School of Public Health

Ethiopian Field Epidemiology Training Program (EFETP)

Complied Body of Work in Field Epidemiology

By

Kayse Aydid Abdi (BSC)

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

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Addis Ababa

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Approved by Examining Board

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Chairman, School Graduate Committee

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Advisor

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Examiner

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Examiner

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Acknowledgement

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Also, I would like to express my pleasurer the Ethiopian Field Epidemiology Training Program (EFETP) coordinators, for their overall kind support during the two years engagement in the program.

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Acronyms

AAU-SPH----------Addis Ababa University School of Public Health

AFI----------Acute Febrile Illness

AFP----------Acute Flaccid Paralysis

AR----------Attack Rate

AWD----------Acute Water Diarrhoea

BPR----------Business Processing Reengineering

CDC----------Communicable disease control

CFR----------Case fatality Rate

CHD----------Community health day

CMAM----------Community Management Acute Malnutrition

CSA----------Central Statistical Agency

CTC----------Case treatment centre

DHV----------Dengue heamorregic fever

EDHS----------Ethiopian Demographic health survey

EFETP ----------Ethiopian Field Epidemiology Training Program

EPHI----------Ethiopian Public health Institute

ESRB----------Ethiopian Somali Regional Health Bureau

FMOH----------Federal Ministry of Health

GAVI----------Global Alliance for Vaccine and Immunization

GAM----------Global acute malnutrition

GPEI----------Global Polio Eradication Initiative

HC----------Health Center

HP----------Health Post

IDSR----------Integrated Disease Surveillance and Response

IRC ----------International Rescue Committee

MDSR----------Maternal Death Surveillance and Response

NGO----------Non-Governmental Organization

NP-AFP----------None Polio Acute Flaccid Paralysis

OCHA----------Office for the coordination humanitarian affairs

PCR----------Polymerase chain reaction

RED----------Reaching every district

RTD----------Rapid Diagnostic Test

SAM----------Sever acute mal-nutrition

SIAs----------Supplemental Immunization Activities

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

UCI----------Universal Child Immunization

UNICEF----------United Nations children's international Emergency fund

VPD----------Vaccine preventable disease

WPV----------Wild Polio Virus

WHO----------World Health Organization

ABE----------Alternative Basic Education

Executive summary

The Ethiopian Field Epidemiology and Training Program (EFETP) is a 2 year competency based program which 25% is class and 75% is the field base work (residency). The residency (learning by doing) enables to acquire basic knowledge and skills, majorly in outbreak investigations, public health surveillance and other related competencies. The program was jointly running by different stake holder such as Addis Ababa University, EPHI (Ethiopian public health institute), EPHA (Ethiopian public health association), Federal Ministry of Health (FMOH) and CDC-Atlanta. This compiled Body of Works have nine chapters which all of them were done during Residency at Somali field base. This nine chapter included outbreak investigation, Surveillance data analyse, Surveillance system evaluation , Descriptive health profile, Scientific Manuscript for Peer review journals, Abstract of scientific presentation, need assessment, Project proposal and other activities done during Resident like, Weekly bulletin and Training.

The first chapter was outbreak investigation, which I have conducted two outbreaks investigation and well documented. Frist one was a case control study on dengue fever outbreak for Godey Town, May 2015. And the second was measles outbreak investigation in Jijiga city administration, March 2015.

Chapter Two: Explain about Measles case based disease surveillance data review and analysis that was conducted at Regional level. I received 4 year data for RHB data base and EPHI Then, analysed to determine trends in performance of the measles case-based surveillance from 2010-2014 for Ethiopian Somali Region.

Chapter Three: Surveillance system evaluation of acute flaccid paralysis (AFP) and the aim was to assess the performance of the AFP surveillance system and forward practical solution to support and improve the surveillance system of Dolo zone of Ethio-Somali Region in 2016.

Chapter four: Descriptive woreda health profile were conducted from Septembar-12-up to 25 in Shinile District of Ethiopian Somali Regional State in 2014 and the aim was to overview of the Social, Economic, Demographic and Geographic Health status for Shinile District is Somali Regional State, and descriptive correctional study was used.

Chapter five: Manuscript for peer reviewed journal of dengue out of Godey city administration, May 2015.

Chapter Six: Abstract were also prepared from dengue fever outbreak and submitted for scientific conferences.

In chapter seven: Meher Need Assessment on Health and Nutrition was done Sitti zone (especially those effected by Elino), Ethio-Somali Regional State, November 2015 and the objective was to update drought related health problems in Sitti Zone, and to identify immediate needs to assess the adequacy of existing capacity of the Region to handle the situation.

Chapter Eight: Assessment of Vaccination Coverage & Its Determinant in Kebribayah Woreda, Somali Region, Ethiopia May 2016.

Chapter-Nine: Other output that were conducted during Resident such weekly epidemiological bulletin, and training.

Chapter 1

Outbreak Investigation report

1. Investigation of Dengue fever outbreak in Godey town of Shebelle zone, Ethiopian Somali Region, June 2015

1.1. Abstract

Introduction:-Ethiopian Somali Regional Health Bureau was notified by Godey Hospital about an outbreak of unknown acute febrile illness in Godey Town of Shebelle Zone. The illness was characterised by acute onset of high grade fever, chills, headache, and muscle pain. Local health office could not identify the causative agent. Regional health Bureau had sent team to investigate and respond the outbreak and respond. The investigation was conducted to verify the outbreak, identify the etiologic agent, risk factors and recommend control and prevention measures.

Method:-Unmatched case control study supported by descriptive study was used. The investigation carried out from May 20 to July 5, 2015. Line listing all cases was done. We interviewed 34 cases and compared with 68 controls using structured questionnaire. Cases were from hospital and controls were patients admitted in hospital with other medical problem. Eleven serum blood specimens collected and sent to EPHI for investigation of viral infection. Data were entered and analyzed using EPI-Info 7 version 3.2.2. Bi-variate analysis and multi variate analyses were done.

Result:-From May 05 to July 25, 2015 a total of 168 AFI cases with no death were reported in health facilities of Godey Town. The crude attack rate was 22.4 per 10,000. The attack rate in male (24/10,000) was higher than female (20/10,000). Age group 15-44 were highly affected (34.4/10, 000) followed by >45(23.4/10000). Out of 11 serums specimen sent to EPHI, 7 (63%) positive for dengue fever IgM by ELIZA. Many larvae were observed in many of the households visited in Kebeles 01 and 02. In multivariate analyse being sprayed their home were (AOR=0.3; 95%CI: 0.17(0.04-0.6) and using of mosquito repellent (AOR=0.15; 95%CI: (0.05-0.6) shown protective significant association while presence of sick person at home ((AOR=7.3; 95%CI: (2.9-40) shown and Presence of stagnant water around living area (AOR=3.9; 95% (1.03-14) shown negative association towards the occurrence of Dengue Fever.

Conclusion:-Based on laboratory results, cases fulfil definition standard case definition and the vector identified in the assessed households, the causative agent of the outbreak was Dengue Fever Virus. To interrupt the transmission we recommend house hold spray, using mosquito repellent, strengthen social mobilization and dissemination of Dengue fever Key messages.**Key word**: Dengue fever: Godey Town

1.2. Introduction

Dengue is the most rapidly spreading viral vector borne disease worldwide. Approximately 2.5 billion people are living in areas with risk of dengue transmission and an estimated 50-100 million infections occur annually (1). The incidence of dengue virus infection is rising in endemic areas in tropical and subtropical Regions worldwide (2).

Dengue Fever is known as one of the most important arthropod-borne viral diseases affecting humans. Over the past several decades, major outbreaks of Dengue Fever have occurred in many countries, causing significant morbidity and mortality. (2) The magnitude of the Dengue Fever remains alarming. Frequent travelling over the world can cause further spread of Dengue Fever from the endemic areas to many previously unaffected areas (3).

Dengue viruses are members of the genus *Flavin-virus* and family *Flavivridae*. They are single-stranded RNA virus with an icosahedral nucleus capsid surrounded by an envelope. There are four distinct serotypes: DEN-1, DEN-2, DEN-3, and DEN-4. Infection by one dengue serotype can give rise to life-long immunity to the serotype, but only partial protection to other serotypes. Sequential infection by different serotypes of dengue virus has been generally accepted as the predisposing factor of dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS). DHF is more likely to occur when dengue virus affects a person with immunity to a heterologous serotype. The frequency of each serotype causing DHF/DSS is in descending order of: type 2, 3, 4, and 1.All four dengue virus serotypes (DEN-1 to DEN-4) are presently circulating in different geographical areas (4).

Dengue fever and dengue haemorrhagic fever are prevalent in urban areas, as *Aides Egypt* mosquito, the vector of dengue (family: Culicid; genus: *Aides*, subgenus: *Stegomyia;* species: *Aedes aegypti*), usually breeds in urban and peri-urban areas (5).

The rapid growth of industries and building activities, improvement of transport facilities such as railway and roads, increased movement of people from urban to rural areas, and environmental changes have all favoured the spread of dengue in rural as well as urban areas(6).

In the last 50 years, incidence has increased with increasing geographic expansion to new countries and, in the present decade, from urban to rural settings. Dengue has mostly been

documented in Africa from published reports of sero-surveys or from diagnosis in travellers returning from Africa, and dengue cases from countries in Sub-Saharan Africa (11).

Dengue fever had not been previously reported in Ethiopia; it had been previously reported in European travellers returning from Ethiopia, In Ethiopia there is no report of dengue fever until 2013 which is reported from the beginning of the outbreak in mid-October to 9,500 cases were reported from Dire Dawa City (7)

Ethiopian Somali Regional Health Bureau received report about an increase in the number of fever cases from Godey Town of Shabele Zone. Following this report, Regional Public Health Emergency Management (R-PHEM) send team composed of Field Epidemiology Residents, Doctors, Entemiologist & Environmental health professionals to the site of outbreak having the following of confirming the existence of an outbreak; describing the outbreak in relation to time, place and person; to determine the aetiology of the outbreak; and to recommend measures to control the outbreak.

1.3. Objective

1.3.1. General Objective

To investigate the Dengue fever outbreak in Godey Town of Shabele Zone, Somali Region and enhance outbreak prevention and control measures

1.3.2. Specific Objective

- ✓ To verify the existence of the outbreak
- ✓ To describe the magnitude and distribution of the outbreak
- ✓ To identify the source of the outbreak
- ✓ To identify the possible risk factors for transmission of the outbreak

1.4. Method and materials

1.4.1. Study area

Ethno-Somali Regional State has 9 administrative zones, 68 woreda/districts and 4 cities administration, Godey is one of the administrative cities in the Region and found in Shebelle zone. It is located in eastern part of the country about 1,200 km from Addis Ababa and 530 kilo meters away from the Regional capital, Jig-jiga. It is the second largest Town in Somali Region. Total population of Godey is 75,000. The Town is governed by City Administration led by Mayor. The Town is subdivided into 10 Administrative Kebeles. It is also the Capital of Shebelle Zone. The Town is well known for its Semi-arid weather condition and low altitude with flat land surfaces. The temperature is scaling up to 43oC. The altitude varies from 270 to 300 meters above sea level. The main means of subsistence in the Town is farming and small scale trades. There is long and large River (Wabishebelle) that flows crossing the Town. There are 1 Governmental Hospital, 3 private clinics, 1 NGO (SOS) Health center and 4 health posts in Town. Currently, there is huge scarcity of safe drinking water in the Town; hence the population in the Town uses drinking water from unsafe open water sources

1.4.2. Source population:-Source population is people living in Godey city admiration during in the study period

1.4.3. Study population:-The study population was the Sub-population living in woreda that were Kebeles which dengue cases effected

1.4.4. Study design and period

Unmatched case control study design supported by descriptive study was used. The investigation was carried out from May 25 to July 7, 2015 in Godey Town of Shebelle Zone of Ethiopian Somali Region.

1.4.4. The sample size: contains 34 dengue fever case and 68 non dengue case living Godey

City administration

1.4.5. Sampling Technique:

We visited highly effected kebeles such 01 and 02 of Godey City administration

We also assessed to identify mosquito vector for Dengue fever. To found mosquito breeding site, we assessed presence of larvae in 70 households in Kebele 01 and 02 of Gode Town. Three water sources also visited.

Data collection

Descriptive*:* Line list collected from registration and patient cards in the health facilities and descriptive analysis was conducted. Discussions were conducted with health workers and authorities structured questionnaire was used in order to collect basic epidemiological information: symptoms, date of onset of disease, medical care, and age group affected,

Analytical study: unmatched case control study (1:2) done. Cases were based on standard case definition from hospital. Controls were patients admitted in hospital with other medical problem other than dengue fever. Data were collected with structured questionnaire that addresses possible risks. Oral consent from the study subjects was asked. We interviewed 34 cases and compared with 68 controls.

Clinical and Laboratory Diagnosis

Patient records were reviewed for common symptoms associated with febrile illnesses, and clinical history using case definitions. Blood specimen was collected from all febrile cases malaria to check haemo-parasite using Giemsa stain wedel and wield Felix tests for typhoid and typhus.

We collected 11 blood serums to be analyzed at national laboratory (EPHI) for vector born viral infection such as yellow fever, Dengue fever, West Nile fever, Rift valley fever by using ELISA technique.

1.4.6. Operational definition:-

Dengue fever suspected case: any person with AFI illness of 2-7 days duration with 2 or more of the following: headache, retro-orbital pain, myalgia, arthralgia, rash, haemorrhagic manifestations, leukopenia.

A laboratory confirmed case is a suspected case which has laboratory results indicating infection (IgM positive, rise IgG antibody, positive PCR or viral isolation for dengue virus)

Epidemiologically linked case is a suspected case, which has contacts (possibly got the virus) with laboratory confirmed case or another epidemiologically confirmed case

DHV: A probable or confirmed case of dengue with bleeding tendencies as evidenced by one or more of the following: positive tourniquet test & bleeding

1.4.9. Statistical Methods

Data were entered and analyzed using EPi-Info 7 version 3.2.2 statistical software package. Frequency and percentage were calculated for the study variable. Bi-variation analysis and multi viraite analyses were used, 95% CI and p-value were used. In all statistical tests, the differences were considered to be statistically significant if p-value was less than or equal to 0.05. Odd ratio and 95% were confidence interval used.

1.5. Result

Starting from May 25 to July 7, 2015 a total of 168 AFI cases with no death were reported in Godey Town. The index case was seen in kebele 02 of Godey Town on May 27, 2015. This case was 26 years Male who had travel history to Kelafo woreda which 90km from Godey. Then the cases build up gradually and reached the peak at June 27, 2015.

1.5.1. Descriptive Investigation

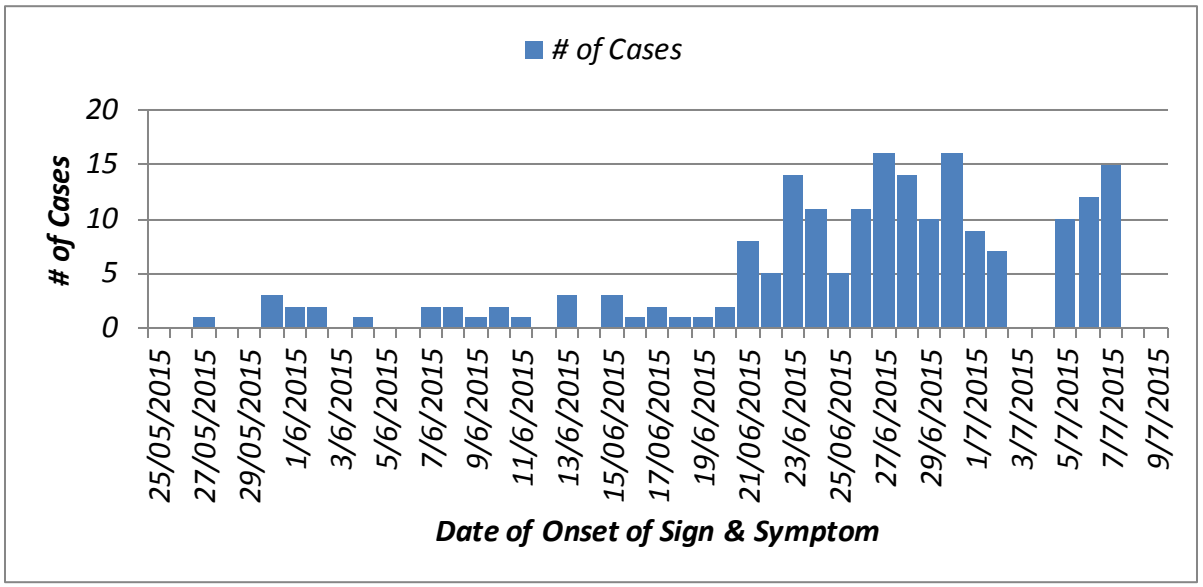

Figure 1.5.1:- showing Epi-curve of AFI cases by date of onset of dengue fever in Godey Town, Shabele Zone of Ethio-Somali Region, June 2015

Distribution of cases by sex

The crude attack rate of dengue fever was 22.4 per 10,000 populations. Out of 168 Acute febrile illness treated at health facilities, 84 (50%) were females and 84 (50%) were males. The AR was higher (24/10,000) among males compared with females (20/10,000) as shown on table 1.5.2.

Table 1.5.1:- distribution and attack rate of AFI case by Sex in Godey Town of zone, Ethio-Somali Region, June 2015

Sex	Population	Number case	Percent	Attach rate rate/10,000	Number of death	CFR
Male	34,000	84	50%	24	0	0
Female	41,000	84	50%	20	0	0
Total	75,000	168	100	22.4	0	0

Distribution of cases by age

Dengue fever outbreak affected all age group (three months to 80 year). The mean ages of the affected cases were 23 years. High number of cases were reported from age group ranging 15-44(67.8%), followed by 5-14(12.6%) while least were those <1(1.7%). The attack rate was high on age group 15-44 which was 34.4/10,000 population, followed by age group >45 (23.4/10,000). (Table 1.5.3)

Table 1.5.2:- Attack rate of AFI case by age group in Godey Town of Shabele Zone, Ethio-Somali Region, in June 2015.

Age Group of AFI cases	Population	Number of cases	Percent (%)	AR per 10,000	Number of death	CFR
<5	10,950	11	1.7	10	0	0
5 to 14	22,800	22	13.1	9.7	0	0
15 to 44	32,250	114	67.8	34.4	0	0
>45	9,000	21	12.6	23.4	0	0
Total	75,000	168	100	100	0	0

Distribution of cases by kebeles

From total cases treated at health facilities, only about 113(67.8%) of cases were identified by their kebeles, while the remaining of cases 55(32.1%) were not identified. From those their kebeles were identified 31% were from kebele 02, followed by kebele 01 (23.3%). The cases were reported from all kebeles of town with varies number.

Table 1.5.3:- distribution and attack rate of AFI case by kebele in Godey Town of Shabele zone, Ethio-Somali Region, June 2015

Name of kebeles	Population	Number of cases	%	AR per 10,000	CFR
1	8,897	27	23.9	30.4	0
2	12,858	35	27.4	24.1	0
3	9,560	13	11,5	13.6	0
4	10,000	13	11,5	13	0
5	10,487	12	10.61	11	0
6	15,847	10	8.84	6.3	0
7	7,351	10	8.84	6.3	0
Total		113	100.0		0

Laboratory investigation

All the suspected cases of AFI were tested for Haemo-parasite, typhoid, typhus and rickettsia in health facilitated found in the Town. None of the cases were positive for the test. The first laboratory confirmed case was identified accidentally, when a UN staff from Godey Town got sick and visited UN Clinic, from where blood sample was sent to EPHI and found to be positive for Dengue virus. Additional 11 blood samples were collected by Godey City Administration Health Office and sent to EPHI from which 7 samples were positive for Dengue virus IgM by ELIZA method. Later FMOH team brought dengue RDT, We tested 28 cases and 11 cases become positive.

Clinical presentation

During an outbreak management from the total treated (168), majority 151(90%) of the cases were managed at OPD, while 17(10%) were admitted. All cases developed high grade fever 168 (100%), head ache was seen among 167 (99.4%) of cases, while 28 (17%) of cases developed nasal bleeding as shown below table (table 1.5.4)

Table 1.5.4:- Sing and symptom among the case treated in Godey town, Shebelle zone, Ethiopian Somali Region, in2015

Symptoms	Number of cases	Proportion (%)	Diagnosis methods
High grade fever	168	168/168 (100%)	Thermometer
Headache	167	167/168(99.4%)	Clinical
Joint pain	133	133/168 (79.1%)	Clinical
Chills	125	125/18 (74.4%)	Clinical
Nasal bleeding	28	28/168 (17%)	Clinical

Environmental activities and control

Suspected mosquito breeding sites were assessed to identify mosquito vector for Dengue fever. To found mosquito breeding site, we assessed presence of larvae in 70 households in Kebele 01 and 02 of Gode Town. In 29 (41%) households larvae of aides mosquito found in water containers.

The barrels were not properly covered, unhygienic, and the water remains unused for up to 3 days-1 month. During the household visits, the team provided key message to families how to manage the water to make it clean, mode of transmission of dengue fever and the prevention and control measures.

Three water sources were visited – two of them were open ponds which were located in the southern part of Godey. The other is closed and cemented water tanker located to the north of Godey; no mosquito larvae were observed in all of these visited water sources. As information obtained from the Woreda Health Office, chlorine was not being added at the time of study into the water sources due to shortage of chlorine in Godey.

1.5.2. Analytic investigation

We interviewed 34 suspected acute febrile cases (median age: 24 years) and 68 control subjects (median age: 26 years). In bivariate analysis, the presence of stagnant water, living around rivers, wearing short clothes during day time and presence of sick person in their home were risk factor while sparaying the house with antimosquito chemichal and mosqueto repelent and house spray show shows protective assocation

Table 1.5.5:-Bivariate analysis for different exposures, Godey town, Shebelle zone, Ethiopian Somali Region, in June 2015

Exposure		Cases	Control	COR(95%CI)	P. value
Having ITN	Yes	28	52	1.4 (0.51-4.1)	0.49
	No	6	16		
Presence of stagnant water around living area	Yes	19	22	2.6 (1.14-6.17)	0.022
	No	15	46		
Having river near area	Yes	21	27	2.5(1.05-5.71)	0.035
	No	13	41		
Using short closes during day time	Yes	26	30	4.1(1.63-10.39)	0.002
	No	8	38		
[Using of window screen and air conditioner	Yes	19	38	1(0.4-2.9)	1.000
	No	15	30		
Are your home spayed	Yes	9	38	0.3(0.12-0.69)	0.005
	No	25	30		
Is there sick person in your home	Yes	26	21	7.3(2.83-18.71)	0.000014
	No	8	47		
Did you use mosquito repellant?	Yes	10	37	0.4 (0.15-0.84)	0.02
	No	24	31		

Multi-variate analysis done for all variables which had shown association during bivariate analysis. However, four variables show significant association on multivariate analysis. These includes; presence of stagnant and sick person in the house were a risk factor while home spray and using of mosquito repellent shown protective s association

Table1.6.6.Multivariate analysis for different exposures, Godey town, Shebelle zone, Ethiopian Somali Region, in June 2015

Exposure		Cases	Control	COR(95%CI)	AOR(95%CI)	P-value
Presence of stagnant water around living area	Yes	19	22	2.6 (1.14-6.17)	3.9 (1.03-14)	0.045*
	No	15	46			
Having river near area	Yes	21	27	2.5(1.05-5.71)	1.27(0.4-4.1)	0.70
	No	13	41			
Using short closes during day time	Yes	26	30	4.1(1.63-10.39)	3.6(1-13.1)	0.05
	No	8	38			
Are your home spayed	Yes	9	38	0.3(0.12-0.69)	0.17(0.04-0.6)	0.01*
	No	25	30			
Is there sick person in your home	Yes	26	21	7.3(2.83-18.71)	10.6(2.9-40)	0.000*
	No	8	47			
Did you use mosquito repellant?	Yes	10	37	0.4 (0.15-0.84)	0.15 (0.05-0.6)	0.007*
	No	24	31			

1.5.3. Responses activities conducted

Active case search was conducted by investigation team, including staff from RHB and City Health Office, Urban HEWs, and community members, in line with creating awareness to the community and case referral to health facilities. Case management at hospital and private clinics; Advocacy meeting at higher level – City Administration:

The City Administration Mayor took responsibility, call a large forum meeting with Kebele Cabinets, and Urban HEWs, provided a guide that every Kebele in collaboration of Urban HEWs, and with support of RHB and City Health Office, to undertake urgent prevention and control measures. More than 1,500 people attended the meeting Focus areas for the directions included:

- ✓ Active case search, referral, and case management
- ✓ Environmental management, including household water treatment and management and IRS spray
- ✓ Social mobilization and awareness creation
- ✓ Environmental sanitation

1.6. Discussion

The outbreak investigation was conducted in Gode Hospital and private clinic located in Gode Town of Shebelle Zone. It was evident that the Dengue fever might have started much earlier than the date reported by the council as most of cases were treated as malaria at health facilities.

