followers.

The population density was 285.4 person per 1 Km² in 2008, which is greater than the Arsi zone average of 132.2. In Tiyo woreda there were 3,577 surviving infants, 10,377 under three and 23,146 households. There were no data available concerning the population pyramid.

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Table 6:- Population Distribution Profile by Kebele of Tiyo Woreda, 2008E.C

S/No	Health facility	Total population	Total live birth	Surviving infant	<2 yrs	6-59 month	<5yrs	Pregnant women	Non preg women
1	Golja HC	2485	86	80	142	373	408	86	464
	Ketar kebele	2852	99	92	163	428	469	99	532
	Alko K	7094	246	228	405	1064	1166	246	1324
	Borera k	3431	119	110	196	515	564	119	640
	Murkicha K	3580	124	115	204	537	588	124	668
	Tulu chebi K	10145	352	327	579	1522	1667	352	1893
	Golja PHCU	29,586	1027	953	1689	4438	4861	1027	5521
2	Bilalo HC	4007	139	129	229	601	658	139	748
	Dosha k	4723	164	152	270	708	776	164	881
	Tulukuche k	3363	117	108	192	505	553	117	628
	Burka chilalo k	3174	110	102	181	476	522	110	592
	Chebi HP	2627	91	85	150	394	432	91	490
	Bilalo HP	3793	132	122	217	569	623	132	708
	Bilala PHCU	21,688	753	698	1238	3253	3563	753	4047
3	Akiya k	8522	296	274	487	1278	1400	296	1590
	Denkaka k	8275	287	266	472	1241	1360	287	1544
	Gora silingo k	6792	236	219	388	1019	1116	236	1267
	Kubete k	6232	216	201	356	935	1024	216	1163
	Dugda okulo k	3708	129	119	212	556	609	129	692
	Gonde HC	6321	219	204	361	948	1039	219	1179
	Gonde PHCU	39,852	1383	1283	2276	5978	6548	1383	7436
4	Berti HC	5153	179	166	294	773	847	179	961
	Berti HP	5235	182	169	299	785	860	182	977
	Luke k	5654	196	182	323	848	929	196	1055
	Shala chebety	3933	136	127	225	590	646	136	734
	Berti PHCU	19,974	693	643	1141	2996	3282	693	3727
Total	111,100	3,855	3,577	6,344	16,665	18,254	3,855	20,731	

Production

Bimodal pattern of rainfall gives a wide opportunity for the district to produce different types of crops and use the same land twice a year. That is for kiremt and Belg. However, kiremt is the largest season in terms of both cultivated land area and crop production.

The major annual crops grown in the district are cereals, pluses, Oil seeds and maize. From cereal crops Barley, Teff, wheat and Maize are the most widely grown ones. In addition, it is known in producing some cash crops like tomato, onion, carrot, sugar cane, etc.

In the kiremt and Belg season of 2008, about 25,134 hectares of land were cultivated from which 1, 560068.5 quintals of production was obtained. These give an average productivity of 62.07 quintals per hectares. By crop type in 2008 wheat with production of 610,975(39.2 %), barley with production of 268,341.5(17.2%), beans with production of 31,078(2%), maize with production of 49,830(3.8%) and the others Teff, sorghum, pea and others with production of 599,844 (38.4%) quintals.

Concerning Fertilizers to improve crop production and productivity, the Tiyo woreda farmers were classified in to 3 groups, namely model farmers use NPS or NPS+ B use 2 Quintal per hectare, medium farmers use the same fertilizer 1.5 quintal per hectare and small farmers use 1 quintal per hectare and all of the 3 groups of farmers use 1 quintal urea per hectare. Four kebeles use NPS + B are fertilizers of nitrogen phosphate with boron for the land deficient of boron.

In 2008 (NPS + B) fertilizer distributed were 3,427quintal and NPS only fertilizer 19,945 quintal, urea 1,449quintal fertilizer were distributed to the community.

Most inhabitants are farmers 80 %(dependents on seasonal agriculture and animal production), Government and private sector employee 13%, 6% have their own business and 1% livestock.

Education

Tiyo woreda had 48 primary school, 4 high school, 1 preparatory school. In 2008 a total of 27,796 students were planned to be enrolled and 25,749 (92.6%) were registered and started class. Of these 12,305(47.8%) were females in different grades.

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Table 7:- Student's Enrolment by Sex and Grade in Tiyo woreda, 2008 E.C

No	Grade	Plan	Achievement	%	No of female from Total	% of females from Total	Remark
1	KG	525	475	90.5	235	49.5	
2	1-8	24,994	24,319	97.3	11,720	48.2	
3	9-10	2,205	1,389	63	568	40.89	
4	11-12	72	77	107	22	28.6	
5	TVET	-	-	-	-	-	
	Total	27,796	26,260	94.5	12,545	47.8	

There were 4 private kindergarten schools with 12 sections and the numbers of teachers were 10 with a student's of 475.

The district provides primary education by 335 Male and 254 Female with total of 589 teachers and there were a total of 509 sections. The teacher to student's ratio was 1:42 while class room to student's ratio was 1:48.

In secondary school there were Male 68 and Female 15, total 83 teachers with 33 rooms. A teacher to student ratio was 1:17 and class room to student's ratio was 1:42. In preparatory school there were Male 11 and Female 1 total 12 teachers. Teacher to student ratio 1:7

In the woreda most of the time dropout rate is high in primary school (1-8) and in high school from 9-10 grades than others in both sex. On the other hand, male students drop their class than Female students in primary, high school 9-10 and in preparatory school females drops than Males. Detail information on dropout rate is presented as follow in table 3.

Table 8:- School Dropout by Sex and Grade Tiyo woreda, 2008 E.C

No	Grade	Total No of student									Remark
		Male enrolled	Male drop	% male drop	Female enrolled	Female drop	% female drop	Total enrolled	Total drop	%	
1	1-8	12,599	254	2.0	11,720	192	1.6	24,319	446	1.8	
2	9-10	821	58	7.0	568	23	4.0	1,389	81	5.8	
3	11-12	55	1	1.8	22	1	4.5	77	2	2.6	
	Total	13,475	313	2.3	12,310	216	1.8	25,785	529	2.0	

Students drop their class for different reasons like illness, lack of support, they don't have interest to learn, low awareness on subject matter, lack of school facilities like latrine, water supply, shortage of teachers in subject matter. Because of lack of data we couldn't figure out the number of students with their reasons who discontinued their class.

Facilities and Infrastructure

Road accessibility is the major in day to day activities. In Tiyo woreda all kebele have road access with 161.12Km length of gravel all weather road type and 23Km of asphalt road. Regarding communication, all urban and rural kebeles have supplied with mobile telephone services. On the other hand, one urban kebele has supplied with digital type of telecommunication. In addition, the district has postal services in Asella and Gonde town. Among the total health posts and health centers all health facilities have road access.

The district were used electricity, biogas (>84 households), solar energy, traditional source of energy like Charcoal, animal dug, farm residue and fire wood.

All towns of the district had supplied with electric power. In rural areas the dominant source of energy for cooking and other purposes are traditional sources of energy like firewood, crop residue, and animal dung. In urban area, charcoal is most important energy source followed by fire wood and electricity.

Concerning electricity in the health facility all of the 4 health centers and from 18 health post 1 health post had access to electric power supply.

When we see the water supply, spring on spot (27) and ground water (3) were the main source of water supply for the district. According to data obtained from water resource office, the woreda drinking water service coverage was reached 41%. Most of the populations are getting water within 1 - 1.5Km distance and greater than 10 L per person per day.

When we see the water supply service in health institutions, all of the 4 health centers had water supply and from 23 health posts 3 of them had water supply.

Health system

Health indicators

Immunization coverage

At woreda level the dropout rate from Penta one to Penta three was 3.1% and from Penta one to Measles was 15.0%. Furthermore the dropout of Penta one to PCV-one was 0% and Penta one to PCV-three was also 3.1%. The others vaccination coverage presented as follow by type of antigen in table 4.

Table 9:- Immunization Coverage by Type of Antigen, Tiyo woreda, 2008 E.C

S/No	Type of Antigen	Plan	Achievement	Coverage (%)	Remark
1	BCG	3855	3912	101	
2	Penta 1	3577	3993	112	
3	Penta 3	3577	3882	109	
4	OPV 0				Polio dose given 10,842
5	OPV 1				
6	OPV 3				
7	Rota 1	3577	3963	111	
8	Rota 2	3577	3801	106	
7	Measles	3577	3455	97	
8	PCV-1	3577	3993	111.6	
9	PCV-3	3577	3882	109	
10	Full immunization	3577	3442	96	

Data were not available data concerning vital statistics like, CBR, CDR, IMR, <5MR, MMR and others in the woreda.

Maternal Health Services

The woreda health is working on family planning services through health extension workers at each kebele health post level and in all health centers and the coverage were 76% (plan 20,695, achievement 15,747) for short acting contraceptives like pills, depo and for long acting 44%(20,695, achievement 9,068) which are like Norplant, IUCD. Health extension workers provide only the short acting contraceptives and most of the community use the short acting contraceptives because of habit and fear of side effects for the long acting.

Concerning antenatal care, 1st visit antenatal care (ANC) coverage was 121% and 4th and above were 105%. On the other hand TT dose given for pregnant and non-pregnant women were 9505.

Health Services

The district had 4 type B government health centers and 18 health posts. All health centers and health posts were functional and there were 20 private (medium/lower clinics, drug stores, drug vendors) health facilities in the woreda. At the end of 2008 the primary health service coverage was 90%. Table 5 below shows detail information about health facilities.

Table 10:- Health Facilities by Type, Tiyo Woreda, 2008 EC

No	Type of Health facilities		Number	Remark
1	Hospital		0	
2	Government health centers	Type A	0	
		Type B	4	
3	Health post		18	
4	Private health facilities	Medium clinic	1	
		Lower clinic	11	
		Higher clinic	0	
		Diagnostic lab	0	
		Drug store	4	
		Drug vendor	4	

At the end of 2008 one health center was served for 27,775 populations and one health post served for 6,172 populations.

Concerning health professionals and supportive staff a total of 44 male and 39 female health professional, 38 health extension workers and 44 supportive staff were employed and working at different level of health system.

In all health centers there were 6 Health officers, 29 Nurses, 12 Midwife Nurses and other paramedics and supportive staffs. In 18 health posts there are 38 health extension workers, which mean 2 health extension workers for each kebele (35 Health extension in rural kebeles and 3 in urban, Gonde, Kulumsa and Golja). In woreda health office a total of 25 health professionals were

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working at different department. Additional information regarding number of health professionals and other administrative staffs presented in table 6 as follow.

Table 11:- Number of Health Professionals and Other Administrative Staff Employed, Tiyo Woreda, 2008 EC

No	Type of professional	No of professionals			Remark	
		Male	Female	Total		
1	Physician /GP	0	0	0		
2	Health officer	6	2	8	2 woreda H.Office	
3	BSc Nurse clinical	10	4	14	7 woreda H.Office	
4	Diploma Nurse clinical	13	17	30	9 woreda H.Office	
5	Public Nurse (Deg and Dip)	3	0	3	2 woreda H.Office	
6	Midwifery (Deg and Dip)	Deg	1	11	14	2 woreda H.Office
		Diploma	0	2		
7	Lab. (Deg and Dip)	Deg	2	1	5	-----
		Diploma	2	0		
9	Pharmacy (Dep. And Deg.)	Deg	3	1	6	1 woreda H.Office
		Diploma	2	0		
10	Environmental health (Dep. And Deg.)	Deg	3	0	4	4 woreda H.Office
		Diploma	0	1		
11	Health Extension Worker	0	38	38		
12	Health education	0	0	0		
13	Health Information Technologist (HIT)	1	0	1	1 woreda H.Office	
14	Others(Supportive staff)	27	17	44	8 woreda H.Office	
	Total	73	94	167	36.W.HOffice	

Health Professionals to Population Ratio

Considering the health professionals to population ratio, all professionals were included who are working in health facility only. In Tiyo woreda 1 health officer served for 18,516 population, one nurse served for 3,831 population, one midwives' served for 9,258 and one health extension worker served for 2,923 population.

In 2008 ten top causes of morbidity in outpatient department the most frequently occurred disease was acute febrile illness and accounts about 20.9% of total cases. List of ten top diseases presented as follow in table 7.

Table 12:- List of Top Ten Leading Causes of OPD, Tiyo Woreda, 2008 EC

S/No	Disease	No of Cases	% from Total Cases	Remark
1	Acute Febrile Illness(AFI)	1,548	20.9	
2	Acute Upper Respiratory infection	1,294	17.47	
3	Pneumonia	1,037	14	
4	Diarrhea / Non bloody /	807	10.9	
5	Typhoid Fever	745	10.06	
6	Trauma/injury, fracture/	562	7.59	
7	Dyspepsia	438	5.91	
8	Other unspecified infections & parasitic diseases	393	5.31	
9	Urinary Tract infection	308	4.16	
10	Disease of musculoskeletal system & connective tissue	274	3.70	
Total		7,406	100	

Regarding health care financing all health centers were utilizing their money. On the other hand, woreda administration allocated for five sectors like education, health, water , agriculture, road which were called for poverty reduction were 55,734,635 birr and from these 9,481,467 birr (17%)

for health sector including running cost, salary, and for drug in 2008 budget year. This budget allocation rate was almost constant for the last 3 years.

Community Health Service

At this time federal ministry of health implemented developmental army in each kebele starting from 2010. Therefore, all Community health workers are replaced by those developmental armies all over the country and in the woreda there are 2,590 of 1 to 5 developmental armies.

MCH/RH

One component of the health sector transformation plan is reducing maternal and child death. To accomplish this plan in Tiyo woreda health office many activities were implemented which included in the growth and transformation strategic plan.

Family planning is one of activities done under reproductive health/ MCH services which services are given to the community by their choice, like permanent family planning, long acting family planning and short term family planning methods.

In the woreda short acting injectable (depo) and pills were mostly preferred methods and the need of permanent and long acting family planning is increasing.

The woreda health office train 38 health extension workers on long acting like Norplant and IUCD family planning methods, but currently they give only the short acting contraceptives like depo and pills because of lack of community awareness and fear of side effects for the long acting. Based on this in 2008 there were 9,068 (46%) users of long acting family planning methods and 15,747(76%) for short acting contraceptives.

Concerning deliveries and Post-natal care (PNC) services were given in all health centers. In 2008 a total of 3,650(94.7%) of deliveries attended by skilled health professionals in health facilities and 3,482(90%) mothers were received post-natal care services.

Concerning essential drugs: - most of the essential drugs supplied by PFSA and others purchased by the woreda budget and there were no supply problem on the essential drugs.