In current dengue fever investigation, there was no deaths report, which may indicate to a good case management at both Gode Hospital and private clinics.

In this study, most of the patients were in the age group of 15–45 years; this finding was similar to that of a study in west Bengal (8), this could be related to differences in lifestyle, time spent outdoors near vectors, sleeping without mosquito nets or other aspects of inadequate disease prevention among the young. Another explanation could be that the disease can create lifelong immunity for the individual, so that older persons who have been exposed more often may have more resistance, decreasing the morbidity rate (10).

Non-use of protective measures while living in a dengue endemic area was a risk factor identified in current investigation. Similar finding was reported from Malaysia (9)

In current outbreak being sprayed their home was among factors identified the main reason for not spraying was Shortage of IRS/out of stock and IRS spray materials according to council health office

Based on the outbreak investigation findings and the laboratory confirmation of Dengue virus by RDTs and PCR, the outbreak under question was due to Dengue Fever. The outbreak response, prevention and control measures need strengthening in order to control the outbreak as soon as possible and avoid unnecessary health and socio-economic consequences.

1.7. Conclusion

Based on laboratory results, cases fulfil definition standard case definition and the vector identified in the assessed households, this investigation identifies that the aetiology of the outbreak was Dengue virus. not praying of home, without using mosquito replant and contact with patients having dengue at home were contributing factors fort outbreak.

1.8. Recommendation

- ✓ Strengthen social mobilization and dissemination of Dengue fever Key messages, with full participation of the community.
- ✓ Continue with urgency the house to house IRS spray, particularly for highly affected Kebeles 01 and 02.
- ✓ Mobilize and allocate operational budget for intervention like spraying and social mobilization

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Annex1.1.1: questionnaire for un know febrile ilness, in Godey Town of Shabele Zone, Somali Regional Health Bureau, 2015

No.	Question	Coding Classification	Go To
Demographic Information			
	Respondent ID	_____	
	Sex	1.Male 2.Female	
	Age	_____Years, _____ Months	
	Maritul Status	1. Single 2. Married 3. Divorced 4. Widowed 5.NA	
	Occupation	1. Student 2. Dailly laberer 3. House wife 4. Merchant	
	Number of family members?	_____	
Clinical Information			
	Respondent Classification	1. Cases 2. Controls	If Control skip to 3.1
	Date of Onset	dd/mm/yyyy _____	

No.	Question	Coding Classification	Go To
	Sign and symptoms	1.Fever 2. Headache 3. Joint Pain 4. Chill 5. Nasal Bleeding 6. severe muscle and joint pain	
	Date seen at health Facility	dd/mm/yyyy _____	
	Treatment	Antibiotics _____ Antiviral _____ Antipyretics _____	
Laboratory Specimens			
	Blood Serum	1.Yes 2.No	
	BF	1.Yes 2.No	
	Whole Blood	1.Yes 2.No	
Expsure			
	Do you have bed net?	1.Yes 2.No	

No.	Question	Coding Classification	Go To
	If Yes, do you use bed net while sleeping?	1.Yes 2.No	

	Do you have bed net?	1.Yes 2.No	
	If Yes, do you use bed net while sleeping?	1.Yes 2.No	
	When did you get the last bed net?	_____ Year	
	Who use bed net always?	1.Children 2.Women 3. All use equally	
	Is there any stagnant water around your village?	1.Yes 2.No	
	If Yes, approximately distance of stagnant water from your house?	1.less than 100m 2.more than 100m	
	Is your house sprayed?	1.Yes 2.No	
	When was the last time that your house sprayed?	1.One month ago 2.Two months ago 3, Three months ago	

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

2. Measles outbreak investigation in Jigjiga Town of Ethiopian Somali Region, May, 2015

2.1. Abstract

Introduction:-Measles remains to be common disease in many parts of the world. Measles is the most common cause of morbidity and mortality in Ethiopia. We received Rumours of Suspected Measles Outbreak from Jijiga Town. We investigated to verify the existence of outbreak, determine the magnitude of the outbreak, and undertake appropriate public health control measures in Jigjiga Town, Ethio-Somali Region,

Methods:-Descriptive investigation was conducted between from 13/3/20015 to 30/4/2015. We defined a suspected measles case as any person with fever, rash, cough, and coryza in Jijiga Town kebeles & surrounding from 13/3/2015 to 30/4/2015. Case patients were line listed and information on age, sex, residence, date of onset,, vaccination status, were collected. Five blood samples were collected. The collected data were entered in to Epi info 3.5.1 version and analysed using both Epi info & Microsoft Excel 2007.

Result:-During study period, a total of 95 suspected Measles cases were reported with four deaths. The overall attack rate and case fatality rate was 6.5/10,000 and 4.2%respectively. Highly affected (32.1/10,000) and high case fatality (5.2%) were those age group <5 years, 49(51.6%) of the cases were male. High number of cases 23(27%) are from 03 kebele followed by kebele 14 which is 9(11%). The cases were also reported from 6 rural kebeles surrounding Jijiga kebeles. Five blood samples become positive for measles IgM. Majority 59(62.1%) of the cases were unvaccinated. Case management, intensifying of surveillance and vaccination campaign targeting < 5 children were among intervention conducted.

Conclusion and recommendation: There was laboratory confirmed measles outbreak in Jijiga Town affecting mainly under five children. Promotion of awareness in the community by health education on measles and strengthening routine immunization are among the recommendation

Key word: Measles, Jijiga Town

2.2. Introduction

Measles remains to be a common disease in many parts of the world. An estimated 10 million cases and 164,000 deaths from measles occur worldwide each year, Measles is a leading cause of vaccine-preventable deaths among young children worldwide (1, 2)

Measles is one of the communicable diseases, which is still causing preventable mortality and morbidity in the country. Measles is an acute highly contagious viral disease caused by Measles virus. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva. Common source outbreaks associated with airborne transmission of measles virus have been documented (2).

Measles virus is paramyxovirus of single serological type. The disease is highly communicable with an incubation period of about 10 days (with a range of 7 to 18 days). The disease is characterized by prodromal fever, conjunctivitis, coryza, cough and presence of koplik spot. A characteristics Maculopapular rash appears on the third to seventh day beginning on the face and become more generalized. Man is the only host factor for the measles virus (3).

WHO defines a suspected measles outbreak as the occurrence of 5 or more reported suspected measles cases in a health facility or district in 1 month, with plausible means of transmission. This threshold value should trigger an outbreak investigation to determine the true size and reason for the outbreak. An outbreak of measles is said to have been confirmed when there are 3 or more IgM positive measles cases in a health facility or district in one month(4).

In countries like Ethiopia, the standard case-fatality rate has been estimated at between 3% and 6%; the highest case-fatality rate occurs in infants 6 to 11 months of age, with malnourished infants at greatest risk.(4) These rates may underestimate the true lethality of measles because of incomplete reporting of outcomes of measles illness. In certain high-risk populations, case-fatality rates as high as 30% have been reported in infants aged less than 1 year of age (4).

Measles cases continue to be reported in large numbers despite on-going Government efforts for mass immunization.

In 2014-15 measles outbreak occurred in many Woreda of the Region. Jigjiga, Gashamo, Kabridahar & Dhegahbur and Kabribayah woreda were among the most affected communities in the Region and more than 1,500 cases were reported (5).

On up to February, 2015 Rumors' about Suspected Measles Outbreak were received by Regional Health Bureau Public Health Emergency Management (RHB-PHEM) from Karamara Hospital. A team composed of resident of field epidemiology went to the hospital and to verify the rumor and identify the extent of the problem and to give technical support to the Town and undertake appropriate intervention based on the finding.

Justification

The measles outbreaks reported since February in jigjiga Town of Somali Region, The outbreak were occurred same woreda Faafan Zone and later expanded Jigjiga Town. Since the City is the capital of the Region and presence of high community mobility in-out, the probability of the cases to expand to other areas is high unless appropriate control and intervention was undertaken timely.

2.3. Objective

2.3.1. General objective

To Verify and determine the magnitude of the outbreak and to undertake appropriate public health control measures in Jijiga Town- Ethio-Somali Region,

2.3.2. Specific Objectives:

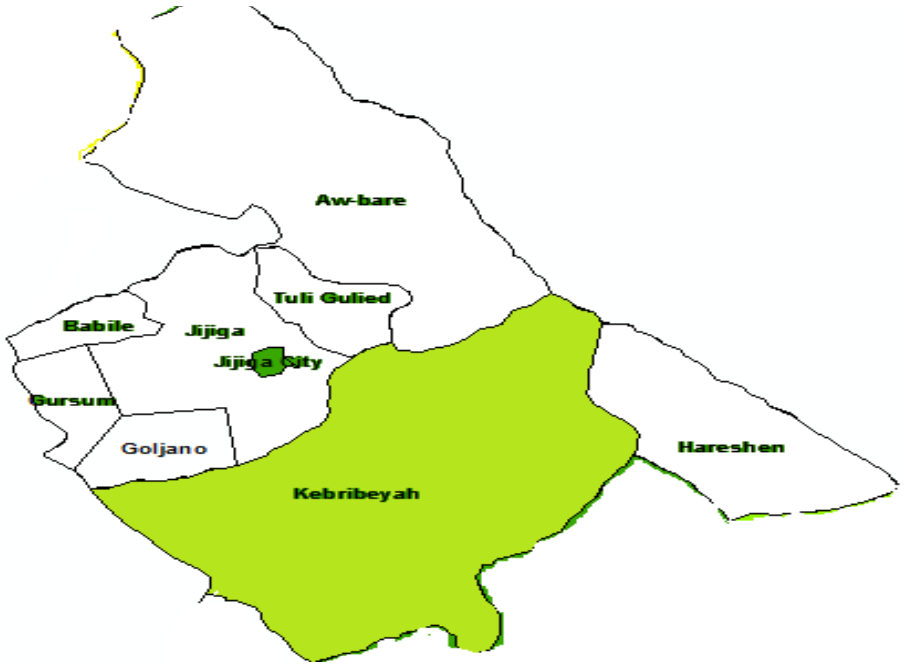
- ✓ To confirm the existence of the measles outbreak in Jigjiga Town
- ✓ To describe distribution of the outbreak
- ✓ To recommend prevention and control measures

2.4. Methods

2.4.1. Study area and Study Population

Jigjiga Town is located in the eastern part of the country. It is located 610 km away from Addis Ababa and it is the capital for Somali Region; the climate is warm and temperate. Jigjiga has a significant amount of rainfall during the year. This is true even for the driest month. The average annual temperature in Jigjiga is 19.4 °C. The rainfall here averages 712 m

Administratively, it consists of 20 urban kebele 10 rural, Total population of the Town is estimated to be 350,000 in 2015 (168,000male and 182,000 females). In terms of health delivery system, Jijiga Town has one Hospital, 3 health centers, 12 health post and 35private clinic.



Map.2.4.1- Map of jigjiga city of Ethiopian Somali Region, in 2015

2.4.2. Study period

The investigation was carried out from 13/3/2015 to 30/4/2015

2.4.3. Source population

Source population is people living in Jigjiga city administration during the study period.

2.4.5. Study population

The study population was the Sub-population living in jigjiga that that were affected by measles cases.

2.4.3. Study design

Cross-sectional descriptive investigation was conducted

2.4.6. Sampling procedure

The sampling procedure was convenience sampling method in which all measles case reported throughout the city was included in to the study.

2.4.4. Data collection and analyse

Reviewing of records & developing of line list. Also we interviewed patients, Health workers managing cases at hospitals. We defined a suspected measles case as any person with fever, rash, cough, and coryza in Jigjiga Town & surrounding from 13/3/2015 to 30/4/2015.We also conducted active case search in the community. The collected data were entered excel and analysed Microsoft Excel.

2.4.6. Laboratory Investigation

Five blood samples were collected from patients for confirmation and sent to the National laboratory.

Operational definition

A laboratory confirmed case is a suspected case which has laboratory results indicating infection (IGM positive or isolated for a measles virus)

Epidemiologically linked case is a suspected case, which has contacts (possibly got the virus) with laboratory confirmed case or another epidemiologically confirmed case

Measles-related death is a death in an individual with confirmed (clinically, laboratory, or epidemiologically) measles in which death occurs within 30 days of rash onset and is not due to other unrelated causes Example A trauma or chronic disease

1.4.7. Ethical Consideration

Permission for outbreak investigation was obtained in a form of supportive letter from the Ethiopian Somali Regional Health Bureau.

2.4.8. Dissemination of finding

The finding of investigation was shared for Jijiga Town administration, Karamarada Hospital, Regional Health Bureau, and AAU-SPH of the EFETP Program.

4.5. Results

From May 13 to April30, 2015, a total of 95-suspected measles cases with four deaths were reported from health facilities in Jigjiga Town and through active case search in the community. The overall attack rate and case fatality rate were 6.5/10,000 and 4.2%, respectively.

Distribution of cases by sex

In this outbreak 49(51.6%) of the cases were males while females constituted 46(48.4%)

Distribution of cases by age

During the outbreak, highly affected (32.1/10,000) were that age group <5 years, followed by 5-14(3.8/10.000) while no cases were reported from those >45 years. Including community deaths in current outbreak there were four deaths and all of deaths were from that age group under five. (Table 2.5.1)

Table 2.5.1.Showing distribution of measles cases by attack rate and age Jigjiga Town in May, 2015

S.No1	Age Group	Measles cases							
		Population	Male	Female	Total	Percentage (%)	number of death	CFR in %	Attack rate/10,000
1	Less than 5	24,009	43	34	77	81.1	4.0	5.2	32.1
2	5 to 14	45,106	6	11	17	17.9	0.0	0.0	3.8
3	15 to 44	66,934	0	1	1	1.1	0.0	0.0	0.1
4	45+	9,458	0	0	0	0	0	0.0	0.0
	Total	145,507	49	46	95	100	4	4.2	6.5

Distribution of cases by place

The cases were scattered in different kebeles of the Town and the surrounding kebeles of the District. The outbreak affected 15 kebeles of Jigjiga Town and woreda kebeles as shown below:-High number of cases 23(27%) were from 03 kebele followed by kebele 14 which were 9(11%). The cases were also reported from 6 rural kebeles surrounding Jijiga kebeles (fig 2.5.1)

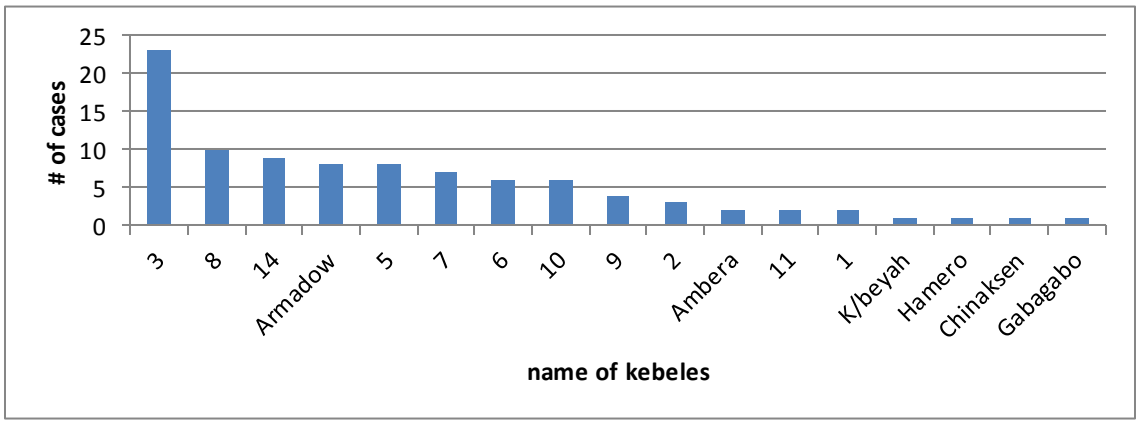


Figure:-2.5.1. Distribution of measles cases per kebele in jigjiga Town, in May 2015

Distribution of cases by time

The index case was seen on March 13 on 8 months old unvaccinated boy who came from Hemero. The second case was from kebele 10 & he was 4 years old unvaccinated boy. Then the cases propagated to other 10 kebeles of the Town and its surrounding 3kebeles.

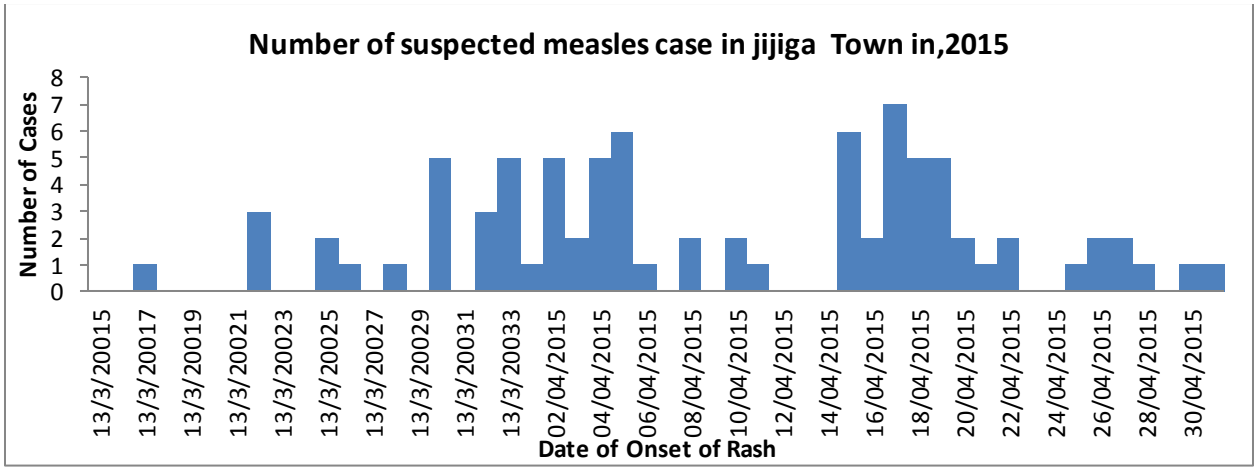


Fig 2.5.2:- Showing Number of suspected measles case by date of onset in Town, May, 2015

Distribution of Suspected cases by Vaccination Status

When we see the distribution of suspected cases by vaccination status, majority 59(62.1%) of the cases were unvaccinated, 28(29.5%) were vaccinated, while the vaccination status of the remaining eight (8.4%) were unknown. (Table 2.5.2)

Table 2.5.2:-Showing distribution of cases by vaccination status, Jigjiga Town, in May, 2015

Vaccination status	Number	Percentage
Vaccinated at least 1 dose	28	29.5
Un vaccinated	59	62.1
Unknown	8	8.4
Total	95	100

Laboratory investigation

Five blood samples which were taken for measles IgM confirmation and all (100%) of the serum were positive for measles IgM at the National Reference laboratory.

Intervention done

- ✓ Three measles cases management isolation centers were established in Karamara Hospital
- ✓ Orientation was given to some health personnel working on case management at health facilities
- ✓ Active case search was initiated was by PHEM and Jigjiga Town Health Office. As a result 29 (35%) unreported cases were identified in the community.
- ✓ Sensitization of community members on measles case management was done during active case search.
- ✓ 4500 under 5 children were vaccinated in out beak affected kebeles

1.6. Discussion

The overall attack rate and case fatality rate was 6.5/10,000 and 4.2%, respectively. In current outbreak, there was high fatality compared with the National the measles guideline in which (1-3%) is accepted (4) while it is within Current estimates of CFRs used by WHO in endemic countries range between 0.05% - 6%(7). The higher fatality can be explained by late coming of patients to health facilities and this may contribute to developing of complications, which result in deaths (8).

All collected blood samples (5/5) were positive for measles virus-specific immunoglobulin M (IgM) at National Laboratory, which is enough to confirm measles outbreak according to the MOH- WHO guideline. All other cases were confirmed by Epidemiological linkage (4).

The mostly affected age group in current outbreak was among age group < 5 and in addition with high-unvaccinated children may show weakness in routine immunization coverage among affected children.

In the current measles outbreak, about 81.1% of the cases were < 5 and this make the responses team to limit vaccination campaign to target group < 5 years which based on the age distribution of early cases. This allowed the response team to optimize the use of available resources, a more efficient use of limited resources and a greater coverage of young children at highest risk of death (6).

The index cases were reported from Hamaro and were unvaccinated; this may be the sources of the current outbreak. The outbreak was distributed to majority of kebeles of the Town and this may be due to no early responses, which is important to limit the outbreak. The cases propagated to most of the Town kebeles and the Town active case surveillance activity is not so strong, the cases may be peaks suddenly and might be shift of age group based on experience of previous outbreak in many parts of the Region.(5).

About 35% of cases were detected by active case search and this may show the importance active case search as the local community may keep cases at home rather than brining to Health facility, the population do not go to health facilities for case management timely due to the belief of the community that no treatment exists for measles. Similar finding was reported from Kebridahar in which the community uses traditional treatment for measles (9).

The case management at Town level was not as per measles management protocol and in the Health centers, & there was no preparedness' at Town level which is the limitation at current outbreak investigation.

1.7. Conclusion and recommendation

There was laboratory confirmed measles outbreak in Jijiga Town affecting mainly under five children. Promotion of awareness in the community by health education and promotion on measles, Strengthening routine immunization & Active case surveillance of febrile-rash illness have to be enhanced and continued in the community.

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Chapter 2

Surveillance data analyses

2. Case based measles surveillance data analysis report of Ethio-Somali Region, 2015

2.1. Abstract

Background:-Measles is major health problem in Ethiopia. Since the adoption of the measles case-based surveillance system in 2002, data has been routinely collected at all levels of the health delivery system and sent to the national level. However, appropriate data compilation and analysis to assess the incidence trends and to assess the achievement of the indicators has not been conducted in the Region. This study was conducted to evaluate case-based measles surveillance data in Ethio-Somali Region and describe the incidence trends.

Methods: Retrospective cross-sectional based on quantitative secondary data from Ethio-Somali Regional Health Bureau were obtained and analyzed using Epi-Info 7 for the study period of January 2010 to December 2014.

Results:-Total of 378 suspected measles cases were reported by case based for the period of 2010 to 2014. Out of the total, 197 (52%) cases were confirmed as IgM+ for measles and 38 (10%) epi-linked. The remaining 140 (37%) became negative and 3(0.7%) were discarded. Children one to four and under one year age groups account for 113 of the total case and were the most affected and (AR=2.2/10,000) and 19 (AR=1.2/10,000), respectively.

The measles detection rate of the Region was 1.44 per 100,000 populations per year. The non-measles febrile rash detection in the Region was 0.7 cases per 100,000 per year on average. Around 159 (42%) of the cases had zero vaccination history and 128 (34%) unknown. Cases who had 1 and above 1 measles vaccine were 71 (19%) and 20 (5%), respectively. The proportion of cases with adequate specimen was 92%, while timeliness of specimen arrive the lab within 3 days was 87%.

Conclusion:-Children under 5 years age groups were the most affected. Case based surveillance system in the Region was both measles detection rate and non-measles febrile rash detection rate. Most cases had either zero or unknown vaccination history. We recommended that the case based measles surveillance system should achieve the minimum requirement as per the national and WHO guidelines.

2.2. Introduction

Public health surveillance is the ongoing systematic collection, organization, analysis and interpretation of the outcome-specific data essential to the planning, implementation and evaluation of public health practice and dissemination of health data to public health agencies use to monitor the health of their communities [1]. Its purpose is to provide a factual basis from which agencies can appropriately set priorities, plan programs, and take action to promote and protect the public's health. In order to take appropriate public health interventions, the surveillance data should be analyzed and interpreted accordingly.

Ongoing analysis of surveillance data is important for detecting outbreak and unexpected increase or decrease in disease occurrence, monitoring disease trends, and evaluating the effectiveness of disease control programs and policies. This information is also needed to determine the most appropriate and efficient allocation of public health resources and personnel. [2].

Measles is an acute viral disease caused by a paramyxovirus of the genus Morbillivirus. Symptoms include fever, cough, runny nose, red eyes and a generalized maculopapular erythematous rash. It is spread by respiratory system contact with fluids from an infected person's nose and mouth by either droplet (coughing or sneezing) or aerosol transmission [3, 4, 5]

Although a vaccine has been available since 1959, measles remains an important cause of morbidity and mortality in children, particularly in developing countries, where more than 95% of measles-associated deaths occur [5].

Measles is one of the five major causes of childhood illnesses, which contribute to 70% of under-five morbidity and mortality. According to the WHO measles burden estimator, the annual cases are estimated at 1.45 million and the deaths at 69,000. According to this estimate Ethiopia contributes to 46% of the cases and 51% of the deaths from measles among eight eastern African countries [6 & 7].

Measles is vaccine preventable and a child is eligible for measles vaccine once they attain nine months of age. Measles is one of the diseases earmarked for elimination worldwide. [7]. In line with the WHO pre-elimination goal for measles, the WHO African Region recommended to its member countries the measles case based surveillance with laboratory confirmation as one of the main strategies for measles control. Under this case based surveillance system, every

measles case is reported and investigated immediately and also included in weekly reporting system [7 & 8].

In countries where the main objective is to completely interrupt measles transmission, an intensive case-based surveillance to detect, investigate and confirm every suspected measles case in the community is recommended. [7].To achieves measles pre-elimination, a high routine vaccine coverage rate (with at least 90% of infants in all regions needs vaccination) and periodic vaccination supplemental immunization activities (reaching at least 95% of the targeted population) are required. The periodicity of supplemental immunization activities (SIAs) though routinely coming every 3 to 4 years, is determined by the routine EPI coverage, the coverage during catch up SIAs and the results of measles surveillance [7 & 8].

Measles elimination is defined as the absence of endemic measles cases for a period of twelve months or more, in the presence of adequate surveillance, and when the following criteria are met: (i) achieving and maintaining at least 95% coverage with both first dose measles vaccination and the second opportunity of measles vaccination in all districts and nationally; (ii) having less than 10 confirmed cases in 80% or more of measles outbreaks; (iii) achieving a measles incidence of < 1 confirmed measles case per million population per year [9& 10].

In Ethiopia, one of the pre-elimination strategies is establishing case-based measles surveillance since 2002. Ethiopia adopted these Regional goals and a strategy has been taking important steps to control measles [8]. The Africa Region as well as Ethiopia is working towards measles elimination by 2020. One of the four important strategies is to quickly identify cases and respond to suspect outbreaks involving case-based measles surveillance [9 & 10]. The primary objectives of measles surveillance are to: Detect continuing measles transmission in an area; Identify, investigate and manage outbreaks; Predict outbreaks by identifying geographic areas and age groups at high-risk and Evaluate vaccination strategies in order to improve measles.

Since the adoption of the measles case-based surveillance system in 2002, in Ethiopia, data has been routinely collected at all levels of the health delivery system and sent to the national level. To our knowledge there was no documented evidence to show data collected was periodically being used to identify at risk populations, monitor impact of interventions and measure progress towards achieving measles elimination strategy in Ethio-Somali Region.

2.3. Objective

2.3.1. General objectives

We analyzed this data to determine trends in performance of the measles case-based surveillance performance from 2010-2014

2. 3.2. Specific objectives

- ✓ To describe case-based Measles cases reported from 2010-2014
- ✓ To assess non-measles febrile rash rate
- ✓ To analyze measles detection rate

2.4. Methods and materials

2.4.1. Regional back ground

Ethiopia's Somali Regional State was established when Ethiopia declared and started a Federalism Government system and decentralization based policies. It is located in the east and southeast part of Ethiopia; and has borders with Oromia in the West and Southwest, and Afar in the Northeast. Internationally, it has borders with Kenya in the South, Somalia Republic in the East and Djibouti in the northwest. Administratively, Somali Region consists of nine administrative zones namely, Afder, Dollo, Fafan, Jarar, Korahe, Liban, Nogob, Shabele and Siti Zones. These nine zones are further divided into 68 woreda and 4 City administrations.

The majority of the population (86%) is pastoralists and agro-pastoralists. Most of the people lead pastoral - nomadic lifestyle and the main income is driven from livestock rearing and petty trading. Small scale farming of sorghum and maize, which meet some of the consumption needs.

In terms of health delivery system, the Region has 9 Hospitals, 147 Health Centers, 905 Health Posts and one Referral Hospital (Not yet completed). The smallest health structure in the Region is called health post and staffed with two Health extension workers recruited from Kebele. In the hard to reach areas there is a strategy developed to provide high impact child survival interventions including Routine Immunizations by the Mobile Health and Nutrition Teams (MH&NTs). Currently, there are 29SRHB MH&NTs supported by UNICEF, Which support the postural community and hard to reach area.

In Ethiopia, VPD surveillance is implemented within the framework for Integrated Disease Surveillance and Response of integrated disease surveillance (IDSR) strategy, the strategy that was adopted by the Federal Ministry of Health (FMoH) in 2001. The VPD surveillance infrastructure (human and logistics) have provided the platform on which IDSR implementation was rolled out nationwide. After the restructuring of the FMoH in 2008, VPD surveillance became a component of the Public Health Emergency Management (PHEM) core process, at the Federal level within the Ethiopian Health and Nutrition Institute (EHNRI). Surveillance remains as an integrated program, based upon IDSR guidelines [7].

The FMoH of Ethiopia identified 21 top priority diseases which are epidemic prone, of international concern and diseases on eradication and elimination programs for surveillance activities. These diseases are monitored by designated bodies through available means of communication- telephone, paper based reporting etc. These diseases are set to be reported as mandatory notification (which are immediately reportable) diseases which are and routine surveillance (which are to be reported weekly). Measles case is among immediately reportable disease. For these purposes, each of these diseases has case definition(s) and integrated diseases reporting formats defined by the Ministry of Health and the WHO; and reporting is institutionalized into the health facilities and health offices [11].

2.4.2. Study design

The study was Retrospective cross-sectional based on quantitative secondary data. Review of measles case based data reported from all woreda was summarized and analyzed.

2.4.3. Study period

The study was conducted from 2010 to 2014. Study took 1 month time period to be finalized.

2.4.4. Source population

Source population was all people living in Ethio-Somali Regional state in the study period.

2.4.5. Study population

The study population was the Subpopulation living in woreda that were susceptible to be affected by measles cases.

2.4.6. Sample size and sampling procedure

The sampling procedure was convenience sampling method in which all case-based measles data reported throughout the Region were included in to the study.

2.4.7. Data collection methods & Analysis

Electronic copy of the data collected from the Regional and National compiled reported using case-based report format. Data were entered and analyzed using SPSS version 17.0 and excel.

2.4.8. Inclusion criteria

- ✓ All cases that were sent to the Ethiopian Public Health Institute for laboratory confirmation and those were confirmed by epidemiological linkage

2.4.9. Exclusion criteria

- ✓ All cases suspected for measles cases and have no any epidemiological linkage
- ✓ Suspect Measles cases report on weekly bases and sampled not taken or not Epi-linked case are excluded

2.4.10. Case definitions:

Suspected measles case is defined as:-

- ✓ Any person with generalized maculopapular rash and fever plus one of the following: cough or coryza (runny nose) or conjunctivitis (red eyes)

Laboratory confirmed:

A suspected measles case that is investigated, including the collection of blood specimen, has serological confirmation of recent measles virus infection (measles IgM positive) and had not received measles vaccination in the 30 days preceding the specimen collection.

Confirmed by Epidemiological linkage:

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

Discarded/ not measles:- A suspected measles case that has been completely investigated, including the collection of adequate blood specimen, and lacks serologic evidence of recent measles virus infection (IgM negative) or is considered to have IgM positivity due to measles vaccination with in the 30 days preceding the collection of a specimen.

2.4.11. Ethical issues

Data confidentiality and system security was maintained through disclosure of the relevant data to concerned body only. Document reviewed by peer group and shared their ideas on issues related to ethics.

2.5. Results

Cumulatively 378 suspected measles cases were reported and investigated by case based method for the period of January 2010 to December 2014. Out of the total reported cases, 197 (52%) cases were confirmed as IgM+ for measles by national laboratory, 38 (10%) epi-linked cases and 3 (0.8%) positive for Rubella. The remaining 140 (37%) became negative for measles IgM and also not epi-linked.

Table 2.5.1:- Description of measles cases expected, reported number with samples and the outcome of the laboratory investigation by year in Ethio-Somali region from 2010-2014.

Year	Expected number of cases per 100,000	Reported number of cases per 100,000	Number cases positive for measles IgM	Number of cases positive for or Rubella	Epi-linked cases	Discarde/ negative cases
2010	90	83	46	2	0	35
2011	95	75	7	0	24	44
2012	101	87	55	1	7	24
2013	103	58	43	0	0	15
2014	104	75	46	0	7	22
Total	493	378	197	3	38	140

Among the 378 cases investigated, age group 1 - 4 year and under 1 year accounts for 113 (30%) and were the most affected age groups (AR=2.2/10,000) and 19 (AR=1.2/10,000), respectively. The least affected age group were 44 and above years. Seven (1.9%) of the total reported cases had missing information on age group. (Table:-2.5.2)

Table 2.5.2:- Shows measles cases by age group in Ethio-Somali Regional State from 2010-2014

Year	Mid-population	Cases	Age category of the reported case in years						Total
			under 1	1 to 4	5 t0 14	15 to 44	44 & above	Unknown	
2010 to 2014	4,980,400	Number of cases	19	113	148	90	1	7	378
		Percentage	5.0	29.9	39.2	23.8	0.3	1.9	100
		Population	157,381	503,020	1,693,336	1,095,688	1,530,975		4,980,400
		AR per 10,000	1.2	2.2	0.9	0.8	0.0		0.8

The measles detection rate of Ethio-Somali Region was below the recommended and also far below national achievement as shown on the following graphs. It was 1.44 and 4.94 per 100,000 populations per year in Ethio-Somali Region and National level, respectively on average from 2010 to 2014.(fig-2.5.1)

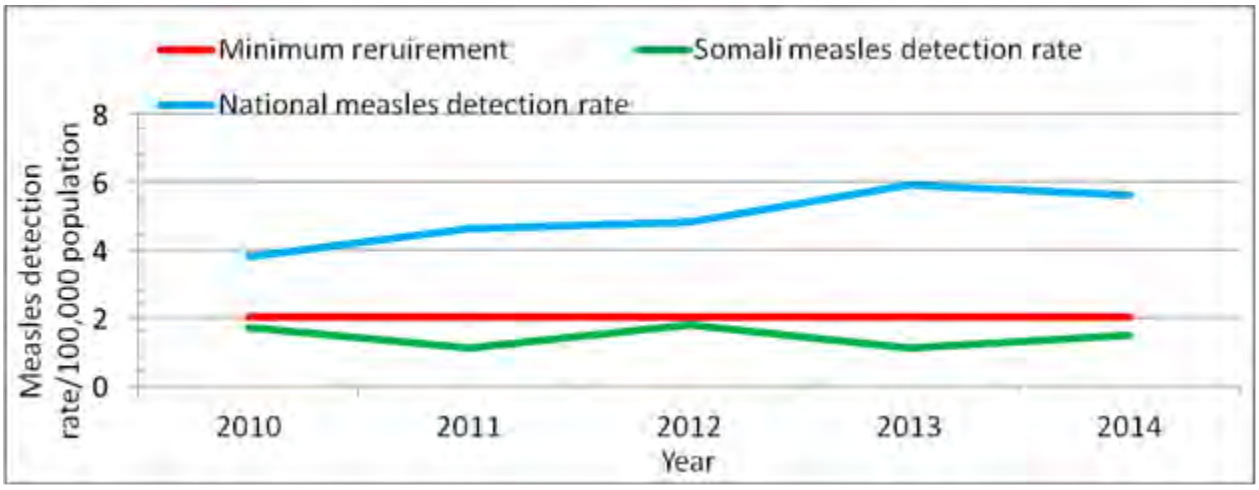

Fig-2.5.1 show that trends of measles detection rate in Ethio-Somali Region and National level compared with minimum requirement from 2010-2014

The indicators of measles surveillance were detection rate of non-measles febrile rash. In Ethio-Somali Region the detection of non-measles febrile rash was below 2/100,000 from 2010 to 2014 while the national were above 2/100,000/year as shown on the following graph. Overall, the Regional measles surveillance system performed poor for the period 2010-2014, having an average annualized rate of investigation of 0.7 cases per 100 000 per year.

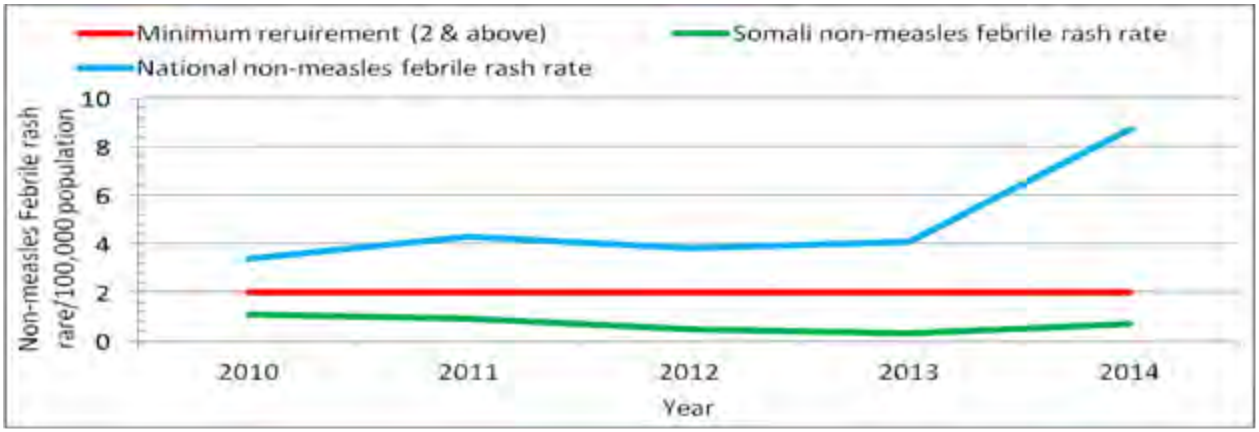

Figure-2.5.2. How trends of non-measles febrile rash detection rate in Ethio-Somali Region and national level compared with minimum requirement from 2010-2014

Around 159 (42%) of the cases had zero vaccination history and 128 (34%) of the cases were unknown vaccination history. Cases who had at least a single dose and 2 & above measles vaccine were 71 (19%) and 20 (5%), respectively.

Characterization of specimens received at the laboratory yearly during the period under review revealed that the proportion of specimens arriving at the laboratory timely (within 3 days of being taken) was 87 on averages in the period 2010-2014. The percentage of serum specimens arriving at the National measles virology laboratory with adequacy was 92% on average.

The non-measles febrile detection rates at zonal level also did not achieve the minimum requirement as shown on Table 2.5.2. The non-measles febrile detection rate in Korahey zone was zero except in 2013 which is 0.9/100,000.

Tables 2.5.3 show the non-measles febrile rash detection rate in Ethio-Somali Region by zone from 2010-2014

S.No1	Name of zone	Non-measles febrile rash detection rate per 100,000 population				
		2010	2011	2012	2013	2014
1	Korahey	0	0	0	0.9	0
2	Afdhere	0	0.9	1.8	0	0.5
3	Jarar	5	0	0.2	0	0
4	Nogob	0.2	0	0	0	1.8
5	Shebele	3	1.6	0.4	0.2	0
6	Fafan	2.5	1	0.4	0.3	0.9
7	Liban	0	1.1	0.5	0.8	0.2
8	Siti	2.4	1.6	1.3	0.4	2.5
9	Dolo	1	1.6	0	0	0
	Regional level	1.7	0.9	0.5	0.3	0.7

2.6. Discussion

Based on the Ethiopian Ministry of Health measles surveillance guidelines one of the four important strategies is to quickly identify and respond to cases using case-based measles surveillance. Measles case-based surveillance is part of the National integrated disease surveillance and response (IDSR) system and a key component of the measles control program. It is a system whereby every suspected measles case should be detected and under laboratory investigation in WHO accredited laboratories [2].

This study demonstrated that most of the cases were less than 15 years of age which was 74.1%. Among the total cases, 39.2% of them were children between the ages of 5 - 14 years. Similar observations were noted in other African Countries in which an average 50% of cases occur in children aged 5 - 14 years [12].

Measles case based surveillance data were collected using the standard case based investigation form was monitored with some recommended indicators [2]. For instance non-measles febrile rash detection rate and measles detection rate were among the indicators.

In Ethio-Somali Region, Measles Surveillance indicators were below target. The National Guideline and also WHO recommend that non-measles febrile rash have to be >2/100,000 population per year. But the Regional non-measles febrile rash detection rate was 0.7 cases per 100 000 per year from 2010-2014. This shows that it was far below the minimum requirement based on guideline [2] and lower than the national performance which was 4.9/100,000/year in the same period.

On further analysis of the performance of the national measles case based surveillance system in terms of case investigation by year shows declining trend in the region. The annualized non-measles detection rates decreased from 1.7 cases per 100,000 populations per year in 2010 to 0.7 cases/100,000 population per year in 2014.

The Regional measles detection rate performance of Ethio-Somali Region was much less than the national level. It was 1.44 at Regional level which did not achieve the minimum requirements.

Characterization of specimens received at the laboratory yearly during the period under review revealed that the proportion of specimens arriving at the laboratory timely (within 3 days of being taken) was consistently above the WHO recommended target of 80% in the period 2010-2014 which was 87%. The proportion of serum specimens arriving at the national measles

virology laboratory in adequate volume was also above the recommended target which was92% in the Region.

Zero dose cases (42%) and unknown vaccination status (34%) accounted for 76% of the total reported cases (378). Only 24% of the cases received either 1 or more measles vaccine doses. This might indicate the quality of the data filled on the form during investigation of reported cases and the measles vaccine coverage was low.

2.7. Conclusion

High numbers of the cases were children 5-14 age group followed by under 5 children. The measles case based surveillance performance in the Region was not achieved both for measles detection rate and non-measles febrile rash detection rate in the study period of 2010 to 2014. The analysis showed both indicators had decreasing trend. The system has been operating below the recommended WHO standards. Most of the reported cases had either zero or unknown vaccination coverage. But the proportion of adequate samples and transporting the samples improved.

2.8. Recommendations

We recommend that regular training and refresher courses be organized on vaccine preventable disease surveillance to improve health staff's knowledge of the system and hence the system's performance. The case based measles surveillance system should achieve the minimum requirement as per the national and WHO guidelines..

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Chapter 3

Surveillance System Evaluation

3. Evaluation of AFP Surveillance System of Dolo Zone, Ethio-Somali Region, March 2016

3.1. Abstract

Introduction: - The Federal Ministry of Health of Ethiopia identified 21 priority diseases based on epidemic prone, of international concern and diseases on eradication and elimination programs for public health surveillance activities. These diseases are monitored by designated bodies through available means of communication. These diseases are set to be immediately reportable and weekly reported diseases. Therefore, the Evaluation of this AFP surveillance system was needed to check the effectiveness and efficiency of the system to achieve the stated objectives/goals for disease Eradication program in the woreda of Dolo Zone,

Method: Institution-based cross sectional descriptive study was conducted from February 4 to 21, 2016. The study consist both qualitative aspects and quantitative descriptive components of the AFP surveillance System.

Result: In Ethio-Somali Regional Health Bureau PHEM Core-process have 20 staff member powers (18 PHEM officers who qualified in different disciplines of health, 1 secretary and 1 cleaner). There is no PHEM structure at zonal level throughout the Region. At woreda and health facility level, there is 1 PHEM Focal Person. Based on the National PHEM Guideline, all the community living in the Region must be set under surveillance for all the 21 priority diseases. AFP is one of the immediately reportable diseases in the Region. Since polio outbreak occurred from 2013-2015 a total of 10 polio cases were reported from Doolo zone (4 from Geladi, 3 from Warder and 3 from bokh) and still it is not declared that the transmission stopped,

Conclusion and Recommendation:-Weekly report was below minimum standard in assessed woredas of Dolo Zone due to lack of/ frequent interruption of network access. All the assessed areas did not analyze the surveillance data except at Regional level. The RHBs and Woreda Health Offices have to support the health facilities documentation by providing technical support, all formats, case definition and guidelines is one of the highly recommended.

3.2. Introduction

Poliomyelitis is a highly contagious viral disease caused by infection with the poliovirus serotypes 1, 2 and 3. The poliovirus infects mostly children below the age of five years, and in up to 1% of those infected the virus invades the central nervous system leading to muscle weakness and irreversible paralysis (usually in the lower limbs), often progressing to breathing problems, and death ([2].

Global Polio Eradication Initiative (GPEI) has been launched in 1988 and since that time, nearly five million people are walking, who would otherwise have been paralyzed by the disease. The GPEI has reduced the global incidence of polio by more than 99 percent [2].

The Polio Eradication Initiative (PEI) in Ethiopia started in 1996 following the Declaration on Polio Eradication in Africa in the same year. Ethiopia has accelerated implementation of polio eradication strategies since the declaration of the initiative: routine immunization, supplemental immunization activities (SIAs), Acute Flaccid Paralysis (AFP) surveillance, and mop-up vaccinations [2].

The Federal Ministry of Health of Ethiopia identified 21 priority diseases based on epidemic prone, of international concern and diseases on eradication and elimination programs for public health surveillance activities. These diseases are monitored by designated bodies through available means of communication. These diseases are set to be immediately reportable and weekly reported diseases [3 & 4]. For these purposes, each of these diseases has case definition(s) and integrated diseases reporting formats defined by the Ministry of Health and the WHO; and reporting is institutionalized into the health facilities and health offices.

Public health surveillance is an ongoing systematic collection analysis, interpretation and dissemination of data regarding a health related event for use in public health action to reduce morbidity, mortality and to improve health [5]. Data disseminated by a public health surveillance system can be used for immediate public health action, program planning and evaluation, and formulating research hypotheses.

An evaluation system serves a complementary, but distinct function from that of a monitoring system within a performance management framework. Building an evaluation system allows for a more in-depth study of performance outcomes and impacts; can bring in other data

sources than just extant indicators; can address factors that are too difficult or expensive to continuously monitor; and perhaps most important, can tackle the issue of why and how the trends being tracked with monitoring data are moving in the directions they are [6]

Every disease surveillance system should be analyzed and re-evaluated periodically to ensure that it address the current priority disease within the Region in which it operates and to improve performance where necessary [7]. The purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively and provides managers of health surveillance systems that the quality of the information their system produce, the effectiveness of their systems in supporting the objective of the programs that they serve, the effectiveness of their systems in supporting informed decision-making; and the efficiency of their systems [8 & 9].