Environmental Health/ Water Supply & Sanitations

Tiyo woreda had a total of 23,145 Households in 2008. Of these 13,336 (58%) had latrine with hand Wash. There were a total of 132 communal/public latrines. Of the total households there were 11,620(50.2%) households use solid waste disposal pit and open defecation free (ODF) kebeles were 10. On the other hand, in all kebeles there were safe drinking water supply and as woreda the safe drinking water supply coverage was 41%.

Inspection of food and drinking establishments, inspection of government and private health facilities were performed according to the schedule. In addition health education was given to the community on different topics such as solid and liquid wastes, malaria, ANC/PNC, EPI, F/P, STD, HIV/AIDS and others health problems at different places like at health facilities, schools, health posts, religious areas, during community meetings and others.

Endemic Diseases

Malaria

Tiyo woreda has 2 malarious kebeles namely Dugda okolo and Chefe misoma with at risk population of 3708. The district health office performed different activities like case management, indoor residual spray (deltametrin), health education on prevention methods and environmental management on mosquito breeding sites. For the last three years ITNs were not distributed to the risk areas but deltametrin house hold spray done every year from September to October.

In the affected kebeles health extension workers in the health post screen/diagnose febrile patients with para check and give anti-malarial drugs like coartem and for sever patients they refer to next health facility. Malaria were not occurred as epidemic since the last three years in the woreda. Annually only 5-7 cases were seen in the woreda.

TB & Leprosy

In 2008 a total of 55 smear positive patients were identified and started anti-TB drug and 52 cured with detection rate of 59%. On other hand all TB patients were screened for HIV and all of them Negative for HIV. There was 1 registered leprosy patient.

HIV/AIDS

In prevention and control measure of HIV/AIDS program all of the 4 health centers give VCT, PICT, PMTCT services, health education, condom distribution and others services were given to the community. In 2008 a total of 2,058(12.3%) tests on VCT, 11,551(69%) PICT and 3143(16.8%) PMTCT were performed in VCT room, OPD, ANC and other service units.

ART service available in all health centers in the woreda and population on ART were 8, on pre ART 5 and 2 infants were enrolled in ART service. The number of peoples living with HIV/AIDS were 13 patients, but no any support for PLWHA from government as well as NGOs. On the other hand in all health posts, health education was given to the community by health extension workers and they facilitate schedule for VCT service in the health post. There were no NGOs working on HIV/AIDS prevention and control program in the woreda.

Nutritional Status and Disasters

Nutrition screening program were done in the woreda and a total of <5 children weighted were 6,599(36.2%) from these 1104(16.7%) moderate malnutrition, 672(10.2%) severe acute malnutrition, 39 cases admitted & managed in the health center with supplementation of F 75 and F100 therapeutic feeding.

There were no any disaster and epidemic occurred in the woreda during the last five years.

Discussion

In Tiyo woreda most of the population (91.5%) were living in rural areas. The population density were 285.4 person/km², which is greater than Arsi zone average of 132.2 person/km². All of the woreda kebeles were accessible to road facility. The crops were produced twice per year and even if different crops produced in the woreda, there were mal nutrition problem especially in the under-five children.

Concerning the education, students enrolled in primary, secondary and preparatory schools were 94.5% and with female enrolment were 47.8% as comparing the plan. The dropout rate for males (1-12 grades) were 2.3% & Female 1.8%. The dropout rate were higher in grades 9-10 with males 7% & Female 4%. The main Reasons for dropout were lack of family support & low awareness on the subject matter.

All health centers (4) & only 1 health post were access to electricity and water supply were accessed in all health centers and 3 health post.

The woreda safe water supply were 41% with the main source of spring on spot and ground water and communal water tap, the community get water within average distance of 1.5km and 10 liter per person per day which is less from WHO recommended daily allowance of 40 liter per person per day.

Concerning the immunization coverage most of antigens given were above the plan which is more than 100%. The dropout rate of penta 1 to penta 3 were 3.1%, penta 1 to measles were 15.0%.

The contraceptive acceptance rate were for short acting were 76% & for long acting were 44%. In 2008, 94.7% of deliveries were attended by skilled health professionals in health facilities and 90% mothers were received post-natal care services.

In the woreda governmental health institutions were 4 health center and 18 health post and 20 different types private health institution were serving the community.

The health professional to population ratio were 1 health officer serving 18,516 population, 1 nurse serving 3,831 population and 1 midwives' for 9,258 population.

The ten top leading causes of morbidity in outpatient department the most frequently occurred disease was acute febrile illness with unknown fever and accounts about 20.9% of total cases

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followed by acute upper Respiratory infection, Pneumonia, Diarrhea(Non bloody) and Typhoid fever.

Regarding health care financing all of the 4 health center utilize their resource by their own and the woreda health sector budget rate were constant for the last 3 years and the 2008 budget were 17% from 5 sectors of the woreda administration. But there were budget scarcity especially for EPI service and supportive supervision.

In the woreda a total of 23,145 Households with 13,336 (58%) households had latrine with hand Wash, 132 communal/public latrines, 11,620(50.2%) households use solid waste disposal pit and open defecation free (ODF) kebeles were 10.

In the woreda has 2 malarious kebeles namely Dugda okolo and Chefe misoma with at risk population of 3708, but annually an average of 6 cases were seen. Household spray were done every year from September to October.

In 2008 a total of 55 smear positive patients were identified and started anti-TB drug and 52 cured with detection rate of 59%. On other hand all TB patients were screened for HIV and all of them negative for HIV. There was 1 registered leprosy patient.

In prevention and control measure of HIV/AIDS program a total of 2,058(12.3%) tests on VCT, 11,551(69%) PICT and 3143(16.8%) PMTCT were performed.

ART service were available in all health centers and population on ART were 8, on pre ART 5 and 2 infants were enrolled in ART service. The number of peoples living with HIV/AIDS were 13.

In Nutritional screening program a total of <5 children weighted were 6,599(36.2%), 1104(16.7%) moderate mal nutrition, 672(10.2%) severe acute mal nutrition with admission of 39 cases.

There were no any disaster and epidemic occurred in the woreda during the last 5 years.

Conclusion

In Tiyo woreda health service utilization like ANC, PNC, Vaccination, delivery service were in good performance.

Health indicators are below the target are high Dropout rate of penta 1 to measles. The TT and polio coverage were not known since it is expressed as TT dose and polio dose given. Low family planning, low VCT, PICT, PMTCT services, High health workers to population ratio, high health center to population ratio, health posts were without water and electric supply, low budget allocation to health sector, low latrine utilization and solid waste disposal system, were some of the major problems.

Recommendation

- ✓ The woreda health office should strongly work on vaccination dropout rate.
- ✓ TT and polio vaccines coverage should be known, expressed as coverage or the HMIS should be assessed changed to the coverage form.
- ✓ HIV/AIDS programs must be strengthen in order to increase the performance.
- ✓ Infrastructures like water supply should be avail in the health institution.
- ✓ For all services to undertake budget is mandatory and the woreda health office should allocate the necessary budget by communicating the woreda administration and concerned bodies.
- ✓ The need of other stakeholders and NGO on health sector in the woreda are essential to fulfill the Health Sector Transformation Plan.
- ✓ Additional health professionals should be employed for health centers as per the standard of BPR or WHO guide line.
- ✓ Vehicles are essential for supportive supervision and to run the overall health service

Summary of Assessment Findings

Resource shortage

I. Transportation & Other Materials

- There were no vehicle for health office and only one ambulance serving the whole woreda community at the base of woreda and also shortage of motor cycle.