Therefore, the Evaluation of this AFP surveillance system was needed to check the effectiveness and efficiency of the system to achieve the stated objectives/goals for AFP Eradication program in the woreda of Dolo Zone, assess of resources from Health post to zonal levels, and examine quality of surveillance, multiple use of data collection tools and timely utilization of the data at woreda level for action, and epidemic preparedness and response. Especially, with the implementation of the new structure for surveillance system (PHEM) in the sector, the change in the quality of information needs to be assessed.

3.3. Rationale of the Evaluation

AFP surveillance systems helps to evaluate the program by monitoring the absence of WPV in the country and help make the final decision that WPVs has been eradicated. As such, AFP surveillance will remain long after most of the PEI activities are discontinued. Eradication requires that sensitive surveillance systems capable of identifying cases of polio are in place in every country. Data from the AFP surveillance system are required to certify eradication.

The WHO has set minimum performance indicators that should be used to evaluate the performance of AFP surveillance, monitor progress towards the given targets and to ensure that it is conducted to accurately guide the polio eradication initiative. Thus the evaluation of AFP surveillance system was intended to achieve the following main purposes:-

- ✓ To strengthen management of the woreda health office through better use of health information for decision making
- ✓ To identify the surveillance strength in detecting and confirming of WPV diseases through AFP surveillance system in the zone
- ✓ To asses of the collected data and speed of information flow within the system at the local level as evidence for public health decision making

3.4. Objectives of the Evaluation

3.4.1. General Objective

To assess the performance of the AFP surveillance system and forward practical recommendation to support and improve the surveillance system of Dolo Zone of the Ethio-Somali Region

3.4.2. Specific Objectives

- ✓ To assess the core activities such as case detection, reporting, analysis and response of surveillance system.
- ✓ To evaluate the attributes of the surveillance system of the selected diseases
- ✓ To assess support function such as standard guidelines, supervision and resources for Surveillance.
- ✓ To identify gaps and opportunities in performing the core and support functions of surveillance and asses the resources available.

3.5. Methodology and Materials

3.5.1. Study Area

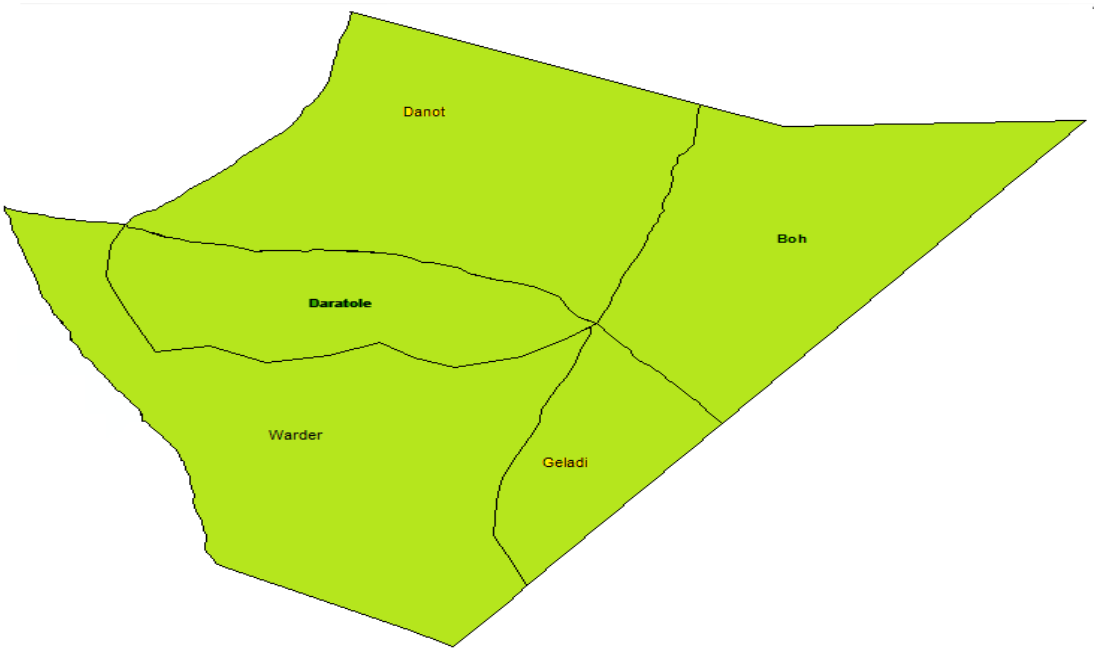
The Somali Region has a population of approximately 5.6 million. When Ethiopia established a Federal Government and decentralization system Somali Regional State was one of the Federal states of the country. It is the second largest Regional state which contributes 30% of the total land mass of the country and it has an estimated area of about 250,000 square kilometers. The State of Somali is l Region located in the eastern and south eastern part of Ethiopia. The State has common boundaries with Afar and the Republic of Djibouti in the north, Kenya in the south, the State of Oromia in the west, and Somalia in the east and in the South. The capital is Jijiga located in the eastern part of the country. Administratively, Somali Regional State sub divided in to eleven administrative zones. These Eleven zones are further divided into 93 woredas and 6 Towns. The majority of the population, 85% is pastoralist and agro-pastoralists. Population densities are highest in agro-pastoral Zones including Shabele, Fafan and Liben. Most of the people in the Somali Region lead pastoral - nomadic lifestyle. The main source of income of the Region's population is driven from livestock rearing and petty trading and Small scale farming, which meet some of the consumption needs. The Region is under developed with poor infrastructure, its population is underserved. The live style is more nomads and pastoralist population which moves from place to place for searching water and grassland. This has difficult for polio eradication at present and in the past.

In the history of polio eradication in Ethiopia, in 2006 a total of 16 wild polio virus type1 were detected in Somali Region due to importation, and genetically linked with Somalia wild polio virus. A Total of 16 cases were detected in the Region, with one case each in Afder, Jarar and korahey, while in Dolo zone 13 cases were identified. All reported cases were type 1, and nearly all were identified in Bookh (6) and Geladi woredas (6) where the current outbreak is going on.

Dolo Zone is one of the nine Zones of Ethiopian Somali Regional State and includes five woredas namely Warder, Danot, Galadi, Bookh and Doratole woreda. According to the CSA 2007 housing and population census projection total population of the zone for 2016 was estimated to be 355,339.

The health service delivery system of the Dolo Zone is comprises of Hospital, Health centers and Health posts. One Hospital, 13 functional Health centers and 72 Health post (which 54 are functional) with man power shortage in the health centers.

The index case of the 2013 outbreak of polio started in Dolo Zone after importation from Punt land of Somalia to Injiro Kebele, of Geladi woreda Somali Region. Then, the outbreak was reported from other 2 woreda namely Warder and Bokh. A total of 10 WPV were confirmed up to 2014. The Zone has long border with Republic of Somalia, Population movement Low and population immunity in Somali Region of Ethiopia is a challenge. Poor Infrastructures of the Region is another issue and most of the people lead pastoral - nomadic lifestyle



Map: 3.5.1 Map of doolo zone of Somali Region in, 2015

3.5.2 .Study Design and period

Institution-based cross sectional descriptive study was conducted from February 4 to 21, 2016. It consisted of both the qualitative aspects and quantitative descriptive components of the AFP surveillance System in Dolo Zone.

3.5.3. Study Subjects

The study subjects were the health facilities (Health Centers & Health Posts), Health offices (Woreda Health Offices & Regional Health Bureau).

3.5.4. Sample Size and sampling method

Three woreda health offices, three health centers and three health posts were included in the sample. A total of 9 samples were used.

Selection of the zone, woreda and the health facilities was done as in the steps below:

- ✓ From the Region Dolo Zone was selected purposely
- ✓ From the zone 3 woreda Health office was selected by simple random sampling (SRS) method
- ✓ From each selected Woreda one Health centers and one Health post was selected

3.5.5. Data collection technique

Updated Guidelines for Evaluating Public Health Surveillance Systems from the United States Centers for Disease control and Prevention was used. Semi-structured interviews were conducted with representatives from woreda health offices and selected health facilities. Reviews of documents were done.

3.5.6. Data Analysis

Data were entered and analyzed using the Microsoft Excel and qualitative data were summarized to complement the quantitative data.

3.5.7. Operational definitions

The operational definition of each term which was used during the evaluation is presented as follows:

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

Case registration: is the process of recording the cases identified.

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

Stake holders: individuals or organizations that generate or use surveillance data for promotion of heath and for prevention or control of diseases.

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

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

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

Quality: the quality of data reflects the completeness and validity of the data recorded in the Zonal health department.

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

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

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

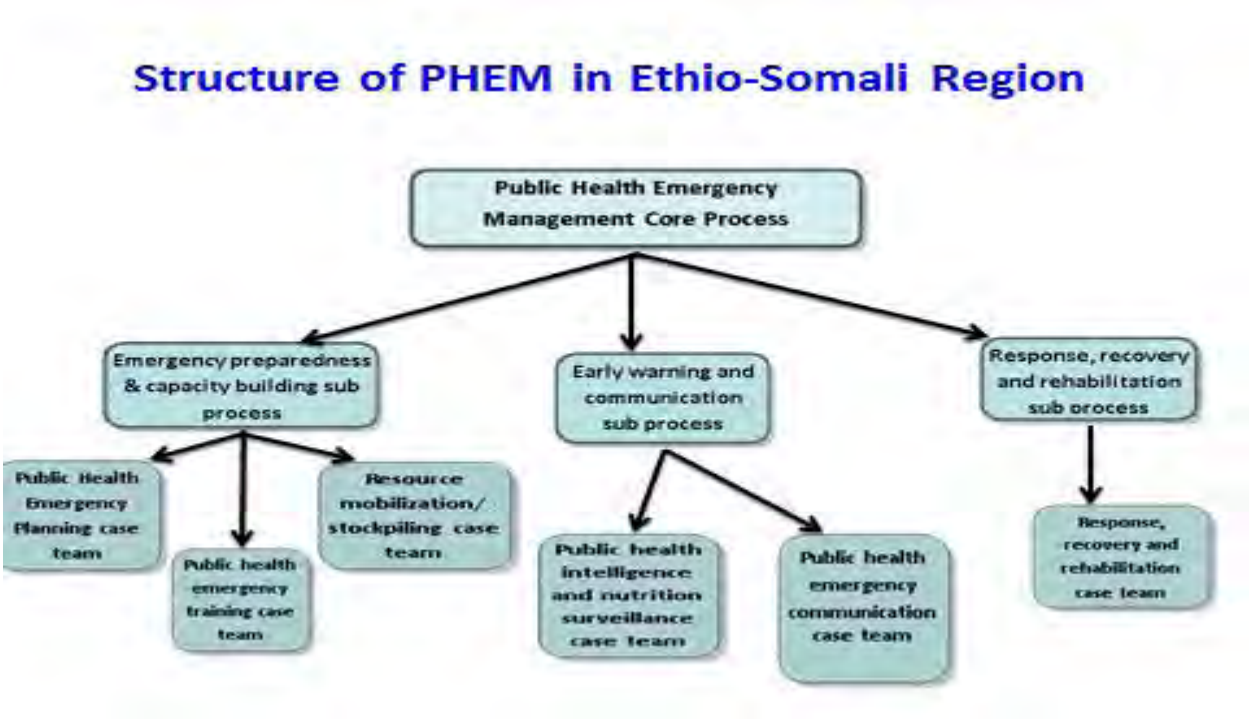
Stability: Stability was assessed by questioning the surveillance officers on the consistency of the system.

3.6. Results

Public Health Surveillance system in Ethio-Somali Region

Public Health Emergency Management is defined as the process of anticipating, preventing, preparing for, responding to and recovering from the impact of epidemics and health consequences of natural and manmade disasters. The sub processes identified for the process include, Preparedness, Early Warning, Response and Recovery [3].

The process is fully integrated, adaptable, all-hazards and all health approach national preparedness and response system. This core process is comprised of three sub processes in Ethio-Somali Regional Health Bureau which are: Public Health Emergency Preparedness, Early Warning, and Response and Recovery.



In Ethio-Somali Regional Health Bureau PHEM Core-process has 20 staff member (18 PHEM officers who qualified in different discipline of health, 1 secretary and 1 cleaner). There is no PHEM structure at zonal level throughout the Region. At woreda and health facility level, there is 1 PHEM Focal Person. The FMoH of Ethiopia identified 21 priority diseases which are epidemic prone, of international concern and diseases on eradication and elimination programs for surveillance activities [3 &8]. These diseases are monitored by PHEM core process in Ethio-Somali Region through available means of communication-

telephone, paper based reporting etc. These diseases are set to be reported as mandatory notification (which are immediately reportable) diseases and routine surveillance (which are to be reported weekly).

Table 3.6.1:- List of Regional and National notifiable and reportable diseases, March, 2016

Immediately Reportable	Weekly Reportable
Acute Flaccid Paralysis/Polio	All the above and in addition
Anthrax	Dysentery
Avian Human Influenza	Malaria
AWD/Cholera	Meningitis
Dracunculiasis / Guinea worm	Malnutrition
Measles	Relapsing fever
Neonatal Tetanus	Typhoid fever
Pandemic Influenza A (H1N1)	Typhus
Rabies	
Smallpox	
Severe Acute Respiratory Syndrome (SARS)	
Viral Hemorrhagic Fever (VHF)	
Yellow fever	
MDSR	

These 21 reportable diseases are implemented under integrated disease surveillance and response (IDSR) as a strategy. IDSR is an approach adapted to strengthen National and Regional surveillance system by coordinating and streamlining. all surveillance activities and ensuring timely provision of surveillance data to all disease prevention and control programs

These 21 reportable diseases and any public health related threats and risks will be reported. The report start from the health facilities and move to the next level while feedback and supervision begins from upper level to lower level as shown on the following diagram.

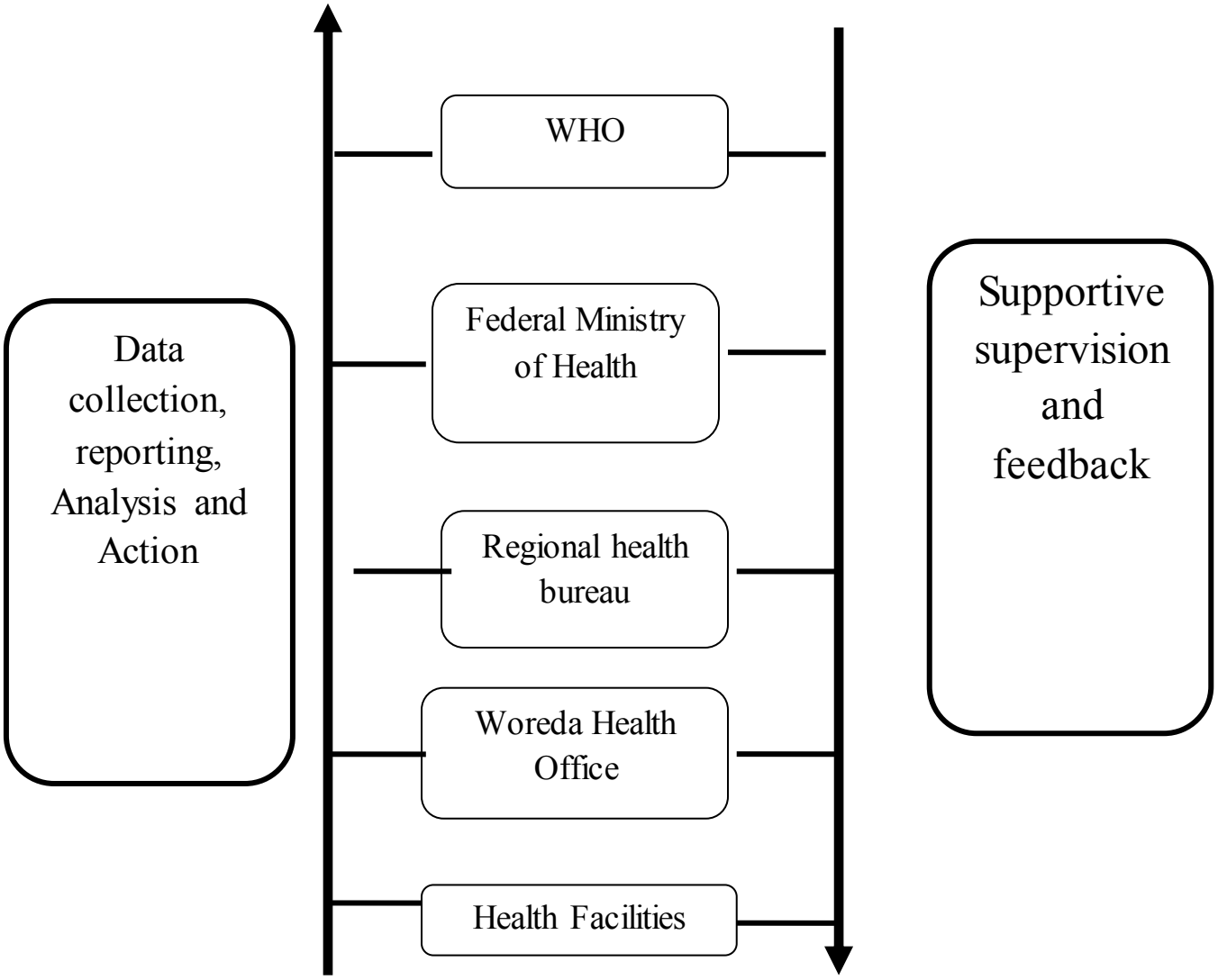


Figure 3.6.1: Data and information flow in IDSR indicating varying cycles at various levels in Somali Region, in 2015.

The overall purpose of surveillance of priority diseases is to monitor the trend against the seated tolerance limits, and pick any deviation from the limit at the earliest point in time and have prompt response. Furthermore, as early warning system, it guides prevention and risk aversion actions like immunization, vector control and so on.

Population under AFP Surveillance, site visited and Resource used to operate. Based on the National PHEM Guideline, all the community living in the Region must be set under

surveillance for all the 21 priority diseases. AFP is one of immediately reportable disease in the Region. In this evaluation we assessed selected health facility of three woreda which shows below.

Table 3.6.2:-Name and number of sites assessed in Dolo Zone of Ethio-Somali Region, March/2016

S. N	Visited site	Population	No. of HC visited	No of HP visited	Woreda Health office visited	Total site visited
1	Warder Woreda		1	1	1	3
2	Geladi Woreda		1	1	1	3
3	Bokh Woreda		1	1	1	3
	Total site visited in the Zone		3	3	3	9

The methods of assessing resources to operate the surveillance system included only material resources directly required to operate of surveillance. In the assessed site, 3 woreda health Bureau and 6 health facilities had no regular budget for the surveillance activity from government budget. Due to that the surveillance mainly depended on of partner's donation and support.

The availability of critical resources is important for the undertakings of surveillance activities and epidemic preparedness. As described in the following table essential material and resources were available to undertake surveillance activities at visited sites.

Table 3.6.3:- Availability of resource in assessed woreda of Dolo Zone, Ethio-Somali Region, in March/2016

Types of resource	Woreda(n =3)	HC (n=3)	HP(n=3)
Sites that have the following resources in %			

Electricity	100	33.3	0
Motorcycle	100	66.6	0
Vehicle	0	0	0
Computers	100	0	0
Printers	100	0	0
Fax	0	0	0
Network	100	100	66.6
Calculator and stationary	100	100	100

3.6.1. Core and support function of surveillance system

Case Detection, registration and specimen transportation

In the assessed areas health workers detect any AFP cases using standard AFP case definition. While health extension workers and community volunteers notify any AFP to health workers of nearest Health centers and/or Woreda Health Office using community case definition. Both types of case definition exist on the National PHEM Guideline.

Stand case definition	Any child under 15 years of age with acute flaccid paralysis (AFP) or any person with paralytic illness at any age in whom the clinician suspects poliomyelitis
Community case definition	Any person with sudden onset of paralysis of the limbs

In all visited woreda and health centers standard AFP case definition was posted. But none of the assessed health posts had any community case definition.

If community volunteers and health extension workers identify any suspected AFP cases, they report to the next level. Then the woreda PHEM focal person go to the reported site with zonal WHO surveillance officer for case investigation and stool sample collection if it met

the standard case definition. They collect 2 separate stool samples. The finding shows that the amount of the stool they try to collect is 8 gm by estimation and the time interval between 1st and 2nd samples 24-48 hours.

Table 3.6.4:- AFP case detection, reporting and specimen transportation capacity in Dolo Zone, Ethio-Somali Region, March/2016

S. N	Variables	woreda (N=3)	HC (N=3)	HP (N=3)
1	Availability of PHEM manual	100%	67%	0%
2	IDSR included in the annual health plan (EFY 2004) of the zone	100%	0%	0%
3	Availability of standard case definition for health workers and community case definition for HEWS and community	100%	100%	0%
4	Availability of AFP guidelines	100%	67%	0%
5	Available and utilization of Rumor logbook or registration book	100%	0%	0%
6	Availability of AFP case based investigation form and formats correctly filled	100%	0%	NA
7	Capacity to collect, process and transport to national laboratory properly	100%	100%	NA
8	Availability of Weekly report format and Presence of documented 2015 report	67%	33%	0%

All woreda are expected to report at least 2 AFP cases per 100,000 under 15 year's population. In 2015 a total of 22 AFP cases were detected from Dolo Zone and from visited woreda 6, 8 and 4 cases were reported from Warder, Geladi and Bokh, respectively.

3.6.2. Data Analysis and Dissemination

All woreda Health office and Health centers are expected to analyze the collected data and disseminate the report to stakeholder. But none of the assessed Woreda and Health facilities practice of the collected data. Surveillance data analysis was done only in the Regional health Bureau regularly.

3.6.3. Epidemic Preparedness and response

Since polio outbreak occurred from 2013-2015 a total of 10 polio cases (4 from Geladi, 3 from Warder and 3 from bokh) were reported that and still not declared the transmission has stopped, all the assessed area had epidemic preparedness and response plan. At zonal and woreda level epidemic response committee and rapid response teams were established and still on responding. Polio campaign was ongoing since the onset of the outbreak. There is also stock of bivalent OPV, syringes and other supplies to continue the response until declared free of polio outbreak.

3.6.4. Training

All visited woreda level surveillance focal person staffs had short term training on selected priority diseases (PHEM guidelines, community surveillance, on priority diseases like AFP) by Regional Health Bureau and WHO. All interviewed Health post and Health center focal person were trained on community based surveillance of vaccine preventable diseases, but not on PHEM.

3.6.5. Supportive supervision and Feedback

There was no regular program for specific supportive supervision at all assessed sites. Was conducted on an irregular way oral feedback were given but providing written feedback is not commonly practiced

3.6.6. Description of performance and attributes of the surveillance system

Usefulness

All respondent (100%) knew that AFP is immediately reportable diseases under IDSR and the reported data was utilized by decision makers for action. The outbreak which started in 2013 was identified though AFP surveillance system and intervention activities were going to interrupt the cases. They believe this was one of the indicators of usefulness of the system.