II. Man power shortage and budget

- There were shortage of health professionals like Health officer, pharmacy, clinical nurses and midwives).
- A gap on training for technical staffs like on HMIS, reporting system and refreshment trainings.
- Inadequate budget allocation for Health service like EPI from woreda administration

2. Weak management system

- Poor supportive supervision
- Incomplete reporting system (Incomplete, inaccurate and not on time bases) from health facilities.
- No feedback to concerned body on regular basis at all levels

3. Low Family Health service coverage

- Vaccination coverage not known for TT for pregnant and non-pregnant women, it is reported as TT dose given and also for polio vaccine it is expressed as dose.
- Dropout rate of penta 1 to measles were 15%.
- Low Family Planning for long acting service utilization 44%

4. Prevention and control of communicable Disease (HIV/AIDS control)

- VCT, PICT, PMTCT coverage were 12.3%, 69%, 16.8% respectively.
- Low screening for nutrition 36.2%

5. Low Environmental health & sanitation coverage

- Low Latrine coverage (58%).
- Low solid waste disposal pit (50.2%)

6. Infrastructure

- Shortage of rooms for Bilalo health center due to design problem and also shortage of latrine.
- No water supply for all health posts and 1 health center (beriti).

Table 13:- Problem Identification and Priority Setting, Tiyo Woreda, 2008EC.

Sn	Problem	Magnitude	Severity	Feasibility	Community concern	Government concern	Total	Rank
1	Weak Management system (Planning , implementation, M & E) and HMIS	5	3	4	3	4	19	2
2	Resource shortage (Human, transportation and Budget	4	3	2	4	4	17	4
3	Low Family planning service coverage	3	5	4	4	4	20	1
4	Prevention and control of communicable Disease (HIV/AIDS)	2	3	3	2	3	13	6
5	Low Environmental health & sanitation coverage	4	4	3	3	4	18	3
6	Low infrastructure coverage (water supply, electricity...)	3	3	3	4	3	16	5

Reference

- FMOH, Health Sector Development plan IV, 2010/11 – 2014/15
- Central Statistical Agency (CSA) [Ethiopia] and ICF. 2016. Ethiopia Demographic and Health Survey 2016: Key Indicators Report. Addis Ababa, Ethiopia, and Rockville, Maryland, USA.
- FMOH, Health sector Transformation plan 2015-2020.
- EFETP Resident manual, 2012, Addis Ababa, Ethiopia.
- Wikipedia, "http://www.en.wikipedia.org/wiki/Tiyo#cite_note-oromia2," [Online].

Annex 4:- Questionnaire on Health Assessment profile in Arsi zone Tiyo woreda, February 2017.

1. Geography & Climate:

Tiyo woreda bordered

South----- North -----East----- West-----

Total land area ----- Altitude -----

Climatic zones -----

Average annual temperature and rain fall-----

Arable or cultivated land-----

Plantation -----

Rainy season-----

2. Administrative & political structure:

Tiyo woreda has ----- Urban -----Rural kebeles.

Latitude and longitude -----with elevation of -----meters from ASL

Sectors of the woreda -----

Industries in the woreda----- small scale-----

Grain mills-----

Business center-----

Whole sales-----

Retailers and service providers-----

Farmer's association/cooperatives-----

Road accessibility -----

Dry weather road-----km, all weather road-----km. Asphalt-----km.

3. Demographic information

Tiyo woreda total population of -----Male ----- Female----- Growth rate -----

Population living in urban----- Population in Rural -----

Women of reproductive age group (women 15-49 years of age) -----

Population under 15 years-----

Population pyramid

Religion

Orthodox -----Muslim -----Protestant-----

Ethnicity

Amhara ----- Oromo ----- Tigre -----

Gurage-----Others-----

Language

Afan Oromo-----

Amharic -----

Others -----

Population density ----- person per 1 Km²

Surviving infants ----- Under three years ----- No of households -----

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No	Name of kebeles	Total population			<1 yr	<3 yr	<5 yr	Pregnant	Non pregnant	HH
		Male	Female	Total						
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
	Total									

3. Production (Agriculture)

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4.

Types of crops produced in the woreda-----

Seasons in the woreda -----

Cultivated land -----hectares and products in quintals-----

By crop type in 2008 wheat with production of -----, barley with production of -----, beans with production of ----- maize with production of ----- and the others Teff, sorghum, pea and others with production of----- quintals.

Usage of Fertilizers, NPS ----- quintal per hectare -----quintal of urea -----
-NPS+ B per hectare.

Inhabitants that are farmers -----%

Government and private sector employee -----% and the others -----% have their own business.

Main economy of the woreda -----

Average income-----

5. Education

In Tiyo woreda ----- primary school ----- high school -----
-preparatory and -----TVET School.

In 2008 a total of ----- students were planned to be enrolled and -----
- were registered. No of female student from the total-----

Student’s enrolment by sex and grade in Tiyo woreda, 2008 E.C

No	Grade	Plan	Achievement	%	No of female	% of females	Remark
1	KG						
2	1-8						
3	9-10						
4	11-12						
5	TVET						
	Total						

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No of kindergarten in the woreda ----- No of sections-----
 No of teachers in kindergarten Male-----Female-----
 No of teachers in primary school, Male-----Female-----
 No of sections-----
 The teacher to student’s ratio -----
 Class room to student’s ratio -----
 No of teacher’s secondary school Male-----Female----- with -----rooms.
 Teacher to student ratio -----
 Class room to student’s ratio -----
 No of teachers in preparatory school Male-----Female-----
 Teacher to student ratio -----

School dropout by sex and grade Tiyo woreda 2005 E.C

No	Grade	Total No of student				Remark
		Male	Female	Total	%	
1	1-8					
2	9-10					
3	11-12					
	Total					

Reasons for dropout of students-----

Facilities and infrastructure

Road accessibility -----
 Road with gravel/all weather road-----km.
 Asphalt road-----km
 Dry weather road-----km

Type of communication mobile phone -----Digital type of telecommunication. ----
 Wireless type of telephone ----- Postal services-----

Energy sources

Type of energy source -----

In rural and urban areas the dominant source of energy for cooking -----

Type of water supply -----

The woreda water supply coverage-----

Daily use of water per person-----

Distance of HHs from water source-----

Water supply service in health facilities-----

The total population which has access to drinking water -----

Disaster status in the woreda-----

Health system

Health indicators Immunization coverage

The dropout rate from Penta 1 to Penta 3 -----% and from Penta 1 to Measles ----- %. The dropout of Penta 1 to PCV-1 ----- Penta one to PCV 3-----%.

Immunization coverage by type of antigen in Tiyo woreda, 2008 E.C S.