Simplicity

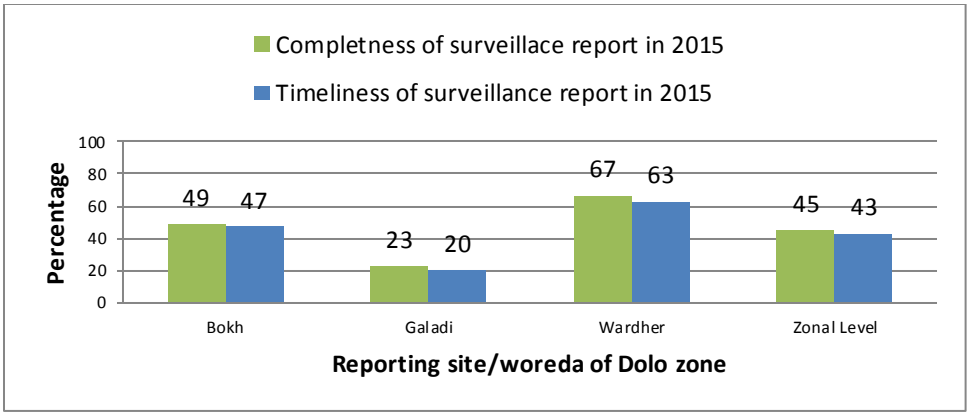
All AFP cases were identified easily using community case definition by community members and health extension workers. The health workers responded that standard AFP case definition was easy, understandable and remember it and used during patient examination. All respondents clearly knew to whom the cases have to be reported though available means of communication. All woreda PHEM focal people had skill to fill line list during outbreak and case investigation form during investigation easily. They exactly knew how information flows up to FMoH

Flexibility

The current AFP reporting form can be modified to include other variables. The reporting formats was easily integrated into IDSR, make the system flexible. During occurrence of polio outbreak in the zone AFP surveillance was changed from passive to active system. This shows that the system could be easily flexible if it is needed.

Data Quality

The completeness to the Region and timeliness of the report could indicate the data quality of the surveillance. Timeliness was calculated as the proportion of the total sites which reported on time divided by the total sites expected to report while completeness was the proportion of reporting sites that submitted the surveillance report irrespective of the time when the report was submitted divided by expected sites to report. In 2015 the completeness and timeliness of Dolo Zone was 45% and 43%, respectively.



Acceptability

Acceptability is measured by the willingness of all stakeholders to participate in the case detection, reporting and investigation. Three of the assessed woreda respond that all the government, private and NGOs health facilities report any suspected AFP case to the office. They told us after the occurrence of the polio outbreak all accept to report regularly if they get any suspicion. But there was a challenge on reporting other diseases on weekly bases.

Representativeness

Representativeness is indicated by health service coverage of the area, capacity of the health workers and health seeking behavior. These all factors were the determinant of the representativeness of AFP surveillance system.

Based on the Regional Health Bureau report the Zones physical health service coverage was around 58% and based on the assessment the community based active surveillance do not cover all the pastoralist and also existence of poor health seeking behavior indicates the AFP surveillance system might not to be representative for all the community in the Zone.

Stability

The introduction of BPR implementation in the health sector had not affected the AFP surveillance system

Sensitivity

Cumulatively, the Dolo Zone annualized non-polio AFP detection rate was 14 AFP cases per 100,000 populations below 15 years per year in 2015. The proportion of AFP cases with two adequate stool specimens was above the minimum target of ≥80% in all assessed areas.

Table 3.6.5:- Shows number of expected AFP case, reported, Annualized NP-AFP rate and Stool Adequacy by area assessed of Ethio-Somali Region, March/2016

S.N	Assessed area	Expected AFP Cases	Reported Cases	Annualized NP-AFP Rate	Stool Adequacy Rate
1	Warder Woreda	1	6	12	83%
2	Geladi Woreda	1	8	16	100%
3	Bokh Woreda	1	4	8	100%
4	Dolo zonal level	3	22	14	95%
5	Ethio-Somali Region	46	109	4.3	92

3.7. Discussion

The evaluation of surveillance system promotes the best use of data collection resources and assures that system operate effectively. Surveillance system evaluation allows us to define whether a specific system is useful for a particular public health initiative and is achieving the overarching goals of the public health program and the data collection objectives [6].

The FMOH launched a reform and restructuring of the health sector in to different core processes, and in particular the disease surveillance and response with the concept of BPR. The core process responsible for surveillance was Public Health Emergency management (PHEM) center. This new structure is extended down to the district level in their capacities.

The last indigenous case of wild poliovirus (WPV) reported in Ethiopia was in December 2001. However, Ethiopia was affected by six separate WPV importations from neighboring countries from 2004 to 2013. Through implementation of high quality SIAs, improvement in routine immunization and early detection of circulations, the country has been able to contain these outbreaks [2].

The last imported WPV was on July, 2013 from Dolo zone of Ethio-Somali Region. A total of 10 cases were detected up to January, 2014. The outbreak was detected from the assessed 3 woreda (Geladi, Warder and Bokh). The first 3 cases were from Bokh and notified from Kenyan polio laboratory after crossing the border to seek medical care in Goldogob and Galkayo hospitals in Somalia. The stool specimen was collected by WHO teams of Somalia Republic.

Despite the activities of government and including civil society organizations, surveillance in bordering regions of Ethiopia has not reached certification level. NP-AFP rate remained unstable, many times below 2.0 /100,000 individuals under 15 years of age and stool adequacy below 80%. For polio eradication certification, the quality of surveillance at National level must be maintained and surveillance gaps at sub national level must be closed [2].

The structure of surveillance data reporting flow from the health facilities up to the national level was well organized in simple and defined role and responsibility. The national PHEM guidelines state that surveillance data analysis and interpretation should be done daily and weekly at each level where data are collected (starting from health facility level to national

level) to guide responses to public health emergencies [2].But there were problems with reporting means due to lack of network access, fax and computers for data management and analysis. This affected the overall flow of reports by the expected health facilities.

The assessment indicate that the Dolo Zone weekly surveillance report completeness was 45% and timeliness 43% in 2015 which is below national and WHO requirement (>80% for both timeliness and completeness). The analysis of the IDSR data's was done at regional level weekly regularly for action. But none of the woreda and visited health facilities analyzes the surveillance data and monitor trends.

Supportive supervision is an important support function to strengthen the capacity of staff and ensure that the right skills are used appropriately, the necessary logistics are in place, and that planned activities are implemented according to schedule. This evaluation has identified that in the visited site there was no program specific supportive supervision done in 2015, except integrated supervision.

A public health surveillance system is dependent on a clear case definition for the health-related event under surveillance, guidelines and different report formats. The use of a case definition increases the specificity of reporting and improves the comparability of the health-related event reported from different sources of data, including geographic areas. In all assessed health posts there is no posted community case definition, weekly report format and documented and guidelines like HEM and AFP guidelines. In most assessed health facilities previously reported surveillance report to the woreda was not available at the time of assessment. This indicates that there is poor documentation system due to awareness of the health workers on the importance of data, commitment and negligence.

The non-polio AFP detection rate and stool adequacy rate is an indicator of the sensitivity of the AFP surveillance system in a country, and illustrates the ability of a country to detect a case of poliomyelitis if wild poliovirus was to be re-imported into the country. A sensitive AFP surveillance system should be capable of investigating and collecting 2 adequate stool specimens within 14 days of onset of paralysis from at least 80% of all reported AFP cases. The Dolo Zone achieved both of stool adequacy rate and NP-AFP detection rate which was 95% and 14/100,000 under 15 children per year (2015, respectively.

3.8. Conclusion

The polio outbreak occurred due to importation from Somalia Republic. It is necessary to continually strengthen the AFP surveillance system at the community level to ensure that the system is robust enough to document the absence of the wild poliovirus in the Region and improve the immunity of the community against polio in order to get certificate of polio outbreak free.

The AFP surveillance system in Ethio-Somali Region met most of surveillance system attributes except data quality problem on weekly surveillance report. Weekly report was below minimum standard in assessed woreda of Dolo Zone due to lack of/frequent interruption of network access. All the assessed areas were no analyzing the surveillance data except at Regional level.

This evaluation has identified that in all assessed areas there was no program specific supportive supervision and no written feedback. All health posts were in lack of community case definition, weekly report formats and guidelines. It was also observed that poor documentation seen at all levels was due to awareness, commitment and negligence of the health workers.

3.9. Recommendation

- ✓ Considering the fact that detection of WPV in a polio-free country is a public health emergency Ethio-Somali RHB in collaboration with WHO, UNICEF and other partners should continue implementing a high quality outbreak response, which includes surveillance and immunization.
- ✓ Awareness creation and capacity building have to be given to health workers and community volunteers to strengthen the surveillance system quality
- ✓ The RHBs and Woreda Health Offices have to support the health facilities documentation by providing technical support, all formats, case definition and guidelines
- ✓ The Woreda Health bureau and all health facilitate should improve the completeness and timeliness of the weekly surveillance reporting system and initiate data analysis, interpreted and used for decision making at all levels.
- ✓ The RHBs and Woreda Health Offices should strengthen monitoring and supervision regularly and also strengthen the zero reporting mechanism at health facility level

3.10. References

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Chapter 4

Health profile description report

4. Descriptive health profile Report in Shinile district of Somali Region in September, 2015

4.1. Summary Report

Introduction: District Health profile seeks to present the health status of the residents using trends, where Possible, to aid in decision making for evidence based health planning service provision, Academic research for Regional Government and other development partner will create favourable environment for health unit for planning, intervention of health event based on their district profile. The purpose of this profile was to provide overview of the social, economic, demographic and Geographic health status for Shinile District

Method: - Health and health related data were collected from Sep-12-up to 25 in 2015 for Shinile district of Siti Zone in Somali Region. Standard checklists were used to collect the District Health profile data from the District Health Office, District Education and District water office

Result:- Shinile District, is one of the 68 district in the Somali Regional State, it achieved its administrative status as district in 1984 E.C. Shinile is capital Town of Siti Zone and its far away from Jigjiga by 175 km and 520 km away from Addis Ababa. The total area of the District is 1300 square kilometers. The Mean monthly temperature varies between 25ºC and 34ºC.

The projected population in 2014 was estimated to be around 59,498of those, 29,671 were Females and 29,487 Males. Most Shinile people are pastoralist which around70% and 20% of the people are agro postural. While only 10% are living in urban areas, largest populations of Shinile are Muslim which estimates of 99% of the population. Pneumonia, upper respiratory tract infection, acute febrile illness and mal-nutrition are the four causes of morbidity under five children, in addition of this family planning is very low

Conclusion:-Pneumonia, upper track infection, acute febrile illness and mal-nutrition are the top four causes of morbidity under five children. Family planning in the woreda also is very low, so strengthen of health education is one of the highly recommended.

4.2. Introduction

A health profile is a comprehensive compilation of information about a community. The data in a profile reflects the health of a given community from many different angles. The information may include data already collected and published about a community or information collected by the organizations or individuals creating the profile. A community health profile includes both previously identified health issues and the identification of new, emerging issues. A comprehensive community health profile includes: a narrative description of the given community, community strengths and challenges, demographic and economic data, health status data, community resources, including services, coalitions, and systems and interpretation of data presented, from both the perspective of the health of District and the broader community(1).

District Health profile seeks to present the health status of the residents using trends, where Possible, to aid in decision making for evidence based health planning, the service provision of Academic Research. In Public inquiry and other stakeholder The primary objectives of this Health profile is to examine the functional structures and managerial processes at district level that enable the provision of essential health care services to the population, Organization and management of Health system at District level in terms of structures(2).

The Priority health activities and availability of resources were provided abroad overview of Social, economic, demographic and geographic health status of the Woreda health service. The District Health Profile is a living document which is filled in District Health Office, in order to use it Regional Government and other development partner will create favourable environment for health unit for planning, intervention of health event.

4.2.1. Rationale of the Study:

In Ethiopian Somali Region, at the District level (including study area) there is no an organized health and health related indicator which determine the health status of the community & contribute in filing a gap in planning and taking evidence based information for action. Therefore, data generated from the health profile description project will help Shinile District and other stakeholders for public health planning, resource allocation, interventions and evaluation. Such information is essential for sustaining increased

investments in Global health. Systematic assessment of health facility performance based on accepted standard and norms may also help to improve service quality.

4.3. Objectives

4.3.1 General objective

The purpose of this profile is to asses and to describe the current health profile of shinile woreda, Somali Regional State.

4.3.2. Specific objective

1. To identify the status of the health service coverage in the District.

2. To identify the extent of the health problem in the District.

3. To provide base line health and health related information.

4. 4.Methods

Health and health related data were collected from September 12-25/2015 in Shinile District of Siti Zone, Ethiopian Somali Region. Standard checklists were used to collect the district Health profile data from the District Health Office, District Education and District water were collected data to generate desired information.

4.4.1. Study design, Study area, and Study design

Descriptive cross sectional study was conducted from Septembar-12-up to 25 in Shinile District of Ethiopian Somali Regional State in 2014.

Map-4.4.1:- Shinile district of siti zone in Ethiopia Somali Region, 2015

4.4.2. Source population

Source population is people living in shinile woreda during the study period.

4.4.3. Data collection techniques and procedure

The health data were collected from District Health Office as well as health related information was collected from different District administrative offices (Water, Education, Agriculture and census Bureau) of the year 2014. Interview and standard check list were the main tools for data collection.

Data Entry & Analysis: Finally data was compiled and analysed manually and using Microsoft excel.

4.4.4. Ethical Clearance

Health and health related information of Shinile District was collected after obtaining official letter from Ethiopian Somali Regional Health Bureau as well as permission obtained from Shinile Woreda Health Office and other concerned bodies in the District.

4.5. Results

Historical Background

Shinile District, one of the 68 District in the Somali Regional State, achieved its administrative status as District in 1984 E.C. Shinile is capital Town of Siti Zone it's far from jigjiga 175 km and 520 km far away from Addis Ababa. The total area of the District is 1300 square kilometres. The mean monthly temperature varies between 25ºC and 34ºC and the mean annual rainfall of the Woreda is 560 mm.

4.5.1 Demographic information

The projected population in 2014 was estimated be around 59,498 of those 29,671 were Female and 29,487 Male. Most Shinile people are under pastoralist which 70% and 20% of the people are agro pastoral, while only 10% are living in urban areas, The largest ethnic group in shinile District is Somali which account for around 99%, all other ethnic groups made up of 1% of the population, The Somali Language is spoken by 99% and second sAmharic, 99% of the population are Muslim.

Table 4.5.1:-Population distribution by village/kebeles and distance kilometers from the Shinile District, Ethiopian Somali Region, 2014.

s/n	Name kabeles	Total population	Male	Female	Km
1	Shinile Town	10870	5520	5350	0
2	Lastomi	3802	1900	1902	54
3	Marjano	4445	2180	2265	35
4	Godbin	3064	1480	1584	7
5	Barak	3137	1560	1597	7
6	Kalabayd	4480	2240	2240	25
7	Gaad	3029	1490	1539	15

8	Harawo	4673	2373	2300	15
9	Milo	6048	3050	2998	37
10	Xaarey	5940	2970	2970	75
11	Xadhkaley	5808	2889	2919	80
12	Meta	4202	2019	2183	50
	Total	59498	29,487	29,671	

4.5.2. Vital Statistics and health indicators

Vital statistics like total death, total births, under one and under five deaths are not recorded in the district.

Table-4.5.2:- Shows distribution of population group and vital statistics and population of Shinile District, Somali Regional, 2014.

s/n	Parameter	Number	Percent%
1	Total population	59,498	100
2	Male population	29,487	49.6
3	Female population	29,671	49.4
4	Under one population	3,697	6.2
5	Under five population	5,881	9.9
6	5-59 population	5733	9.6
7	15-49 population	2435	4.1
8	Pregnancy woman	1,880	3.1
9	No-pregnancy	11,745	19.8
10	Average house hold	9,015	0.51

4.5.3 Health facility

Health care services provided by the public health sector in Shinile Woreda consisted of Two Health Centres (HCs), and fifteen Health Posts (HPs). Of those; two HCs and fourteen HPs were functional. The health care services also provided by 2 private clinics and three rural pharmacies

Table:-4.5.3. List of health facility and private clinics, Shinile District, in Ethiopian Somali Region, In 2014

S. No	Type of HF	No of HFs	Functional HFs	Non-functional HFs
1	Health centre	2	2	0
2	Health post	15	14	1
3	Private clinic	2	2	0
4	Rural pharmacy	3	3	0

4.5.4 Health professional

The two Health centre of the district there are a total of 13 BSC nurse, 50 clinical nurse, 4 health officers, 2 pharmacy technician Diploma, 2Lab technicians, 16 mid-wifery diploma and 35 health extension workers,.

Table: - 4.5.4 list of health professional in Shinile District, Ethio-Somali Region, 2014.

s/n	Professional	Male	Female	Total
1	HO	2	2	4
2	PS-nurse	5	8	13
3	Nurse diploma	28	22	50
4	Pharmacy diploma	1	1	2
5	Mid-wifery diploma	1	15	16
6	Laboratory diploma	1	1	2
7	Health extension worker	20	15	35

4.5.5 Education

The total number of schools available in the Woreda was 34, of which, 10 of them were alternative basic education (ABE), 5 primary schools and 4 secondary schools. The school enrolment rate was about 50.2% in the Woreda. The teacher-student ratio was 1:36 in primary schools and 1:30 in secondary schools. The women involvement in schools was 40% in primary schools and 35% in secondary schools.

All of the schools have latrine coverage but not with separate of male and female and poor quality. None of the schools has water and electric supplies.

4.5:-Water and Hygiene Water hygiene and sanitation

In Shinile District safe water supplies coverage was 27%, there were 30 hand-dug wells in which 25 of them were functional, 11bore hole of which 10 of them are functional and there were also 20 Government birkas of which 5 were not functional.

Table:-4.5.5 shows that number well available Shinile woreda for Somali Region, 2014.

s/n	Name	Number	Functional	Non functional
1	Hand-dug wells	30	25	5
2	Borehole	11	10	1
3	Birke's	20	18	2

4.5.6 Electric and Network

The Total kebeles of Shinile which 12, only Shinile Town had 24 hours electric power supply. In case of network service all the kebeles of the district have mobile services. Except Harsiso and Meta kebeles which had land line Telephone services.

Major health program status and coverage in 2014 for Shinile woreda

Since 2011 health performance have been increasing, the health and related indictor were to compare national standard, like Proportion of infants who were protected from neonatal tetanus at birth by the immunization of their mothers with tetanus toxoid (TT2+) before the birth were achieved in 72%, the important indicators were Proportion of Children aged 6-59 months who received vitamin A supplementation was scored in 91% in 2014. The other important in indicators are listed below (table 4.5.6)

Table 4.5.6: Major health indicators of Shinile woreda, Somali Region, 2014

s/n	Health status	Baseline for 2007	Expect to 2008
1	Proportion of Model Kebeles	3(25%)	5(42)
2	Contraceptive Acceptance Rate	977(7%)	992(8)
3	Proportion of births attended by skilled health personnel	147(22%)	
4	Proportion of infants who were protected from neonatal tetanus at birth by the immunization of their mothers with tetanus toxoid (TT2+) before the birth	1194(72%)	1395(80%)
5	Proportion of Children aged 6-59 months who received vitamin A supplementation in	4895(89%)	5471(91%)
6	Proportion of Children aged 2-5 years de-wormed	4095(90%)	4376(92%)
7	Proportion of all forms of TB cases detected during a specified time period.	112(89%)	138(91)
8	Cure rate for bacteriologically confirmed new PTB cases (CR)	78(70%)	110(80%)
9	Proportion of households' access to latrine facilities	27185(47%)	4919(55%)

4.5.7 Immunization coverage

Achievement of vaccination program has considerable attention for the prevention of vaccine Preventable diseases (VPD) outbreaks. The proportion of children who were fully immunized was greater than 60%. Others are motioned below fig 4.5.1

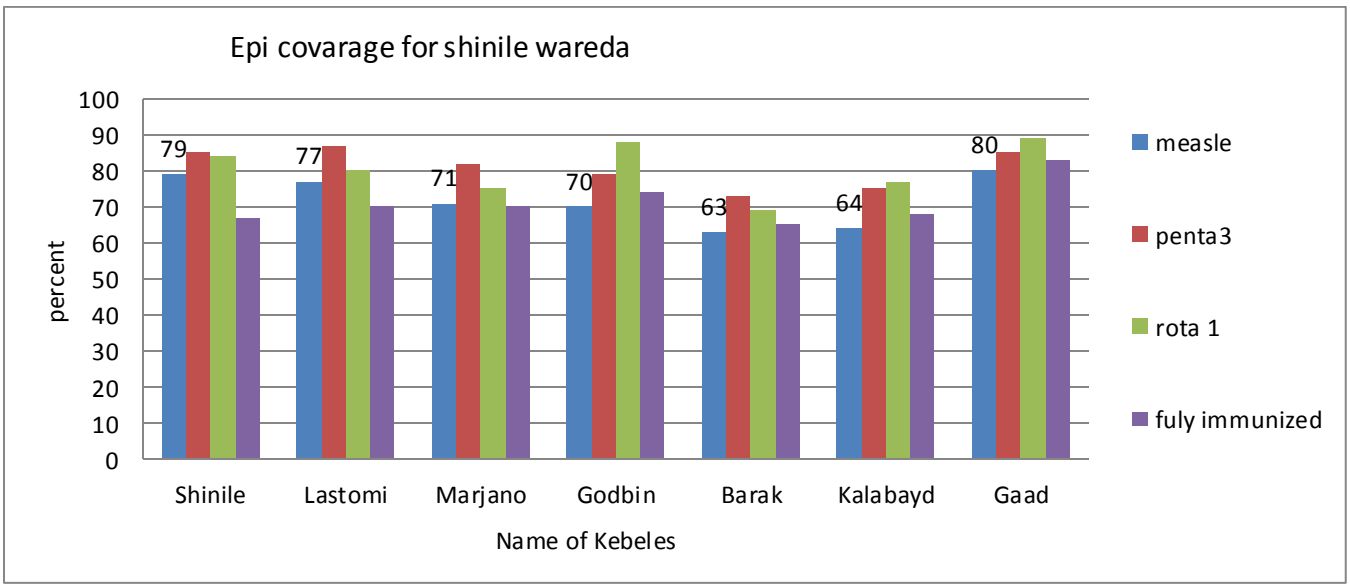

Fig: 4.5.1:- Shows that EPI coverage of Shinile woreda of Somali Region, 2014.

Maternal health service coverage

ANC achievement Rate for Shinile district was 60%. The contraceptive prevalence rate was 3%, from the total 780 birth in 2014 only 190 (42%) were attended professionals

Health education

Health Extension Worker and health providers used to give House to House health education. In this year a total 190 household communities have graduated in 10 packages out of 16 packages for health extension workers. Most of the topic covered in this year included, infant young feeding practice for pregnancy and lactating mother, Malnutrition, tuberculosis, family planning.

In addition to this every health facilities there were regular health education based on the ten top disease of their locality as the woreda health office declared (table 4.5.7).

Table:-4.5.7: leading Cause of under-five morbidity, Shinile District of Somali Region in, 2014.

S/n	Disease	Performance	%	Remark

1	Pneumonia	1320	18.1
2	Upper respiratory infection	1180	16.2
3	Acute febrile illness	980	13.2
.4	Mal-nutrition	920	12.6
5	Urinary tract infection	890	12.2
6	Urinary tract infection	780	10.7
7	Acute gastroenteritis	530	7.3
	Anaemia	390	5.4
8	Infection	290	4
	Total	7280	100

4.5.8 Health Budget allocations

The Total budget for the Woreda Health Office in 2014 including salary was 2.9 million, 1.500.000 for salary, 60000 for Health Facilities drugs and 790,000 constructions; Comparing in 2013 there was an increasing rate of 22%. May be the budget gap filled by Non-Governmental Organization (NGO) supported for the implementation of different programs but the data was not available.

4.5. 9. Discussion

Pneumonia was the leading cause of under five outpatient visit in the district. It accounted for 18% of the total for our patients visit so woreda should give priority to this issue.

Family planning reduces mortality and morbidity due to pregnancy and child birth. Family planning saves lives of women and children as well as improves the quality of life for all. It is one of the best investments that can be made to ensure the health and well-being of women, children, and communities. Family planning has great role in significant reduction of maternal mortality by reducing exposure to unintended pregnancy and unsafe abortion in developing countries where the majority of maternal deaths occur. The use of modern family planning methods has potential to reduce about 25%- 40% of all maternal deaths in developing countries (4).In Shinile woreda the contraceptive acceptance rate was very low; this may be due to that populations are not willing to use modern contraceptive methods.