Sno	Type of Antigen	Coverage	Remark
1	BCG		
2	Penta 1		
3	Penta 3		
4	OPV 0		
5	OPV 1		
6	OPV 3		
7	Rota 1		
8	Rota 2		
7	Measles		
8	PCV-1		
9	PCV-3		
10	Fully immunization		

Maternal health services

Family planning use-----

ANC Coverage

1st visit-----

2nd visit-----

3rd visit-----

4th and above-----

TT coverage

TT₂⁺ for non-pregnant women -----

TT₂⁺ for pregnant women -----

Health services

The primary health service coverage -----%

Health Facilities by type in Tiyo Woreda, 2008

No	Type of Health facilities	Number	Remark
1	Hospital		
2	Government health centers	Type A	
		Type B	
3	Health post		
4	Private health facilities	Medium clinic	
		Higher clinic	
		Diagnostic lab	
		Drug store	

Health center to population ratio-----

Health post to population ratio-----

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Number of health professionals and other administrative staff employed in Tiyo woreda, 2008 E.C

No	Type of professional	No of professionals			Remark
		Male	Female	Total	
1	Physician /GP				
2	Health officer				
3	B.Sc. Nurse clinical				
4	Diploma Nurse clinical				
5	Public Nurse (Deg and Dip)				
6	Midwifery (Deg and Dip)				
7	Lab. (Deg and Dip)				
9	Pharmacy (Dep. And Deg.)				
10	Environmental health (Dep. And Deg.)				
11	Health Extension Worker				
12	Health education				
13	Health Information Technologist (HIT)				
14	Others(Supportive staff)				
	Total				

Health Professionals to Population Ratio

- Physician to population ratio-----
- Health officer to population ratio -----
- Nurse to population ratio -----
- Midwife to population ratio -----
- Health extension to population ratio -----

List of Top Ten Leading causes of OPD in 2008

S/No	Disease	No of cases	% from total cases	Remark
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Total				

Top ten causes of admission and death -----

Health care financing

The woreda Health budget source----- allocated budget -----

Running cost-----

Salary-----

Drugs -----

Woreda health sector budget from total budget -----%

Community health service

HEW-----

1 to 5-----

Women's development army -----

MCH/RH

Family planning

- Short term pills-----
- Depo Provera -----
- Long term Norplant -----
- Training on family planning-----
- PNC-----
- Deliveries -----

Environmental health/Water supply & sanitations

- No of House hold-----
- Latrine utilization -----
- Communal latrines -----
- Solid waste disposal pit -----
- Open defecation free kebeles-----
- Safe drinking water supply -----
- Inspection of food and drinking establishments-----
- Inspection of government and private health facilities -----
- Health education-----

Endemic diseases

1. Malaria -----

2. TB & Leprosy
 - Smear positive -----
 - HIV screening -----
 - Leprosy -----

HIV/AIDS

- VCT----- PITC -----
- PMTCT ----- ART ----- PLWHA -----
- Support for PLWHA-----

Nutritional Status and Disasters

Mal nutrition -----

Admission with mal nutrition -----

Supplementation of therapeutic feeding -----

Any epidemic -----

Essential Drugs

Availability of essential drugs -----

Problem Identification and Priority Setting

Sn	Problem	Magnitude	Severity	Feasibility	Community concern	Government concern	Total	Rank
1								
2								
3								
4								
5								
6								
7								
8								

Chapter 6. Scientific Manuscripts for peer Reviewed Journals

Outbreak Investigation of Dengue Fever in Dire Dawa Administration, a Case Control study, Ethiopia from July, 13/17 To August, 10/2017.

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Abstract

Introduction: - Dengue is a severe flue like illness caused by arbovirus and spread by Aedes mosquitoes with four distinct but closely related dengue viruses called serotypes (Dengue 1 to 4). It is transmitted to humans through the bites of infected mosquitos a vector called female Aedes aegypti. We received a report of acute febrile illness from Dire Dawa Administration health bureau on July 5/2017. A team deployed to investigate and confirm the outbreak, identify risk factors and implement control measures.

Methods: - we conducted a descriptive followed by unmatched case control Study in the ratio of 1:2 (20 cases and 40 controls) from July, 13/17 to August, 10/2017 using structured questionnaire. The data were entered in Epii info 7.0 and analysis made by using SPSS version 20.0 was used to analyze the data and multivariable logistic regression was conducted to assess risk factors for Dengue Fever.

Result: - A total of 106 cases with no deaths identified during the outbreak. Most 73(69%) were males and the rest females. 12 samples were collected for PCR identification of dengue fever and 8 of them confirmed as dengue fever type II. Age group of 15-44 years were more affected (73%) with median age 29 years ranging from 2 years to 80 years.

In multivariable logistic regression Female sex AOR = 0.10; 95% CI (0.01- 0.77) was protective factor and LLINs ownership AOR = 0.07, 95% CI (0.01 - 0.75) was independent risk factor. House sprayed also a protective factor AOR= 0.1 95% CI = (0.02- 0.71).

Conclusion: - Dengue Fever virus is circulating in Dire Dawa, affecting the productive age groups. Enhance sanitary practices and mass Community awareness could reduce the risk of the disease.

Keywords: Dengue fever, Dire Dawa, outbreak, Risk factors.

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Introduction

Dengue is a severe flue like illness caused by arbovirus and spread by Aedes mosquitoes with four distinct but closely related dengue viruses called serotypes (DEN-1, DEN-2, DEN-3 and DEN-4). It is transmitted to humans through the bites of infected mosquitos a vector called female Aedes aegypti. Infection with dengue confers immunity to infection with the same dengue serotype, but aside from short-lived protection does not prevent infection with other serotypes. (1)

Dengue affects infants, young children and adults which is characterized by fever, headache, muscle and joint pains, pain behind the eyes, nausea, vomiting and rash. (1)

Today globally about 2.5 billion people, or 40% of the world's population, live in areas where there is a risk of dengue transmission. Dengue is endemic in at least 100 countries in Asia, the Pacific, the Americas, Africa, and the Caribbean. The World Health Organization (WHO) estimates that 50 to 100 million infections occur yearly, including 500,000 DHF cases and 22,000 deaths, mostly among children. (3)

In Ethiopia Dengue had never been reported previously till the occurrence in Dire Dawa Administration from October – December 2013. During this period 11,000 suspected cases were reported and out of which 40 cases were confirmed by national lab with serotype II.

The current outbreak were reported to Ethiopian Public Health Institute from Dire Dawa Administration Health biro/PHEM/ with a report of unusual increment Acute febrile illness which were malaria negative cases with symptoms of fever, severe headache, back and joint pain and the region suspect for dengue fever and requite for investigation and response.

Based on the request a team from the Ethiopian Public Health Institute prepared and deployed to the area to confirm the existence of the outbreak, identify the etiology, risk factors and finally to implement control and prevention measures.

Objectives

General Objective

- ✚ To Investigate, Describe, Identify Risk Factors Associated with Dengue Fever outbreak and undertake appropriate public health control measures in Dire Dawa Administration.

Specific Objectives

- ✚ To verify the existence of Dengue Fever outbreak in Dire Dawa Administration.
- ✚ To describe the magnitude and distribution of the outbreak in terms of person, place & time.
- ✚ To conduct environmental assessment
- ✚ To identify risk factors and undertake prevention and control measures for the outbreak
- ✚ Recommend corrective actions for preventing further epidemics in the area.

Methods and Materials

Study Area: - The study was conducted in Dire Dawa city which is located at a distance of 515 km far from Addis Ababa to East. It is located at between 9^o 27 N and 9^o 49 S longitude and between 49^o 38 E and 42 19 W with an altitude between 960 - 2,500 meter asl. Climate is warm and dry with low level of precipitation. The mean annual air temperature is 25.4 0_c (18.2- 34 0_c).

Study Period: - The study was conducted from July 13/2017 till August 10/2017

Study Design: - We conducted a descriptive study followed by unmatched case-control in ratio 1:2 (20 cases and 40 controls)

Sample Size: - we interviewed 20 cases and 40 controls from health facilities in Dire Dawa city from July 13/17 to August 10.17.

Sampling: - Standard PHEM case definitions were used to detect Dengue Fever case. Suspected Dengue fever is any person infected with an acute febrile illness with 2 or more of the following: headache, retro-orbital pain, arthralgia, rash, hemorrhagic manifestations, leukopenia; and Supportive serology (a reciprocal HI antibody titer > 1280, a comparable IgG assay ELISA titer or (+) IgM antibody test on a late or acute convalescent phase serum specimen.