Antenatal care is more beneficial in preventing pregnancy outcome and mother to child transmission of some communicable disease like HIV/AIDS. Timely follow up of pregnancy leads to early detection of pregnancy related problems and take appropriate action (5) in Shinile woreda Regarding ANC1services, 58% of delivery attended at home. 70% education and birth in a health facility can reduce 75% of maternal deaths (5).

The school enrolment rate was about 30 % in Shinile Woreda. The women involvement in schools was 40% in primary schools and 35% in secondary schools. This is very low compared school to the Target in Region which is 64% and federal which 80 %(6).

4. 5.10.Conclusion

Pneumonia, upper respiratory tract infection, acute febrile illness and mal-nutrition are the top four causes of morbidity under five children. in addition to this 37% of the community do not have water supply and only 58% attended in ANC1and Family planning in the woreda also is very low, Therefore the woreda have to work with other sectors which work Wash and gender issue to improve the availability of water, as well as increase ANC1 follow up of the pregnancy woman and strengthen of health education is of the highly recommended.

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6. Ethiopian Somali Education Bureau Report in 2014

Annex:-1.4.1.Questionnaire For Health Profile In Kebribayah , Woreda Ethiopia, February 2014

Region ----------Zone----------District----------
Respondent----------Interviewer----------

1. Historical back ground of the area

Woreda Name_____

How & why the name given_____

How and when the woreda was formed/founded?_____

Any other historical aspect_____

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

Altitude _____

Surface Area _____(_____% from the zone)

Town _____rural _____(land)

Geographical coordinate

Latitude _____

Longitude _____

Annual rain fall(average)_____

Annual temp(average)_____

Climatic zones=Dega_____(%) Weynadega_____temperate_____(%)
Kola_____tropical_____(%)

Woreda boundaries

North _____South_____

East _____West_____

3. Political and Administrative Organization

Total no. of kebeles:

rural_____

Urban_____

How many NGOs are in the area _____

Ruling political party_____

Bank _____

4. Population and Population structures

Demographic data

Total Population _____Male_____ Female_____ sex ratio_____

Urban Total _____ Male_____ Female_____

Rural Total _____ Male_____ Female_____

Productive age group_____

Population under 1yrs_____

Population under five yrs._____

Population < 15 years_____

Population >64 years_____

Women 15_49 years of age_____

Total population by kebele(each kebele pop)_____

Population enumerated by woreda/H.E.Ws_____

(Population pyramid)

Population data by age and sex

Male	<1	1-5	6-14	15-24	25-34	35-49	50-64	>65
Female	<1	1-5	6-14	15-24	25-34	35-49	50-64	>65

Ethnic/language

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

Religion

Orthodox _____ (_____ %), Muslim _____ (_____ %),

Protestant_____(_____%), Other _____ (_____ %)

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

Main income sources

Agriculture

Cultivated area_____

Grazing area_____

Cropping seasons_____

Land density_____

Other business

House hold income source

Agriculture_____ (No.)

Government Employer_____(No.)

Private Employer_____(No.)

Daily Laborer_____(No.)

Different business_____ (No.)

Jobless _____ (No.)

Average Income_____

6. Education and school Health

Number of educational institution and no of enrolled

K.G._____No of students Male __Female_____

Primarily School_____ No of students Male __Female_____

Secondary_____ No of students Male __Female_____

Preparatory_____ No of students Male __Female_____

College/ University_____ No of students Male __Female_____

TVET_____ No of students Male _Female_____

Total School Age Children (target) _____

Total Enrolment _____Male _____Female_____

School dropout in year 2006_____

If there is school dropout why _____

Number of teachers at elementary, secondary and colleges/universities _____

Educational status of the community

Total Educated people_____

Male _____

Female _____

level of education

Illiterate _____

Read and write _____

12 completed_____

Diploma _____

Degree & above _____

School health activities:

Number of schools with water supply_____

Toilets:

Schools with functional latrines (male & female)_____

Schools with HIV/other Health clubs_____

7. Facilities

Transport

Accessibility (main roads)_____ _____

Type of road _____

How many kebeles have access to transportation _____

Flow of transportation per day_____

Telecommunication

How many people have access to fixed telephone?_____

How many people have access to mobile phone? (Coverage)_____

How many kebeles have access to fixed telephone?_____

How many kebeles have access to mobile phone? (coverage)_____

Post Office_____

Bank_____

Power supply

How many house hold get power supply_____?

Water

Total safe water coverage _____ (___ %)

Safe water supply coverage by kebele _____

Main source of water supply _____

Kebeles getting safe water____ (__ %)

Population getting safe water_____ (__ %)

Daily water consumption per day per person_____

8. Disaster situation in the woreda

Was there any disaster (natural or manmade) in the woreda in the last one year?_____

Any recent disease outbreak/other public health emergency_____

If yes cases_____ and deaths_____

9. Social situation:

Number of libraries_____

Number of NGO working on public health_____

Number of youth clubs_____

10. Health service institutions and infrastructure

S.NO	Type of health institution		No of institutions
1	Number of	with sustainable/ 24 hour /electric power	
		without sustainable/ 24 hour /electric power	

		with telephone service(cable based/mobile)	
		without telephone service (cable based/mobile)	
		with piped water supply	
		Without piped water supply	
2	Number of Health Centers	with sustainable/ 24 hour /electric power	
		without sustainable/ 24 hour /electric power	
		with telephone service (cable based/mobile)	
		without telephone service (cable based/mobile)	
		with piped water supply	
		Without piped water supply	
3	Number of Hospitals		
4	Number of Health centers		
5	Number of Health post		
6	Number of private clinics	Lower	
		Medium	
		Higher	
7	Number of Drug vendors		
8	Number of Drug stores		
9	Number of Pharmacies		
10	Number of Diagnostic laboratories		
11	Hospital to population ratio		
12	Health center to population ratio		
13	Health posts to population ratio		
14	Physical health service coverage		

Health budget allocation:

Government

Total budget allocated for the district _____

Total budget allocated for health _____ (____ %)

Total budget allocated for emergency_____

Funds from NGO

Total _____ (purpose/programs)_____

Community Health Services;

Status of services provided by community health workers namely

No. of TBAs/TTBA_____ and their responsibility _____

No. of HDA_____ and their responsibility _____

Responsibility of HEWs _____

Others_____

11. Top 10 diseases of morbidity and mortality:-

Morbidity cases in adult OPD			Pediatrics/ <5 year		
Rank	Diseases	%	Rank	Disease	%
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		

Adult		Paediatrics/ <5 year	
Morbidity	Mortality	Morbidity	Mortality
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Top ten of admissions

12 . Child Health

A. Health centres providing IMNCI service_____

C. Live births weighing < 2500gm_____

B . Moderate malnutrition in < 3yrs_____

D. Severe malnutrition in < 3yrs_____

13. Health staff to population ratio:

Physicians (GP+ specialist)_____

Health officers_____

All Nurses_____ Mid-wife Nurses_____

Medical lab_____ Pharmacy_____, Env'tal _____Health education_____

Health extension workers_____

Other_____

Expected No of health staff based on BPR and the gap_____

Cause of the gap_____

No of Health posts full filled HEW _____

No of health posts access with telephone _____

14. Vital statistics and health indicators

S. No	Indicator	Rural	Urban	Total
1	Total population			
2	Male			
3	Female			
4	Under 1 years old			
5	Under 5 years old			
6	Under 15 years old			
7	Productive age female (15-49 years)			
8	Pregnant women			
9	Live births			
10	Total fertility rate			
11	Crude birth rate			
12	Crude death rate			
13	maternal mortality rate			
14	Child mortality			
15	Under 5 mortality rate			
16	Infant mortality rate			
17	Dependency ratio			
18	Average household size			

15. Immunization

Penta 1

Penta3 coverage _____

Measles coverage _____

Full Immunization Coverage_____

Measles dropout rate_____

Penta3 dropout rate _____

PAB_____

16. Maternal health coverage

S.No	Type of service	Coverage (%)
1	Antenatal care (ANC) Coverage at least 1 visit (%)	
2	Antenatal care (ANC) Coverage at least 4 visit (%)	
3	Contraceptive acceptance rate (CAR (%))	
4	Contraceptive prevalence rate (CPR (%))	
5	Post-natal care (PNC) Coverage	
6	Proportion of delivery attended by skilled personnel	
7	Proportion of delivery attended by HEW	
8	HOME delivery	

17. Environmental Health & sanitation.

Latrine coverage_____ & Latrine utilization rate_____

Solid waste management_____

Liquid waste management _____

others_____

Health Education (what, when, where, how and who conducted health education)

_____

_____

_____1

8. Endemic disease

A) Tuberculosis and Leprosy

S. No	Cases	Number

		Male	female	Total
5	TB case detection rate			
6	TB treatment success rate			
7	TB treatment cure rate			
8	Defaulters			
	No of Leprosy cases			

B) MALARIA

S. No	Malaria cases		Adult		Under 5		Preg.	Total		M + F
			M	F	M	F		M	F	
2	Confirmed malaria cases	Pf								
		Pv								
		Mixed								
3	Admission cases due to malaria									
5	IRs coverage	Urban								
		Rural								
		Total								
6	Coverage of LLITN (1 LLITN/1.8 person)	Urban								
		Rural								
		Total								
5	LLITN utilization coverage	Urban								
		Rural								
		Total								

C) HIV/AIDS

HIV prevalence_____

HIV Incidence_____

VCT_____

PMTCT_____

PHTIC _____

Mothers who received NVP from those tested positive_____

Persons Ever Enrolled in HIV Care_____

Persons Ever Started on ART_____

Persons Currently on ART _____

19. Nutrition and foods

Nutrition (malnutrition related OTPs, SC,TSF,CBN and PSNP activities)/HO & Early warning

Total OTP sites_____, total admissions to OTP/yr_____

Total SC sites,_____, Newly opened/yr_____, total admissions to SC/yr_____

Is there TSF (targeted supplementary feeding) program in the woreda_____

CBN program_____ PSNP _____other_____

General food security condition_____

What do you think the main problems of the district are?

_____

_____

_____

Essential drugs (shortage):-

_____

_____

_____

_____

_____

20 .No of factory, Mechanism to control industrial wastes and the impact to health

_____

_____

_____

_____

_____

_____

—

21. Discussion of the highlights and the main findings of the health profile assessment and description

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22. Problem Identification and Priority Setting – set priority health problems based on the public health importance, magnitude, seriousness, community concern, feasibility ----------

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----------23.

Chapter 5

Scientific Manuscript for peer Reviewed journal

5. Dengue fever outbreak in Godey Town of Shebelle Zone, Ethiopian Somali Region, June 2015

1. Ethiopian Field Epidemiology, 2.Ethiopian Somali Regional Health Bureau , 3.Addis Ababa University

5.1 Abstract

Introduction: Ethiopian Somali Regional Health Bureau was notified by Godey Hospital about an outbreak of unknown acute febrile illness in Godey Council of Shebelle Zone. Clinical pictures of the cases looks like malaria, but blood film and Rapid Diagnostic Test (RDT) tested negative for any malaria parasites and patients did not respond to both anti-malaria & antibiotics. The team was sent to investigate dengue fever out break and enhance outbreak prevention and control.

Method: unmatched case control study design supported by descriptive study was used. The investigation was carried out from May 25 to July 7, 2015 in Godey Town of Shebelle Zone of Ethiopian Somali Region.

Result: Starting from May 05 to June 17, 2015 a total of 168 AFI cases with no death were reported in health facilities of Godey Town of Shebelle Zone, High number of cases were from age group ranging 15-44(67.8%), followed by 5-14(12.6%), while least were those <1(1.7%). The result of ELISA test done at national laboratory shows that the presence of dengue virus specific IgM antibodies on 7 cases out of 12 (58%). three variables show significant association on multivariate analysis. , In multivariate analyse being sprayed their home were (AOR=0.3; 95%CI: 0.17(0.04-0.6) and using of mosquito repellent (AOR=0.15; 95%CI: (0.05-0.6) shown protective significant association while presence of sick person at home ((AOR=7.3; 95%CI: (2.9-40) shown and Presence of stagnant water around living area (AOR=3.9; 95% (1.03-14) shown negative association towards the occurrence of Dengue Fever.

Conclusion:-This investigation identifies that the etiology of the outbreak was Dengue virus. Existence of Aides Species mosquitoes larvae in the houses inspected showed us there was a favourable ecology for potential breeding. Environmental management was the most recommended.

Key word: Dengue fever: Godey Town

5.2. Introduction

Dengue is the most rapidly spreading viral vector borne disease worldwide. Approximately 2.5 billion people are living in areas with dengue transmission and an estimated 50-100 million infections occur annually (1). The incidence of dengue virus infection is rising in endemic areas in tropical and subtropical regions worldwide (2).

Dengue Fever is known as one of the most important arthropod-borne viral diseases affecting humans. Over the past several decades, major outbreaks of Dengue Fever have occurred in many countries, causing significant morbidity and mortality. The magnitude of the Dengue Fever issue remains alarming. Frequent travelling over the world can cause further spread of Dengue Fever from the endemic areas to many previously unaffected areas (3).

Dengue viruses are members of the genus *Flavivirus* and family *Flaviviridae*. They are single-stranded RNA virus with an icosahedral nucleocapsid surrounded by an envelope. There are four distinct serotypes: DEN-1, DEN-2, DEN-3, and DEN-4. Infection by one dengue serotype can give rise to life-long immunity to the serotype but only partial protection to other serotypes. Sequential infection by different serotypes of dengue virus has been generally accepted as the predisposing factor of dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS). DHF is more likely to occur when dengue virus affects a person with immunity to a heterologous serotype. The frequency of each serotype causing DHF/DSS is in descending order of: type 2, 3, 4, and 1.All four dengue virus serotypes (DEN-1 to DEN-4) are presently circulating in different geographical areas (4).

Dengue fever and dengue haemorrhagic fever are prevalent in urban areas, as *Aedes aegypti* mosquito, the vector of dengue (family: Culicidae; genus: *Aedes*, subgenus: *Stegomyia;* species: *Aedes aegypti*), usually breeds in urban and peri-urban areas (5).

The rapid growth of industries and building activities, improvement of transport facilities such as railway and roads, increased movement of people from urban to rural areas, and environmental changes have all favoured the spread of dengue in rural as well as urban areas(6).

In the last 50 years, incidence has increased 30-fold with increasing geographic expansion to new countries and, in the present decade, from urban to rural settings. Dengue has mostly been documented in Africa from published reports of sero-surveys or from diagnosis in travelers returning from Africa, and dengue cases from countries in Sub-Saharan Africa.

Dengue fever had not been previously reported in Ethiopia; it had been previously reported in European travellers returning from Ethiopia, In Ethiopia there is no report of dengue fever until 2013 which is reported from the beginning of the outbreak in mid-October to 9,500 cases were reported from Dire Dawa City (7)

Ethiopian Somali Regional Health Bureau received report about an increase in the number of fever cases from Godey Town of Shabele Zone. Following this report, Regional Public Health Emergency Management (R-PHEM) send team composed of Field Epidemiology Residents, Doctors, Entemiologist & Environmental health professionals to the site of outbreak having the following of confirming the existence of an outbreak; describing the outbreak in relation to time, place and person; to determine the etiology of the outbreak; and to recommend measures to control the outbreak.

5.2 Method and materials

5.2.1Study area

Ethno-Somali Regional state has 9 administrative zones, 68 woreda/districts and 4 city councils. Godey is one of the administrative city council in the Region and found in Shebelle zone. It is located in eastern part of the country about 1,200 km from Addis Ababa and 530 kilo meters away from Regional capital, Jig-jiga. It is second largest town in Somali region. Based on the 2011 CSA projection the total population of Godey is 75,000 in 2015. The town is governed by City Administration Council led by a Mayor. The town is subdivided into 10 Administrative Kebeles. It is also the Capital of Shebelle Zone. The town is well known for its Semi-arid weather condition and low altitude with flat land surfaces. The Town is agro-climatically with temperature scaling up to 43oC. The altitude varies from 270 to 300 meters above sea level.

The main means of subsistence in the Town is farming and small scale trades. There is long and large River (Wabishebelle) that flows crossing the Town. There are 1 Governmental Hospital, 3 private clinics, 1 NGO (SOS) Health centre and 4 health posts in Town.

Currently, there e is huge scarcity of safe drinking water in the Town; hence the population in the Town uses drinking water from unsafe open water sources.

5.2.3 Study design and period

Unmatched case control study design supported by descriptive study was used. The investigation was carried out from May 25 to July 7, 2015 in Godey Town of Shebelle Zone of Ethiopian Somali Region.

5.2.4. Data collection

Descriptive: Line list collected from registration and patient cards in the health facilities and descriptive analysis was conducted. Discussions were conducted with health workers and authorities

Analytical study: unmatched case control study (1:2) done. Cases were based on standard case definition from hospital. Controls were patients admitted in hospital with other medical problem other than dengue fever. Data collected with structured questionnaire that addresses possible risks. Oral consent from the study subjects was collected. We interviewed 34 cases and compared with 68 controls.

5.2.5. Laboratory Investigation.

Blood specimen was collected from all febrile cases to check haemo-parasite using Giemsa stain and widel and weil felix tests for typhoid and typhus. We collected 11 blood serums to be analysed at national laboratory (EPHI) for vector born viral infection such as yellow fever, Dengue fever, West Nile fever, Rift valley fever by using ELISA technique.

5.2.6 Data entry and Statistical analysis:

Data were entered and analysed using EPi-Info 7 version 3.2.2 statistical software package. Frequency and percentage were calculated for the study variable. Bi-varriate analysis and multi viraite analyses used and 95% CI and p-value were used. In all statistical tests, the differences were considered to be statistically significant if p-value was less than or equal to0.05. Odd ratio and 95% were confidence interval used.

5.3. Result

5.3.1 Descriptive Investigation

Starting from May 25 to July7, 2015 a total of 168 AFI cases was reported in Godey Town, the index case was seen in kebele 02 of Godey council on May 2015, this case was 26 years adult Male which have travel history of kalafo woreda which far for Godey 90km. There was no death which reported, and then the cases build up gradually and reached the pick at June 27, 2015 as shown ep-curve (fig 5.3.1)

The age of suspected AFI cases ranges from three months to 80 year (the mean age was 23 years), high number of cases were reported from age group ranging 15-44(67.8%), followed by 5-14(12.6%) while least were those <1(1.7%). High AR (34.4/10000 population) was those age from 15-44, followed by >45(23.4/10000) while least (9.7/10000) was 5-14(table 1).

From all cases reported only about 113(67.8%) cases their kebeles were identified, while the remaining of cases 55(32.1%) were not identified. From those their kebeles were identified majority 31% were from kebele 02, followed by kebele 01 (23.3%). The cases were reported from all kebeles of town with varies number (table 5.31).

Please add one paragraph about sex

5.3.2 Analytic investigation

We had interview 34 suspected acute febrile cases (median age: 24 years) and 68 control subjects (median age: 26 years). All variables which had shown statistically significant association during bivariate analysis such as the presence of stagnant water, living around rivers, wearing short clothes during day time, presence of sick person in their home, being sprayed their home and using of mosquito replants. However, on multivariate backward binary logistic regression analysis, In multivariate analyse being sprayed their home were (AOR=0.3; 95%CI: 0.17(0.04-0.6) and using of mosquito repellent (AOR=0.15; 95%CI: (0.05-0.6) shown protective significant association while presence of sick person at home ((AOR=7.3; 95%CI: (2.9-40) shown and Presence of stagnant water around living area (AOR=3.9; 95% (1.03-14) shown negative association towards the occurrence of Dengue Fever.

5.3.3 Responses activities conducted

Active case search was conducted by investigation team, including staff from RHB and Town Health Office, Urban HEWs, and community members, in line with creating awareness to the

community and case referral to health facilities. Case management at hospital and private clinics; hospitals and private clinics were made ready to accept and manage cases.

5.4. Discussion

The present outbreak investigation was conducted in Gode hospital and private clinic located in Gode town of Shebelle zone. It was evident that the dengue fever might have started much earlier than the date reported by the council as most of cases were treated as malaria at health facilities.

In current dengue fever investigation there was no deaths report, which may indicate to a good case management at both Gode Hospital and private clinics.

In this study, most of the patients were those in the age group of 15–45 years; this finding was similar to that of a study in west Bengal (5), this could be related to differences in lifestyle, time spent outdoors near vectors, sleeping without mosquito nets or other aspects of inadequate disease prevention among the young. Another explanation could be that the disease can create lifelong immunity for the individual, so that older persons who have been exposed more often may have more resistance, decreasing the morbidity rate (5).

Non-use of protective measures while living in a dengue endemic area was a risk factor identified in current investigation. Similar finding was reported from Malaysia (7)

In current outbreak being sprayed their home was among factors identified the main reason for not spraying was Shortage of IRS/out of stock and IRS sprays materials according to council health office. Based on the outbreak investigation findings and the laboratory confirmation of Dengue virus by RDTs and PCR, the outbreak under question was due to Dengue Fever. The outbreak response, prevention and control measures need strengthening in order to control the outbreak as soon as possible and avoid unnecessary health and socio-economic consequences

5.5. Conclusion & recommendation:

This investigation identifies that the etiology of the outbreak was Dengue virus. Existence of Aides Species mosquitoes larvae in the houses inspected showed us there was a favourable ecology for potential breeding. Environmental management was the most recommended

5.6. References

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Figures & Tables

Figure 5.3.1:- showing Epi-curve of AFI cases by date of onset of sign and symptom in Godey Town, Shabele zone of Ethio-Somali Region, June 2015

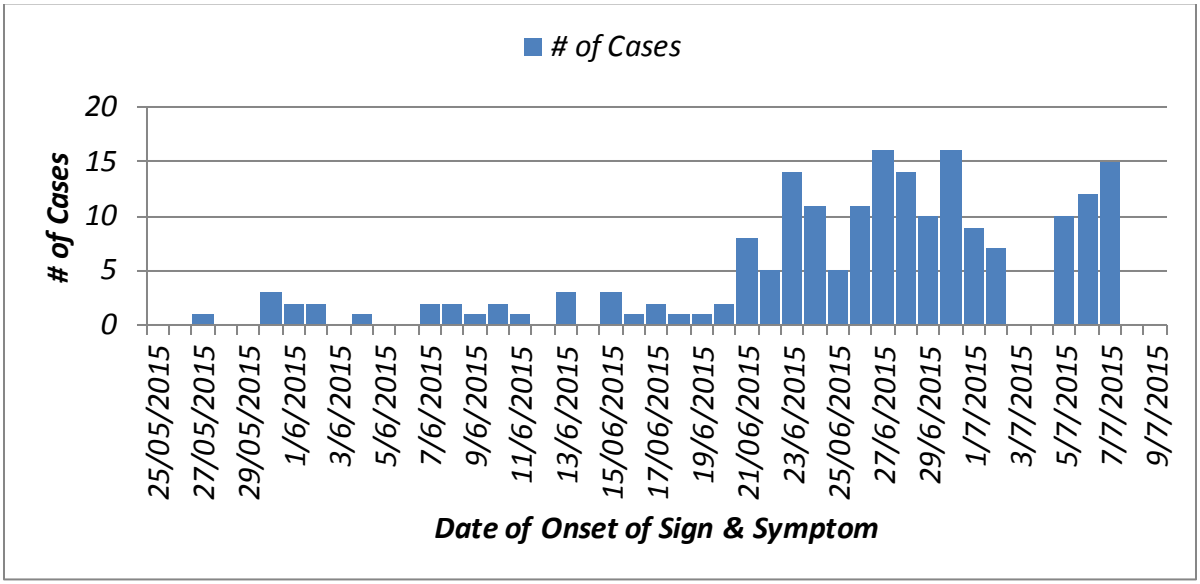


Table 5.3.1 distribution and attack rate of AFI case by age group in Godey Town of zone, Ethio-Somali Region, June 2015

Age Group of AFI cases	Population	Number of cases	Percent (%)	AR per 10,000	Number of death	CFR
<5	10,950	11	1.7	10	0	0
5 to 14	22,800	22	13.1	9.7	0	0
15 to 44	32,250	114	67.8	34.4	0	0
>45	9,000	21	12.6	23.4	0	0
Total	**75,000**	168	100	100	0	0

Multivariate analysis for different exposures, Godey town, Shebelle zone, Ethiopian Somali Region, in June 2015

Exposure		Cases	Control	COR(95%CI)	AOR(95%CI)	P-value
Presence of stagnant water around living area	Yes	19	22	2.6 (1.14-6.17)	3.9 (1.03-14)	0.045*
	No	15	46			
Having river near area	Yes	21	27	2.5(1.05-5.71)	1.27(0.4-4.1)	0.70
	No	13	41			
Using short closes during day time	Yes	26	30	4.1(1.63-10.39)	3.6(1-13.1)	0.05*
	No	8	38			
Are your home spayed	Yes	9	38	0.3(0.12-0.69)	0.17(0.04-0.6)	0.01*
	No	25	30			
Is there sick person in your home	Yes	26	21	7.3(2.83-18.71)	10.6(2.9-40)	0.000*
	No	8	47			
Did you use mosquito repellant?	Yes	10	37	0.4 (0.15-0.84)	0.15 (0.05-0.6)	0.007*
	No	24	31			

Chapter 6

Abstract for Scientific Presentation

1.1. Abstract

Introduction:-Ethiopian Somali Regional Health Bureau notified by Godey Hospital about an outbreak of unknown acute febrile illness in Godey Town of Shebelle Zone. The illness was characterised by acute onset of high grade fever, chills, headache, and muscle pain. Local health office could not identify the causative agent. Clinical pictures of the cases look like malaria. Regional Health Bureau had sent team to investigate and respond the outbreak. The investigation conducted to verify the outbreak, identify the etiologic, risk factors and recommend control and prevention measures.