All cases that fulfilled the case definition were included in the study. Controls were a person without the history of Dengue Fever and in same locality with cases.

Case Definition

Suspected Case of Dengue Fever

Any person with fever of 2 -7 days and more of the following a headache, arthralgia, myalgia, rash, or bleeding from any part of the body an acute febrile illness (fever, severe headache and/or diarrhea) with a negative malaria test.

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

Controls

Any person in the area without signs or symptom of the disease.

Laboratory Investigation

To confirm the existence of dengue fever a total of 12 serum samples were collected from malaria negative patients and transported to the national reference laboratory for PCR investigation.

Environmental Investigation

We assessed the general living environment of cases and controls. In addition to this we assessed the possible mosquito breeding sites within the community and nearby rivers.

Data Collection Method

OPD registration book of the health centers, Hospitals were reviewed retrospectively to observe if similar outbreak had recently occurred. Active case search was conducted in all health facility using line listing of suspected cases. A structured questionnaire was used to interview both the case and control groups.

Data analysis

The collected Data entered in Epi info version 7 and analysis made using SPSS version 20 for bivariate and logistic regression to assess risk factors for dengue fever and Microsoft excels for descriptive data analysis. Results were displayed with tables and graphs and it was interpreted using Odd ratio, P value <0.05 and 95% confidence interval.

Ethical consideration

An official letter written from Ethiopian Public Health Institute (EPHI) to Dire Dawa Health bureau to conduct the investigation and the regional health bureau inform for all health facilities and army hospitals. Informed verbal consent was obtained from participants before interview and all agreed to participate in the study.

Result dissemination

The results of this study will be distributed to AAU/ School of public health department of field epidemiology training program, Ethiopian Public health Institute (EPHI), Dire Dawa regional health bureau in hard copy and soft copy.

Result

Outbreak Description

A total of 106 acute Febrile illness cases with no deaths were identified during the outbreak period, of which 73(69%) were male and the rest were females. A team from Ethiopian Public Health Institute (EPHI) deployed to investigate and start investigation on 13/7/2017 in collaboration with regional PHEM.

Samples were collected for serologic test from 12 suspected individuals and 8 of them become positive with positivity rate of 67%, confirmed by RT PCR at EPHI laboratory, with species of Dengue type 2

In both sex the age group 15-44 years was more affected 73%. The median age of the cases were 29 years with range of 2 years to 80 years.

The crude attack rate was 106/293,000 which is 36.2/100,000 population.

One fourth of 27(25.5%) cases were reported from Dilchora hospital followed by the military hospital 25(24%). 19(18%) of cases were treated as inpatient and the rest were outpatient.

Concerning the residence of cases, all cases are from urban setup. The highest cases were Reported from kebele 03, 52(49%), followed by kebele 04, 20(19%).

Analytic study

In bivariate analyses, 10 variables were initially screened and 5 variables were found to be associated with being a case or control i.e. ($p < 0.20$), which include, Sex, Not using nets, Aedes mosquito observed around home, House sprayed, Contact History, Dressing style.

No association found between the following variables; Age group, knowledge to dengue fever p.value; 0.452, 95% CI= (0.5 - 4.5), presence of stagnant water p.value; 0.282, 95% CI= (0.49- 10.14) and presence of container at home area p.value; 0.576, 95% CI=0.45 - 4.17).

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In multivariate analysis six variables were identified and three variables were association, such as being Female sex AOR = 0.10; 95% CI (0.01- 0.77) was protective factor and LLINs ownership AOR = 0.07, 95% CI (0.01 - 0.75) was independent risk factor. House sprayed also a protective factor AOR= 0.1, 95% CI = (0.02- 0.71). Households who sprayed chemical was 2 times lesser likely (protected) to be bitten by mosquitoes.

Environmental Investigation

- ✚ We identified water caring containers like flower growing plastics, used tires, forests near houses , un emptying water containers, were some of risk factors/favorable for breeding mosquito.
- ✚ At leg hare district there is huge water container which is used for irrigation purpose have a lot of larva and it is one of breeding site for mosquito and may bit people during agricultural activities.
- ✚ Low coverage of and utilization of LLITN, Favorable environment, water containers around home and water for irrigation purpose were risk factors for dengue fever transmission.

Discussion

In Dire Dawa Dengue fever outbreak is circulating since 2013 till now with seasonality after rainy season.

In Dire Dawa there is an increase of outbreaks over the past few years. This is due to the rapid urbanization with unplanned construction activities and poor sanitation facilities which contribute breeding site for mosquitoes.

In this outbreak males were more affected and the population in age group of 15-44 years were mostly affected. This finding agree with the study dengue fever outbreak north Kampala in 2012-2013 and a study in Eritrea from 2005-2015.

Being female is a protective factor because mostly females stay home and males work outside of home areas like in agricultural areas.

People who did use mosquito nets were more likely to be protective as compared to those who did not use mosquito nets (P.Value = 0.0274 ; 95% CI: 0.01- 0.75)

House sprayed also a protective factor p.value, 0.0199 95% CI = (0.02- 0.71).Households who sprayed chemical was 2 times lesser likely (protected) to be bitten by mosquitoes. These findings were similar with the study in Pakistan from 2010 – 2011 and a study in Vietnam 2009-2010.

Insignificant association between presence of a member in the family who suffered from dengue fever (p-value = 0.273); dressing style (wearing body full dress/trousers or wearing half sleeves shirts (p-value= 0.823) and these finding were also similar with the study in Pakistan from 2010 – 2011.

Conclusion

- ✓ There is an increase of Dengue fever outbreak which is circulating in Dire Dawa since 2013, affecting the productive age groups.
- ✓ Strengthening of surveillance and need of incorporating with malaria program for intervention.
- ✓ The national laboratory should be strengthen with the characterization capacity to timely detect and identify serotypes
- ✓ Integrated Vector control strategies specifically at agricultural/irrigation areas is crucial for intervention.

Recommendation

- The regional health bureau adapt protective measures like treated mosquito net distribution, use of chemicals at irrigation areas, water carrying ponds for future outbreak regularly.
- Effective vector control activities need to be part of long-term preventive measures.
- Strengthen the surveillance system which can detect the unusual number of cases and disease.
- Strengthen regional laboratory to diagnose dengue fever.

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Chapter 7: Abstract for Scientific Presentation

Surveillance Data Analysis of Rubella in Amhara Region, Ethiopia, from 2007-2016.

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Abstract

Background: - Rubella is a viral illness occurs during childhood, if infection occur before conception and during early pregnancy may result in miscarriage, fetal death and congenital defects of newborns known as Congenital Rubella Syndrome. Even though Rubella is vaccine preventable disease, in Ethiopia vaccine not introduced and not part of disease surveillance and little is known about rubella epidemiology. We conduct this study to describe the burden, disease trend and seasonality of rubella disease in the Amhara regional state, Ethiopia.

Method: - From 2007- 2016 Rubella case based surveillance system reported to Ethiopian Public Health Institute from Amhara region for laboratory confirmation of Measles and all specimens negative for measles were tested for rubella IgM antibody, data were collected and analyzed retrospectively from January 15 to February 15/2017.