Method:-Unmatched case control study supported by descriptive study was used. The investigation carried out from May 20 to July 5, 2015. Line list all cases collected. We interviewed 34 cases and compared with 68 controls using questionnaire. Data were entered and analyzed using EPI-Info 7.Bi-variate analysis and multi variate analyses were done.

Result:-From May 05 to June 17, 2015 a total of 168 AFI cases with no death were reported in h Godey Town. The crude attack rate was 22.4 per 10,000. The attack rate in male (24/10,000) was higher than female (20/10,000). Age group 15-44 were highly affected (34.4/10, 000) followed by >45(23.4/10000). Out of 11 serums specimen sent to EPHI, 7 (63%) positive for dengue fever IgM by ELIZA. Many larvae were observed in many of the households visited in Kebeles 01 and 02.

Conclusion:-Based on laboratory results, cases fulfil definition standard case definition; the causative agent of the outbreak was Dengue Fever Virus. We recommended house hold spray, using mosquito repellent, strengthen social mobilization and dissemination of Dengue fever Key messages.

Key word: Dengue fever: Godey Town

Chapter 7

Maher Assessment

7. Maher Need Assessment on Health and Nutrition, Sitti zone, Ethio-Somali state, November 2015

7.2. Abstract

Background: Ethiopia has been conducting emergency Health and Nutrition preparedness assessment to address different health and nutrition emergencies caused by different Hazards, namely drought, epidemics, flooding etc. Ethio-Somali Region has done Meher assessment to identify the current threat to the community where emergency assistance (health, nutrition) might be needed due to acute problems and come up with reasonable estimates of the size of the population needing emergency assistance for coming 6 months period.

Method: A cross-sectional study design was used. Siti Zone among hot spot area was selected purposely. Semi-structured questionnaire used to collect information at different level. Meeting with Zonal and Woreda administration and with the community conducted. Document review and observation done. Data entered and analysed by Microsoft Excel 2007.

Result: There was no confirmed outbreak of diseases in all assessed woredas of Siti Zone, but there is increased number measles and dysentery in Hadigala, Denbel and Shinille weredas from June to September, 2015. Malnutrition, acute respiratory infections, diarrhoea and skin diseases were among top five causes of morbidity. In addition, there was no public health emergency preparedness and response plan and there was no accessible emergency response budget. There was also shortages of basic drug such Ringer Lactate, Doxycycline, Amoxicillin suspension and Tetracycline ointment, while ORS, Vit A and Coartem for malaria were partially available. Concerning supplies; RDT for Malaria and CTC kit available: (for AWD) for the coming one month.

Conclusion: - In the assessment period, there is no outbreak occurred throughout Siti zone, but there were increased number measles and dysentery of certain area of the woreda. The emergency preparedness and response plan was not identified even though an increasing number of diseases that might cause an outbreak. In addition of that there were no budget and shortage of drugs and medical supplies for emergency response. Since there were drought on Siti Zone Somali Region preparedness emergency response needs to be prepared for all District and budget of emergency drug should be secured.

7.3. Introduction

The Government of Ethiopia has been dedicating considerable resources to the response to Public Health Emergencies: from epidemics of diseases to widespread malnutrition resulting from drought. The country is also exposed to potential natural disasters like floods and resulting displacement of population and related health and social problems with various degree of impact on the health sector.(1)

Ethiopia has been conducting human health and nutrition emergency needs assessment twice a year following Meher and Belg seasons in condition with food security assessment led by Disaster Risk Management and Food Security Sector. On the assessments both government and non-governmental organizations (Ministry of Agriculture, Disaster Risk Management and Food Security Sector, Ministry of Health, Ministry of Water and Energy, Ministry of Education, National Metrology Agency and respective Regional Bureaus, WHO, UNICEF, OCHA, MSF, Plan International, IRC and etc.) have been participating.(1,4) During the assessment, possible human health and nutrition risks were expected to be identified and numbers of beneficiaries were estimated. Finally, using the results of the assessment humanitarian document are developed and distributed to all partners to fill the gaps identified, to avert and minimize public Health consequences.(4)

Ethiopia is one of resource poor countries in which early identifying and instituting prevention activities are crucial strategies to respond to public health emergencies. Following the Meher and Belg rain fall malaria outbreak is expected in many part of Ethiopia because of the suitable conditions formed for mosquito breeding. On the other hand, since Ethiopia is in meningitis belt the outbreak of meningitis is also suspected during the dry seasons. Not only this internal displacement due to drought left too many Ethiopian populations vulnerable for diarrheal diseases, measles, severe acute malnutrition and the like from year to year. Shortage of drinking water during dry season is decisive contributing risk factors for the occurrence of acute watery diarrhoea across the country. (4)

Therefore, early vulnerability assessment and providing necessary of resource for at risk population is very important to minimize loss of health budget, school dropout rate, and production power due to health consequence of natural and manmade disasters and epidemic diseases. Hence, as usual 2015 Meher assessment was conducted to identify areas where emergency assistance (health, nutrition) might be needed due to acute problems and come up with reasonable estimates of the size of the population needing emergency assistance for the upcoming 6 months period.

7.3.1Justification

In addition to the usual assessment, the global climate information indicated that there was an El-Nino effect, which affects many countries globally including Ethiopia. The El-Nino effect was manifested with shortage of rain. A number of woreda in our country were affected by the shortage of rain which led to severe drought which further exacerbate the already existing poor nutritional status of the most vulnerable group mainly children, pregnant and lactating women. Hence, strong preparedness and response, and successful management of emergency health and nutrition program management is required at all levels.

7.3.2. Background

Sitti Zone is one of the nine administrative Zones of the Somali Region and situated in the north-eastern part of the Region. Sitti Zone has boundaries with Djibouti Republic, Somaliland, Afar Region, Oromiya and Dire Dawa City Council. The new railway line being constructed between Djibouti and Addis Ababa transcends through the Zone as the previous also crossed the area. The rural population of Sitti Zone is estimated at 545,000 persons based on the last national census conducted in 1997. The majority of the rural population is pastoralists followed by agro – pastoralists and limited traders.

7.4. Objectives

The main objectives of the assessment are

- ✓ To update drought related health problems in Sitti Zone by taking into account the complete failure of the rain
- ✓ To identify immediate needs and assess the adequacy of existing capacity of the Region to handle the situation.
- ✓ To identify most vulnerable groups, assess any indication of malnutrition and come up with plan of action for immediate measures

7.5. Methods

7.5.1. Study design

A cross-sectional study design was used to assess and identify human health and nutrition emergency needs in the next six upcoming months.

7.5.2. Study Area Profile

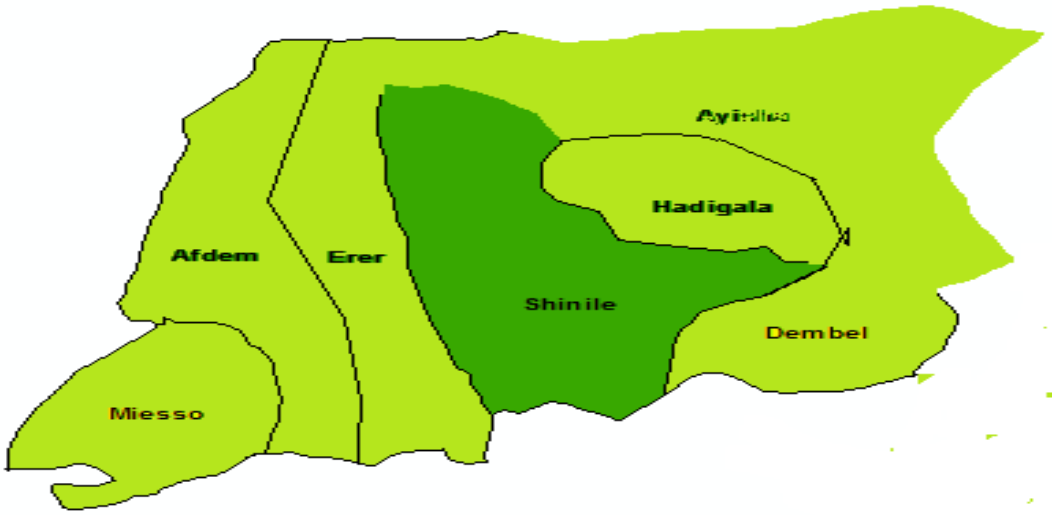
The assessment was conducted in Sitti Zone of Somali Region. All seven districts were selected and visited during the assessment. The zones and districts were selected based on The El-Nino effect in the zone. In terms of health services, there were 104 health facilities in Sitti Zone one of which 16 were health centres and 87 are health posts with one primary hospital at Afdem. In addition, there are presently 12 mobile health teams that are providing health & nutrition services to rural communities resident in remote areas

7.5.3 .Sampling & Sample size:

All woreda in the zone were included

Selection of Assessment area:

Hot spot districts were identified by respective Regional Health Bureau and woreda health departments. During the selection of districts to be addressed by assessment the Regional Health Bureaus and woreda health departments took into consideration both natural disasters and disease trends such as drought, shortage of normal rain, internal displacements, outbreaks, floods, landslides, conflict etc.



Map:-7.5.1. Map-Siti Zone of Somali Region in, 2015

7.5.4. Study period

This assessment was conducted in Sitti Zone from 24 October – 13 November 2015

7.5.5. Assessment Team:

The assessment team participated in a one-day workshop held in Jijiga on 22 October 2015 for all members of the assessment team deployed to cover the Somali Region. The assessment team also examined the impact of the current drought situation in Sitti Zone on health and nutritional status of the local population with specific emphasis on children, adults, pregnant and lactating mothers. This was done with the view to identify existing or potential health and nutrition emergencies or threats because of the drought or other aggravating factors

7.5.6 Assessment Tools:

Semi-Structured questioners were used for data collection. Two different questioners were used to collect Health and nutrition related data at district and Regional levels. The questioners addressed socio-demographic profile, Health profile, status of epidemic prevention and control multi sectoral coordination committee at all levels and go through asking ongoing epidemic situation and check availability of emergency drug at Regional and district levels.

7.5.7. Source of Data:

Both primary and secondary data were collected from Regional Health departments and district Health Offices. Head of district health offices, pharmacist, and Public health emergency management officers, maternal and child health officers were interviewed.

We used the checklist already prepared by the Ethiopian Public Health Institute. The assessment was done by interviewing responsible persons from different units of health sector (Woreda Health office heads, experts/officers, selected household members) as well as reviewing secondary health and nutrition data using the questionnaire developed by EPHI.

Data entry and analysis

We used Microsoft excel to compile, and analyse data.

7.6. Result

Coordination

Somali Regional Health Bureau has functional multi sectoral coordination forum (health & nutrition cluster meeting) which conducts meeting every month while Multi sectoral coordination (Relevant government offices. NGOs and UN agencies) forum for health at zonal level is functional only during epidemics. There is public Health Emergency Preparedness and Response plan .The plan is not funded.

District level

There was no public health emergency preparedness and response plan as well as no accessible emergency response budget at all level.

Preparedness

Main shortages of emergency drugs include; Ringer Lactate, Doxycycline, Amoxicillin suspension and Tetracycline ointment, while ORS, Vit A and Coartem for malaria were partially available. Concerning supplies; RDT for Malaria and CTC kit available: (for AWD) for the coming one month and no budget allocated for emergency Rapid response by the woreda.

Health profile of the Zone

The health situation in all woreda has been stable during the last five months. There was no confirmed outbreak of diseases or health emergency except number of measles and dysentery were increased in Hadigala, and Denbel Woreda.

The five top causes of morbidity in children and adults.

According to verbally and written information provided by Woreda Health Offices staff, the commonly mentioned five top leading causes of morbidity in children of age below five years were malnutrition, acute respiratory infections and diarrhoea. Skin diseases were also stated as one of five top causes. Malnutrition was related to four weredas (Denbel, Aisha, Shinille and Erer) as cause of morbidity in children below age of five years. Malaria was mentioned in the list of five top cause of morbidity in children only in Denbel. In adults, respiratory tract infections, urinary tract infections, Gastro-intestinal problems/dyspepsia, and AFI/Malaria were mentioned as top five causes of morbidity.

Malaria

All woredas of Siti Zone are endemic to malaria. Based on obtained data from assessed Woreda, Malaria cases increased in Shinile and Erer from June to September 2015, but not reach epidemic threshold. A total of 1,095 cases were reported from June to October 2015 from all Woreda.

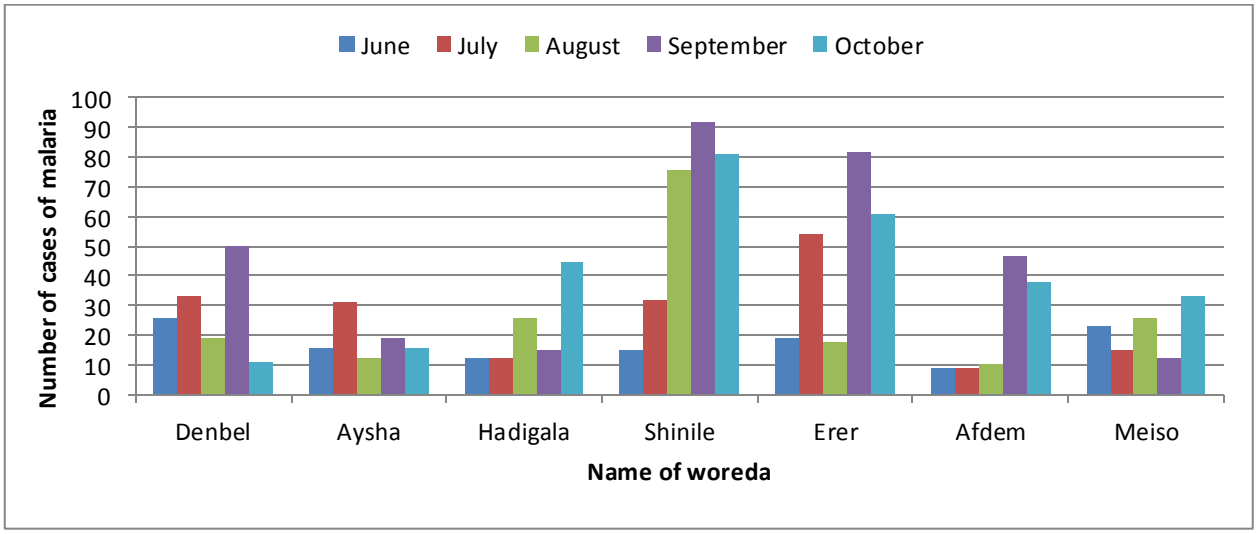


Fig.7.6.1:- Malaria cases of Meher emergency assessed Woreda, Sitti Zone, Somali Region, in, November 2015

Measles

Cases of measles were reported in certain areas of Sitti Zone. In this regard, 33 Measles cases have been reported in the period June to October 2015.from two woreda, namely, Denbel (2 cases) and Hadigala (31

cases). There was no measles death reported during this period. The suspected measles outbreak in Hadigala has occurred in Hariso IDP site. There was no case reported for six days prior to visit.

Dysentery

Total of 200 Dysentery cases were reported in the period June to October 2015, 117cases in Denbel Woreda and 83 in Shinille woreda. No death reported due to Dysentery. This was some of the potential health threats or risks of disease outbreak in Sitti Zone, which need close monitoring during the current emergency in Sitti Zone.

AWD

There was no any outbreak of AWD reported from all woreda visited.

Nutrition

The nutrition status in Sitti Zone Woreda needs urgent response. As a result of the current drought, malnutrition in children is increasing and likely to increase in the coming months if continuous and adequate food distribution and nutrition emergency responses actions are not undertaken on time. Based on information obtained from Woreda Health Offices and visited nutrition SCs/OTPs, malnutrition in children is increasing in the previous months. Therefore, the nutrition situation in the Woreda need close monitoring early detection of children and mothers with malnutrition in all Woreda of Siti.

Enhanced Outreach Strategy (EOS) Nutrition screening for children of age 6-59 months and pregnant and lactating women, integrated with measles immunization campaign was conducted in September 2015, with Zone average coverage of 95%. During this screening time, a total of 1,248 (1.5%) children have been identified with Sever Acute Malnutrition (SAM) and 7,932 with Moderate Acute Malnutrition (MAM), and overall Global Acute Malnutrition (GAM) 9,180 (11%). SAM was found to be the highest in Hadigala Woreda (3%), followed by Afdem Woreda (2.4%). A total of 5,079 (27%) pregnant and lactating women were found to be with acute malnutrition (MUAC below 21 cm). According to information obtained from Woreda, supplementary food was not yet distributed to children and mothers that were identified with malnutrition during the EOS screening despite the fact that WFP Field Office in Dire Dawa has dispatched allocated TSF commodities to final destinations in Sitti Zone for distribution to 20,213 beneficiaries.

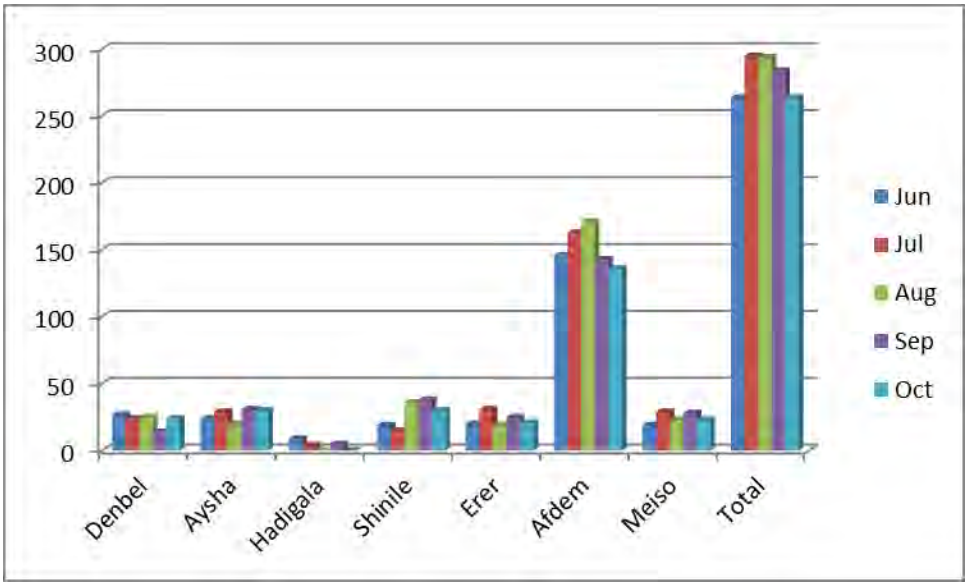


Fig 7.6.2: SAM cases admission trend (number) June to October 2015 in meher emergency needs assessment Woreda, Siti Zone, Somali Region, November 2015

Trends of Malnutrition over past two years

Field information in Sitti zone indicates that there were no significant increase trend in the number of children admitted to nutrition stabilization centres (SCs) and Outpatient Therapeutic Programs (OTPs) in the period June to October 2015. However, there was more than a double increase in the number of SAM cases admitted in the Zone 2015 compared to similar periods in 2014(7.6.1)

Table: -7.6.1.SAM admission trend comparison between 2014 and 2015 (June October) in, Siti Zone, Somali Region, November, 2015.

Woreda	June 2014	July 2014	Aug 2014	Sep 2014	Oct 2014	Total 2014	Jun 2015	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Total 2015
Denbel	17	3	2	16	26	64	27	24	25	14	24	114
Aysha	31	24	17	12	4	88	24	29	20	31	30	134
Hadigala	6	4	6	6	6	28	9	4	0	5	0	18
Shinile	31	15	28	41	23	138	19	15	36	38	30	138
Erer	11	4	6	27	12	60	20	31	19	25	21	116
Afdem	40	30	17	29	20	136	146	163	171	143	136	759
Meiso	20	24	14	18	14	90	19	29	23	28	23	122
Total	156	104	90	149	105	604	264	295	294	284	264	1401

The woreda made efforts to open new SC sites in health centres and health posts at IDP sites. In Sitti Zone, there were a total of 86 OTP and 18 SCs. All seven Woreda have SC sites. All Woreda had health Workers which was trained on SAM management at SC and OTP sites. Same of the nutrition supplies such folic acid and Resomal were not available in all Woreda, though some Woreda claim for shortage of Plump Nut, F100, F75, and Ampicillin injection. Other shortages include glucose 40% and Nasogastric tubes (NGT) (Table:-7.6.2)

Table: - 7. 6.2 Status of TFPs in Meher assessed Woreda, Siti Zone, Somali Region, and November 2015

Woredas	Denbel	Aysha	Hadigala	Shinile	Erer	Afdem	Meiso
Number of SC sites	3	3	2	3	2	2	3
Number of OTP sites.	18	10	8	10	14	9	11
Total Number of TFP (OTP/SC) in the Woreda	18	13	10	13	16	11	14
Training given on clinical SAM management (Y/N)	Y	Y	Y	Y	Y	Y	Y
Availability of protocol for management of SAM (Y/N)	Y	Y	Y	Y	Y	Y	Y
RUTF available (Y/N)	Y	Y	Y	Y	Y	Y	Y
F100 available (Y/N)	Y	Y	Y	Y	Y	Y	Y
F75 available (Y?N)	Y	Y	Y	Y	Y	Y	Y
Routine drugs for TFP available (Y?N)	Y	Y	Y	Y	Y	Y	Y
Shortage of nutrition supplies (list)	F100, F75		Ampicillin Injection, paracetamol		Shortage of Ampicillin injection, F75, F100	Plumpy Nut, F100, F75	

7.7. Discussion

The assessment team has examined the impact the current drought situation in Sitti Zone has on health and nutritional status of the local population with specific emphasis on children, adults, pregnant and lactating mothers. This was done with the view to identify existing or potential health and nutrition emergencies or threats because of the drought or other aggravating factors.

In health, there is no confirmed outbreak of disease in Sitti Zone but there was increasing cases of measles in certain areas of the zone. The services being delivered need improvements with the delivery of required emergency drugs and medical supplies. As the measles, cases were reported from IDP, immunization of all children and good case management should be in place. The Regional Health Bureau deployed medical team to support case management.