Results: - 4,024 (52.4%) specimens were tested for rubella IgM antibody and 594(14.8%) were positive, 3128(77.7%) were Negative and 302(7.5%) were Indeterminate. Majority 521(87.7%) of cases were below 15years and 50.5% were females with 10% were reproductive age group. Most of Cases are from rural 421(71%) and 173(29%), urban areas. Annually the no of cases increases from March to April.

Conclusion: Rubella is common in young children's below the age of 15 years and more common in rural areas than urban areas. Peak of rubella cases observed from March to April. To further understand the burden and epidemiology of Rubella and Congenital Rubella Syndrome in the region surveillance system should be established.

Key words: - Measles, Rubella, Surveillance, Congenital Rubella Syndrome.

Chapter 8. Proposal for Epidemiologic Research project: - Prevalence of Severe Acute Malnutrition and Associated Factors of Children from 6-59 months age group in Tiyo woreda, Arsi zone, Oromia Region, Ethiopia.

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Abstract

Introduction: - Malnutrition is any physical condition implying ill health, inability to maintain adequate growth and appropriate body weight or to sustain acceptable levels of desirable physical activities, brought about by an inadequacy in food quality and quantity.

Malnutrition is one of the major public health problems all over the world. Currently, it faces and associated with more than 41% of the deaths that occur annually in children from 6 to 24 months of age in developing countries, which were approximately 2.3 million (2).

This study will be useful to assess the magnitude of severe acute malnutrition and associated factors in Arsi zone, Tiyo woreda and recommend corrective measures based on the findings.

Methods: - A community based cross sectional study will be conducted from June 15/2018 to June 30, 2018 in Tiyo woreda, Arsi Zone, Oromia region. It is far away from Addis Ababa about 175 kilometers. It is located in the south East of Addis Ababa at 7° 57' N 39° 7' E Latitude and Longitude with elevation of 2,430 meters ASL.

Total population is 111,100 and children under five 18,254 according to the projected population. The sample size determined by single population proportion, 453 children from 6-59 months with severe acute malnutrition among 4 kebeles of Tiyo woreda, will be included in the study. From all kebeles of the woreda, four of them selected using simple random sampling technique. Households and study units were also selected using simple random sampling method.

Data will be collected using a structured questionnaire and anthropometric measurements as well. The total budget allocated for this research will be sixteen thousand six hundred sixty five birr.

Introduction

Malnutrition is any physical condition implying ill health, inability to maintain adequate growth and appropriate body weight or to sustain acceptable levels of desirable physical activities, brought about by an inadequacy in food quality and quantity.(1)

Malnutrition acquires two forms, moderate Acute Malnutrition and severe Acute Malnutrition. Both are an outcome of decreased food consumption and inability to absorb needed energy and nutrients. Severe Acute Malnutrition (SAM) is defined as a weight-for-height below -3 Z score of the WHO growth standards median, and can occur in two forms, marasmus and kwashiorkor.(1)

Malnutrition is one of the major public health problems all over the world. Currently, it faces and associated with more than 41% of the deaths that occur annually in children from 6 to 24 months of age in developing countries, which were approximately 2.3 million (2).

Globally, an estimated 101 million children below five years of age were underweight. These accounted for 16% of children below five years of age. The prevalence was the highest, which was 33%, followed by Sub-Saharan Africa, which was 21%. These were 59 million in South Asia, while 30 million were in sub Saharan Africa. Globally, the prevalence has declined, from 25% in 1990 to 16% in 2013; these reduced by 37%. (1)

The number of children aged under 5 suffering from severe acute malnutrition is now 17 million. Severe Acute Malnutrition is the most extreme form and a major cause of death for children in their first years of life. The probability to die for children with Severe Acute Malnutrition both from direct causes of malnutrition and from indirect causes such as diarrhea, pneumonia or tuberculosis or poor hygiene is ten times higher than for well-nourished children. (1)

This study will be useful to show the magnitude of sever acute malnutrition in Arsi zone, Tiyo worda and recommend corrective measures based on the findings.

Statement of the Problem

A current perception of malnutrition changed from shortages to a multi-sector point of view in the recent decades. Malnutrition consists of two broad groups. First is under nutrition and subsequent forms of protein-energy malnutrition, followed by obesity and overweight. (1)

The number of overweight population has been rising and has doubled, an estimate of almost 2 billion overweight people worldwide. Overweight and obesity occur in developed and middle/low income countries. Developing countries face both forms of malnutrition simultaneously which is known as double burden.(1)

Most of the undernourished population 780 million live in developing countries, particularly in Sub-Saharan Africa and South-East Asia. Under nutrition occurs in developed countries too, where approximately 15 million of the undernourished live.(2)

About one-third of deaths among children below five years of age were attributed to under nutrition and it can lead children to be at greater risk of death and severe illness due to common childhood infections, such as pneumonia, diarrhea, malaria, human immunodeficiency virus, or AIDS and measles [3].World Health Organization (WHO) in 2001 reported that 54%of all child hood mortality was attributable, directly or indirectly, to malnutrition (3).

Severe Acute Malnutrition affects approximately 20 million children under five years of age and contributes to more than 1 million child deaths in the world each year (1)

In Ethiopia, the levels of severe Acute malnutrition were not decreased significantly. The 2011 EDHS report showed that stunting was 58% in 2000, 51% in 2005, and 44% in 2011. This report also showed that wasting was 12% from 2000 to 2005 and 10% in 2011. The third predictor is underweight, which was 41% in 2000, 33% in 2005, and 29% in 2011.

The national trend showed that stunting and underweight prevalence continued to decrease but at a slow pace. The above trend showed that prevalence of wasting was not declined. (4) Therefore, the main aim of this study will be to assess the prevalence of acute severe malnutrition and its associated factors among children aged from 6-59 months of age in Tiyo woreda.

Literature Review

Acute Malnutrition is classified into severe acute malnutrition (SAM) and moderate acute Malnutrition (MAM) according to the degree of wasting and the presence of edema. It is severe Acute malnutrition if the wasting is severe ($W/H < 70\%$ NCHS median or a low MUAC) or there is edema. Acute Malnutrition is defined as moderate acute malnutrition if the wasting is less severe (W/H between 70% and 80% NCHS median); edematous cases are always classified as severe. (1)

It is estimated that 19 million preschool-age children, mostly from the WHO African Region and South-East Asia Region, are suffering from severe wasting (2).

Childhood under nutrition is a major global health problem, contributing to childhood morbidity, mortality, impaired intellectual development, suboptimal adult work capacity, and increased risk of diseases in adulthood. Of the 7.6 million deaths annually among children who are under 5 years of age, approximately 35% are due to nutrition-related factors and 4.4% of deaths have been shown to be specifically attributable to severe wasting (2).

Severe acute malnutrition remains a major cause of child mortality worldwide. While pneumonia and diarrhea are often the final steps in the pathway, severe wasting is estimated to account for around 400,000 child deaths each year. For this reason, the improved management of severe acute malnutrition is an integral part of the World Health Resolution on Infant and Young Child Nutrition (WHA 63.23), to improve child survival and to reduce the global burden of disease.(1)

Malnutrition in children typically develops during the period from 6 to 18 months of age, when growth velocity and brain development are especially high. Young children are particularly susceptible to malnutrition if complementary foods are of low nutrient density and have low bioavailability of micronutrients.

Children's nutritional status will be further compromised if complementary foods are introduced too early or too late, or are contaminated.(3)

COMPILED BODY OF WORK IN FIELD EPIDEMIOLOGY 2018

Severe malnutrition in children who are 6–59 months of age was defined in previous publications as weight-for-height (or length) less than -3 Z-score, or less than 70% of the median National Center for Health Statistics (NHCS)/WHO reference values, or the presence of edematous malnutrition.(3)

Malnutrition in children can take the form of stunting, wasting, or underweight. Children whose weight-for-age indicator is more than two or three standard deviations below the median for the international reference population (ages 0-59 months) are considered moderately or severely underweight. (1)

The prevalence of stunting was 36% in Africa and 27% in Asia. These remain a public health problem, one that often goes unrecognized. More than 90% of stunted children in the world have been living in Africa and Asia. An estimated 80% of world's stunted children lived in just fourteen countries (India, Nigeria, China, Pakistan, Indonesia, Bangladesh, Ethiopia, Democratic Republic of Congo, Philippines, United Republic of Tanzania, Egypt, Kenya, Uganda, and Sudan).

Sub-Saharan Africa and South Asia were the home to three fourths of the world's stunted children, 40% and 39%, respectively (1).

Children whose height/length-for-age indicator is more than two or three standard deviations below the median for the international reference population (ages 0-59 months) are considered moderately or severely stunted (World Bank website 2011). Children whose weight-for-height/length indicator is more than two or three standard deviations below the median for the international reference population (ages 0-59 months) are considered moderately or severely wasted. (2)

According to the World Health Organization (WHO), 60% of all deaths occurring among children aged less than 5 years in developing countries can be attributed to malnutrition. Based on recent estimates, 115 million children under 5 years of age worldwide are underweight, and about 178 million others are too short for their age or stunted, estimate that 50% of children aged 12 to 15 months are underweight, and more than one-third of children less than 5 years are stunted.(2)

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In general, malnutrition is the major public health problem as stated in different literatures above, specifically in developing countries. The causing factor of this problem is not only lack of food. There are a lot of contributing factors like parental illiteracy, larger family size, and low family income, acute and chronic diseases and inappropriate child weaning practice which directly or indirectly interrupt child nutritional status. Therefore, it is important to consider such factors in a given community to intervene and prevent malnutrition. (3)

Malnutrition can best be described in Ethiopia as a long term year round phenomenon due to chronic inadequacies in food instance combined with high levels of illness. It is not a problem found uniquely during drought years, but a year round chronic problem found in majority of households across all regions of the country. (4)

Objectives

General objective

To determine the prevalence of severe acute malnutrition and its associated factors among 6-59 months children in Arsi zone, Tiyo woreda, Oromia region.

Specific objectives

- To assess the magnitude of severe acute malnutrition among children of 6-59 months.
- To assess the factors associated with severe acute malnutrition among children of 6-59 months.

Methods and Material

Study area: - The study will be conducted in Tiyo woreda, Arsi zone, Oromia region, it is far away from Addis Ababa about 175 kilometers. It is located in the south East of Addis Ababa at $7^{\circ} 57' N$ $39^{\circ} 7' E$ Latitude and Longitude with elevation of 2,430 meters ASL, possessing a total area of 65,000 hectare. Total population is 111,100 and children under five 18,254 according to the projected population.



Map of Tiyo woreda

Study Design and period: A community based cross-sectional study will be conducted from June 15/2018 to June 30, 2018 in Tiyo woreda, Arsi Zone, Oromia region.

Source population: - All children from 6-59 months aged residing in the Tiyo woreda will be the source population.

Study population: - Selected children from age of 6-59 months with severe acute malnutrition among 4 kebeles of Tiyo woreda, will be included in the study.

Sample Size and Sampling Techniques: - To determine the sample size, single population proportion formula will be used. The sample size of the study determined using 95% confidence interval, 5% margin of error, design effect of 2 and 35.5% prevalence of under nutrition from previous study in Amhara region west Gojam, 10% non-response rate.

$$n = \frac{(Z / 2)^2 * P (1-P)}{D^2}$$

$$\frac{(1.96)^2 * 0.355(1- 0.355)}{(0.05)^2} = 206$$

206*2+10% = 412+10% = 453 individuals will be included in the study. From all kebeles of the woreda, four of them selected using simple random sampling technique. Households and study units were also selected using simple random sampling method.

Data Collection Methods: - Qualitative data will be collected using a structured questionnaire and anthropometric measurements as well. The questionnaires will be translated to local language Amharic and Afan Oromo, back to English by different person fluent in both languages, and have used to collect data. The collected data reviewed and checked for completeness and consistency.

Data Analysis: - the data will be checked for completeness and consistency before data entry and cleaning. Then analysis will be done using Epi info for analysis.

Data Quality Control: - Pretest will be done out of sampling kebeles. The questionnaire will be modified based on the pretest findings. Training will be provided for data collectors and supervisors on the purpose of the study, on questionnaire, procedure, and techniques of interview. Close monitoring and supportive supervision will be done throughout the data collection period.

Ethical Considerations: - Ethical clearance will be obtained from the Addis Ababa University school of public Health ethical committee, official letter for cooperation to Tiyo woreda administration for permission, a written consent from Health facilities and an informed verbal consent will be obtained from each study participants.

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Budget plan: - The budget needed for the study

No	Budget category	Unit cost	Multiplying factor	Total cost
1	Personnel	Daily wage(including peridium)	No of person*no of days	
	Data collectors	300	2X5	3000.00
	Data entry clerk	200	1X5	1000.00
	Secretarial work	200	1X5	1000.00
	Sub total		Total personnel	5000.00
2	Transport cost	150	5X5	1500.00
	Sub total		Transport Total	1500.00
3	Supplies	Cost per item	Number	
	Questionnaire duplication	birr/questionnaire	500X5.00	2,500.00
	Clip board	50	2	100.00
	Pen	1 pack	200	200.00
	Pencil	1 pack	50	50.00
	Sharper	5/piece	10	50.00
	Printing paper(pack)	200	1	200.00
	Photocopy cost	1birr	300	300.00
	Printing and binding	2birr	50	100.00
	Sub total		Supplies total	3,500.00
4	Training	Cost per item		
	Entertainment /tea and coffee	50birr/participants	5	150.00
	Hall rent	from woreda health office		
	Sub total		Training total	150.00
5	Fuel and other expense			5,000
	Total		Total(1+2+3+4+5)	15,150.00
6	Contingency (10%)		10%*total	1,515.00
7	Grand total		Total (5)+(6)	16,665.00

The total budget allocated for this research will be sixteen thousand six hundred sixty five birr.

COMPILED BODY OF WORK IN FIELD EPIDEMIOLOGY 2018

Gantt chart/work plan/

No	Activities to be done	Responsible body	2018			Remark
			May	June	July	
1	Submitting of research title	Resident				
2	Approval of the title	AAU				
3	proposal preparation	Resident				
	Submission of 1 st draft research proposal	Investigator(me)				
	Submission of final draft research proposal	Investigator(me)				
	Approval of draft research proposal	Investigator(me)				
	Data collection analysis, presentation	Investigator(me)				
	Writing thesis report	Investigator(me)				
	Thesis submission and approval	Investigator(me)				
4	Defense	Investigator(me)				
5	Dissemination of the result to concerned body(AAU, zonal and woreda health office)	Investigator(me)				

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Declaration

I, the undersigned, declare that this is my original work and has never been presented by another person in this or any other University and that all the source materials and references used for this thesis have been duly acknowledged.

Name: Mengistu Temesgen Denboba

Signature _____

Place: Addis Ababa University

Date of Submission: 02- July 2018

The thesis has been submitted for examination with my approval as a university advisor.

Name of advisor: Dr. Adamu Addisie

Signature: _____

Date _____