Even though strong multi-sectoral committee exist at Regional level, but at District level PHEM preparedness is very low. So, in order to prevent and control any epidemic, capacity building should be carried out according to the PHEM guideline.

Emergency and lifesaving drugs are also expected to be stock at district level to timely mobilize and minimize loss of life.

The capacity building activity could focus on establishing and/or strengthening system and human resource needs related to PHEM: surveillance system, communication, and logistics.

7.8. Conclusion

.In the assessment period, there is no confirmed outbreak occurred throughout Siti zone, but there were increased number measles and dysentery of certain area of the Woreda. The emergency preparedness and response plan was not identified even though an increasing number of diseases that might cause an outbreak. In addition of that there were no budget and shortage of drugs and medical supplies for emergency response.

7.9. Recommendation

Health

- ✓ Replicate the Regional EPRP to woreda and revitalize emergency coordination committee
- ✓ Stocks of essential drugs and medical supplies for emergency needs should be secured both at regional and woreda
- ✓ Capacity building for health workers on PHEM, such as preparedness planning, forecasting emergencies, surveillance and reporting soluble strengthened
- ✓ All woreda should improve and strengthen recording, reporting and documentation of all activities.
- ✓ Allocate budget for emergency preparedness and response;
- ✓ Monitoring IDP through established surveillance should be strengthened

Nutrition

- ✓ Strengthen all OTP sites through regular and consistent supportive supervision
- ✓ Link moderate cases and SAM discharged cases to SFP
- ✓ Strengthen enhanced outreach strategy
- ✓ Continue partners to work on nutrition program in the assessed woreda.
- ✓ Giving Training on SAM management protocol for supervisors (health workers) and HEWs
- ✓ Provide adequate TFP supplies to the responsive site

7.10. Reference

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Chapter 8

Project Proposal

8. Assessment of Vaccination Coverage & Its Determinant in Kebribayah Woreda of Ethiopia Somali Region May to September in, 2016

8.2. Summary

Background:-Vaccination is a proven immunization tool in preventing and eradicating communicable diseases. Despite increase in global immunization coverage, many children around the world especially in developing countries still left unvaccinated. In 2007, approximately 27 million infants worldwide were unvaccinated against common childhood diseases and 2-3 million children die of vaccine preventable diseases. About 1 million children in Ethiopia were unvaccinated in 2007 and only 20% of the countries children are fully vaccinated in 2005. To increase the immunization coverage in Ethiopia Somali Region, assessing factors affecting immunization has to be identified through community-based study in three Woredas of Kebribeyah Woreda of Ethiopia Somali Regional State.

Method: cross-sectional community based study will be conducted from May to September 2016, in Kebribeyah, Woreda of Somali Regional State using modified WHO EPI cluster sampling method. A total of 541 children of aged between 12-23 months from 541 households will be selected from kebeles of Woredas. Data will be entered in to the computer using EPI-Info version 3.5.1 and analysed by SPSS version 16 statistical software package.

Expected outcome: From this project, factors associated with low immunization coverage will be identified, shared for Regional Health Bureau.

8.3. Introduction

Discovery of vaccine is one of the successes of public health; it has been an instrument for saving millions of lives. About 85% of the world's children under one year of age have received lifesaving vaccines.(1) Whereas, one fifth of the world's children about 19.3 million infants were not immunized against vaccine preventable childhood killer diseases. Nearly 70 % of these children live in ten countries. An estimated 1.7 million children died in 2008 from vaccine preventable diseases. The deadlines for eliminating maternal and neonatal tetanus and certification of global polio eradication by 2010 have not been met (1).

Vaccination is the most effective means of combating diseases, particularly dangerous infectious diseases. In 1974, World Health Organization (WHO) launched the Expanded Program of Immunization (EPI) to make vaccines available to all children and thereby control vaccine preventable diseases world-wide (2).

All countries have National Immunization Programmes, and in most developing countries, children under five years old are immunized with the standard WHO recommended vaccines that protect against eight diseases – tuberculosis, diphtheria, tetanus (including neonatal tetanus through immunization of mothers), pertussis, polio, measles, hepatitis B (Hep-B), and homophiles influenza (Hib). These vaccines are preventing more than 2.5 million child deaths each year. This estimate is based on assumptions of no immunization and current incidence and mortality rates in unimmunized children (3).

The Ethiopian health policy had given emphasis to the prevention and control of major communicable diseases. Thus, in Ethiopia expanded program on immunization (EPI) was initiated in 1980. The objective of the National Immunization Policy was to reduce mortality and morbidity in children from the EPI target diseases through the immunization of all children under the age two in the first five year, but later after 1986 it was revised to focus children under one year of age in order the child exposure time to natural infection. The program had been planned to make immunization services available to 10% of the population in 1980 and to increase immunization access by 10% each year and reach to 100% coverage (4).

According to Ethiopia Demographic and Health Survey (EDHS), vaccination coverage increased from 14% in the 2000 to 20% in 2005. The 2011 EDHS revealed that 24% of Ethiopian children in the age group of 12–23 months received all the recommended vaccines i.e. one dose

each of BCG and measles, and three doses of DPT and polio. Implementation of the Reaching Every District (RED) approach with continued GAVI s

support, technical and financial support from all partners in health and deployment of the health extension workers were the factors that contributed towards immunization coverage improvement However, systemic barriers related to geographical coverage still remain, requiring bridging approaches such as the enhanced out- reach strategy, even as the country moves towards a more equitable Geographical coverage.(5)

Five Regions (Addis Ababa, Harari, Amhara, Tigray, and SNNP) have persistently attained immunization levels above the national average for the last three consecutive years, while levels in Gambella, Afar and Somali Regions are the farthest below the targets(6)

To increase the immunization coverage in Ethiopia Somali Region, assessing factors affecting immunization has to be identified through community-based study. Such community-based study is not available in the Region. The objective of the study is to assess immunization coverage of children aged 12-23 months and associated factors in Kebribeyah District of Ethiopia Somali Region

Statement of problem

Immunization is among the most successful components of preventive medicine. Despite successes in control of vaccine preventable diseases in the developed world, diseases such as measles still require better control particularly in developing countries with limited resources(7).

The expanded programme on immunization was launched in 1980 with the objective of increasing the coverage by 10% annually. However, the coverage in the first 20 years was very low although during the 1990's good progress was observed through Universal Child Immunization (UCI).(8) The reaching every district (RED) approach has been implemented in Ethiopia since 2004 in districts with poor immunization coverage and high dropout rates. As a result, the coverage showed marked improvement. DPT3 coverage increased from 52% in 2003 to 87% in 2014. The variation in coverage among Regions, however, is large. Now, the Reaching every district strategic approach is recast to reaching every children/community strategic approach in order to deal with inequities within districts (11).Routine child vaccination has been known to reduce infant mortality by preventing diseases. The maternal and child health and other related services in Somali Region are very low when compared to other Regional states in the country. Pentavalent-3 immunization coverage (under 1 year) is 51%. Measles immunization

coverage is 58%, fully immunization coverage 38%, Vitamin A supplementation for 6- 59months of age was 70 %(9),

In Ethiopian Somali Region and study areas, there are no published studies that have been done and with the purpose of establishing factors that are associated with prevalence and immunization coverage. This study will identify specific factors associated with immunization coverage in order to advance improved intervention, policies/strategies therefore raising overall immunization coverage.

7.3.1 Rationale justification

In summary, monitoring immunization coverage performance is essential for improving the quality of services. Administrative coverage (coverage based on registration of doses administered by health care providers) is often unreliable and reporting of routine immunization program data by Woredas is generally weak. Data generated were not adequate to provide reliable coverage estimates that could be used for EPI program planning.

To achieve the EPI targets in the Region, information on the reasons for non-vaccination is equally important. Community-based information about vaccination status and reasons for non-vaccination will be needed in order to increase vaccination coverage rates and implement interventions for control and elimination of vaccine preventable diseases in Somali Region.

Literature Review

In Ethiopia, vaccination is given on routine and outreach bases. The routine vaccinations services are given starting from birth, should be completed before one year of life by all children. BCG and OPV0 are administered at birth, while three doses of OPV and pentavalent vaccines are given at interval of dour week duration; at 6, 10 and 14 weeks, and measles vaccine is give at the age of nine months. If the children did not start immunization at birth, the first doses will be given at the 6th week and the child will not take OPV0 vaccine (10)

Data sources for immunization coverage in Ethiopia are frequently obtained from the Ministry of Health and surveys. The National Demographic and Health Survey of 2000 and 2005, provides the immunization status of the children. According to the DHS 2005 only 20% of children aged 12-23 months were fully vaccinated and 60% had received the BCG vaccination, and 35% had been vaccinated against measles. About 32% DPT3 and 24% of them not took any vaccination (10). In national survey conducted in 2006, 83.4% children age 12-23 months received BCG, 84.3% received DPT1, 54.3% received measles and only 50% are fully immunized (11).

Maternal characteristics are the most known determinant factors of child immunization. A comparative study done among slum and non-slum dwellers in Bangladesh children age of 12-23 months of age in three zone of Dhaka demonstrated that complete coverage is associated with educational status of the mother, income and living conditions. The study revealed that mothers with lowest education, households with limited monthly income and people living in slum area were less likely to complete a child immunization. It also indicated that children whose mothers were born in a rural area or an urban slum, and those whose mothers were aged less than 30 years are 0.35 and 0.43 times less likely to be fully immunized respectively. But in Kenya young age of mothers was associated with high immunization coverage as compared with the older mother (12).

Various documents indicate that mothers' and families' general experiences with health services affect their likelihood of bringing their children for vaccination. Availability of drugs, length of waiting times, and satisfaction with how they have been treated and treatments received are also considerations (14)
Among the 29 sub-Saharan countries Surveyed, full childhood immunization coverage varies widely from only 11% of children of ages 12 to 23 Months in Chad to 78% in Zambia. In some countries, missing the third dose of vaccine in the DPT and Polio series is the reason that complete immunization levels are low [13].

A case control study done in Wanago Woreda Southern Ethiopia in 2008 identified monthly income as the only factor associated with defaulting from immunization. But other socio demographic factors such as family size, age of the mother or immediate care taker, occupational status, ethnicity, religion, parity, and educational status does not show an association with defaulting. In contrast to this study from Tikrit city indicates that urban resident (being urban or rural), educated mothers and those who have 2 and less children were more likely to complete the recommended vaccine. Also mothers age and mothers job were significantly associated with complete vaccination (14).

In another cross sectional study done in Sudan showed that walking time to the nearest place of vaccination strongly influenced the correct vaccination status of the child. Children of mothers who have better access to vaccine services (less than 30 minutes walking time to the nearest place of vaccination) were 3.4 times more likely to have had the correct vaccinations than were children of mothers who have to walk 30 minutes or longer (15).

8.4. Objective

7.4.1 General Objective

To assess immunization status and factors affecting it among children aged 12-23 months old in Kebribeyah Woreda of Ethiopia Somali Regional State

8.4.2 Specific Objectives

- ✓ To determine the immunization coverage among children aged 12-23 months old towards eight vaccine preventable disease.
- ✓ To assess demographic, socio economic and health service factors affecting immunization status among children aged 12-23 months
- ✓ To assess the knowledge of the mother/caretakers on immunization and vaccine preventable disease
- ✓ To see the effect of knowledge of mothers/caretakers on the immunization status of children

8.5. Methods

8.5.1 Study area and population

Kebri bayah, is one of Woreda under Faafan Zone which is among the 9Zones of Somali Region in Ethiopia with total population of 148,769, (2012projection population). Kebri bayah District share international border with Somali land in the southeast and east.

Kebribeyah is the capital town of the District & found 50 km away from Jijiga Town. There are health centres and health posts supposed to provide routine immunization.

Map 8.51 -of kebriyahah woreda of Ethiopian Somali Region in 2015

8.5.2. Study design

Cross-sectional community-based study design will be conducted. Quantitative data will be collected from mother/caretakers who had children aged 12-23 months to assess the immunization status and factors affecting it.

8.5.3. Source population

All household with children of 12-23 months residing in K/beyah Woreda constitutes the source population of the study.

7.5.4. Study population

The study population of this study will be all children in the age group of 12-23 months of age living within eligible household in 10 randomly selected kebeles in the woreda. Mothers'/caretakers will be also studied about their knowledge on the child immunization

8.5.5 Study participants

Children of 12-23 months of age and their mothers/caretakers in the selected eligible households

8.5.6. Sample size determination

Sample size will be calculated based on the single proportion formula, fully immunized children aged between 12-23 months is 20% with 95% confidence interval and precision level of 5% (10). The sample size taken after multiplying by design effect 2

$$N = (Zá/2)^2 \, p(1-p) * 2 = 492$$

$$d2$$

After addition of 10% contingency to the calculated sample size, the total sample size will be of 541children aged between 12-23 months shall be targeted for the study.

8.5.7. Sampling procedure

WHO multi-stage cluster sampling with stratification will be used in which the Woredas will be first stratified into urban and rural Kebeles. To identify the households that had been eligible child (12 to 23 months) census will be conducted for one urban Kebeles and 5 randomly selected rural Kebeles. After households (mothers/care takers) with eligible children will be identified as sampling frame, simple random sampling (SRS) will used to select proportionally allocated sample for selected Kebeles of woreda.

The numbers of children sampled within each selected Kebeles of Woreda will be allocated based on the size of children between 12 and 23 months age in the Kebeles. For those households having more than one child in households, one child will be selected randomly per household during census.

8.5.8. Study variables

Dependent variable

Immunization status of children aged between 12-23 months

Independent variable

- ✓ Socio demographic characteristics of mothers/caretakers
- ✓ Sex of child

- ✓ Knowledge of mothers/caretakers
- ✓ Family size
- ✓ Number of children ever born
- ✓ Experience of child death
- ✓ Birth order
- ✓ Residence
- ✓ Time of travel to reach the nearest health facility
- ✓ Place of delivery
- ✓ Maternal tetanus toxoid immunization
- ✓ ANC follow up
- ✓ Family income

8.5.9. Data collection instrument

The questionnaires will be developed in English and then translated into Somali language and translated back to English for accuracy and consistency. In addition to immunization histories of children, information on socio-demographic characteristics, economic status, sex of the child, ANC follow up, place of delivery, maternal immunization, accessibility and availability of vaccination service, family size and knowledge of mothers or immediate caretakers on immunization will be included. In addition, reasons for defaulting and not immunizing will be also added into the questionnaire.

8.5.10. Data collection

Data on immunization history will be collected in two ways, based on the availability of immunization card and mothers/caretakers verbal report. After a child aged between 12-23 months will be identified from the household, mothers/caretakers of the child will be asked for the presence of child's immunization card. For the child with immunization card, the information on the doses and types of vaccine received by the child will be copied from the card. If immunization card is unavailable for the child, the mothers/caretakers will be asked for immunization history. The number of doses the child took and how (the route of vaccine administered) the child took the vaccine will be asked. Information on other variables will be asked directly from the child's mother/caretaker

8.5.11. Training of data collectors and pre-testing

Ten nursing graduated data collectors and supervisor will be recruited and received two days intensive training before data collection. Training will be given by Somali language how to ask and fill the question, selection criteria of households and children, and how to approach the mothers/caretakers.

Questionnaires will be pretested for completeness and appropriateness to the local context on 20 households in one of the kebeles not selected for the study. Based on the results of the pre-test some questions will be modified.

Data quality control

The questionnaire used for study will be adopted from demographic health survey (DHS) and from the prior researches done in other places, and then developed according to the local context. Every day filled questionnaires will be checked in the field for completeness by both data collectors and supervisors before they return from field. Data collectors will be asked to return and complete for the incomplete questionnaires. Every questionnaire will be checked by principal investigator every day after data collection before data entry

Operational definitions

Fully vaccinated- A child between 12-23 months old who received one BCG, at least three dose of Pentavalent, three doses of OPV and a measles vaccines

Partially vaccinated- a child who misses at least one doses of the eight vaccines

Unvaccinated- a child who did not receive any dose of the eight vaccines

Vaccinated- a child who took at least one dose of the eight vaccines

Coverage by card only: Coverage calculated with numerator based only on documented dose, excluding from the numerator those vaccinated by history.

Coverage by card plus history: Coverage calculated with numerator based on card and mother's report

Knowledge of immunization: If mother has awareness about immunization, knows objectives, age at the child begin, finishes immunization and session to complete immunization considered as knowledgeable.

Knowledge of vaccine preventable diseases: awareness of diseases preventable by vaccination

Immunization coverage: proportion of children who took vaccination

Immunization status: being fully/partially vaccinated or unvaccinated

Inclusion and exclusion criteria

Inclusion criteria

Households with at least one living aged between 12-23 months shall be eligible for the study..

Exclusion criteria

Households without children aged between 12-23 months will be not included and those people who are did not willing to participate

Data processing and analysis

Data will be coded and entered into computer by using EPI Info version 3.5.1 and exported to SPSS version 16 for analysis. Univariate analysis will be used to describe the data using percentage. Binary logistic regression will employed to determine the odds ratio for both multivariate and bivariate analysis. Bivariate analysis will be used to assess the association between independent and dependent variables. Then, all variables that show significance in the bivariate analysis will be included in multivariate logistic regression to determine the factors associated with immunization coverage among children aged between 12-23 months. The result of the study will be presented by tables and charts

8.5.12. Ethical clearance

Ethical clearance for the study will be obtained from Regional Health Bureau. And official support letter from RHB will be written to administrative body of kebribeyah Woreda. Data collection will undertake after permission is obtained from the Woreda Health Office. Study participant will be asked for their consent before asking for any information and oral informed consent will be taken from every study participant. Objectives of the study will be explained for the every study participants and they asked for information only after they give their consent. No person will be obligated to participate in the study without his/her consent.

8.5.13. Dissemination of the results

The finding of the study will be submitted to Somali Regional State Health Bureau and EFETP. The finding will also be presented for different workshops and seminars and will be published in literate peer-reviewed journal.

Project outcomes:

- ✓ Identify reasons/factors for low vaccine utilization among children especially those living in pastoral community in Ethiopia
- ✓ Develop appropriate and effective strategies for improving immunization coverage and utilization to pastoral community
- ✓ Disseminate Information to concerned stakeholders and increased improvement of vaccine utilization/coverage based on sound epidemiological evidence.

8.5.15. WORK PLAN

Work plan for the study of child immunization coverage and associated risk factors among children 12-23 months of age in Kebribeyah Woreda, Ethiopian Somali Regional State, 2016.

S.No1	Activity	May	June	July	August	September
1	Preparation Of research proposal					
2	Questionnaire development					
3	Securing Ethical clearance					
4	Purchasing supplies					
5	Questionnaire pre testing					
6	Duplication of questionnaires					
7	Data collection					
8	Data entry and analysis					
9	Report writing					
10	submission Report					

8.5.16. Budget break down

Assessment of Vaccination Coverage & Its Determinant in Kebribayah Woreda of Ethiopia Somali Region May -2016							
S/N	kebribayah woreda	Participants	Travel day	Data collection	Total days	Periderm Rate	Total
1	Data collector	24	2	5	7	100	16,800
2	Supervisor	2	2	5	7	210	2,940
3	Fuel				10	50*20	10,000
	Sub-total A						**29,740**

B. Supply Cost					
S/N	**Item**	**Unit/days**	**Qty**	**cost/each**	**tot cost**
1	Note book	each	20	20	400.00
2	Paper	each	15	150	2,250.00
3	Pen	each	10	100	1,000.00
4	Parker	Pack	30	100	3,000.00
	Sub-total B				6,650.00
GRAND TOTAL (A+B)					**36,390.00**

8.5.17. References

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Chapter 9

Other out put

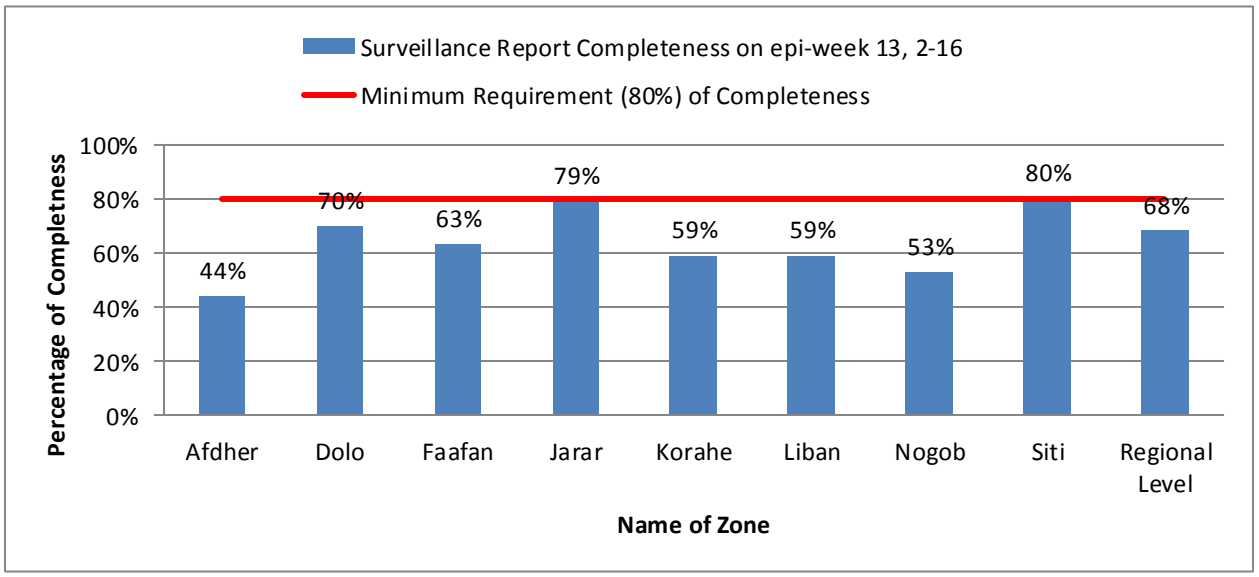
9.1 Epidemiological weekly bulleting of week 13 In March, 28, 2016

Introduction:

This bulletin provides information on public health emergencies and surveillance activities for evidence based decision making. It shows surveillance report, complete-ness and timeliness, all PHEM targeted disease situation in the Region. It also gives an opportunity for partners working on public health to contribute on priority issues of emergency and enhance the surveillance activity in the Region.

Weekly Surveillance Completeness and Timeliness:

In week 13 of WHO week, (68%) districts submitted their Health facilities, the proportion of health facilities submitting weekly reports in each of the reporting districts is below the national target Standard of 80% in most of the Zone. RHB-PHEM is urged to utilize the maximum effort/contribution of Surveillance officers in order to improve the completeness & Timeliness of woreda Health facilities weekly reports submission.



Diseases and conditions

This week; we present a concise profile of top priority diseases/conditions including suspect AFP/Polio, Measles, Malaria; Meningitis, Typhoid Fever, Dysentery, Maternal deaths, and other emergency diseases reported. Hence, this week, a Suspected Measles, Dysentery, Typhoid, and SAM increased in The Region compared to the week 12th of 2016, while Malaria, Meningitis Decreased and the Dengue Fever outbreak in Dolo Ado District has subsided, with no cases recorded after 14/3/2016. Although AWD Response activities in hudat and Moyale Districts are ongoing and the situation is under control, From Moyale and Hudat, 7 and 2 cases were reported for this week respectively. In addition, this week, the highest suspected Measles cases were reported from Kabribeyah and Babile woredas as of 19 and 15 cases respectively.

Malaria cases :A total of 945 malaria cases with 942 outpatient cases , 3 inpatient cases and zero death were reported in the Region, 771 were tested(RDT) for Malaria, Out of this 316 were positive with positivity rate of 41% were reported in Week13, from the total positives Plasmodium falciparum and Plasmodium Vivax 78%and 22% respectively.

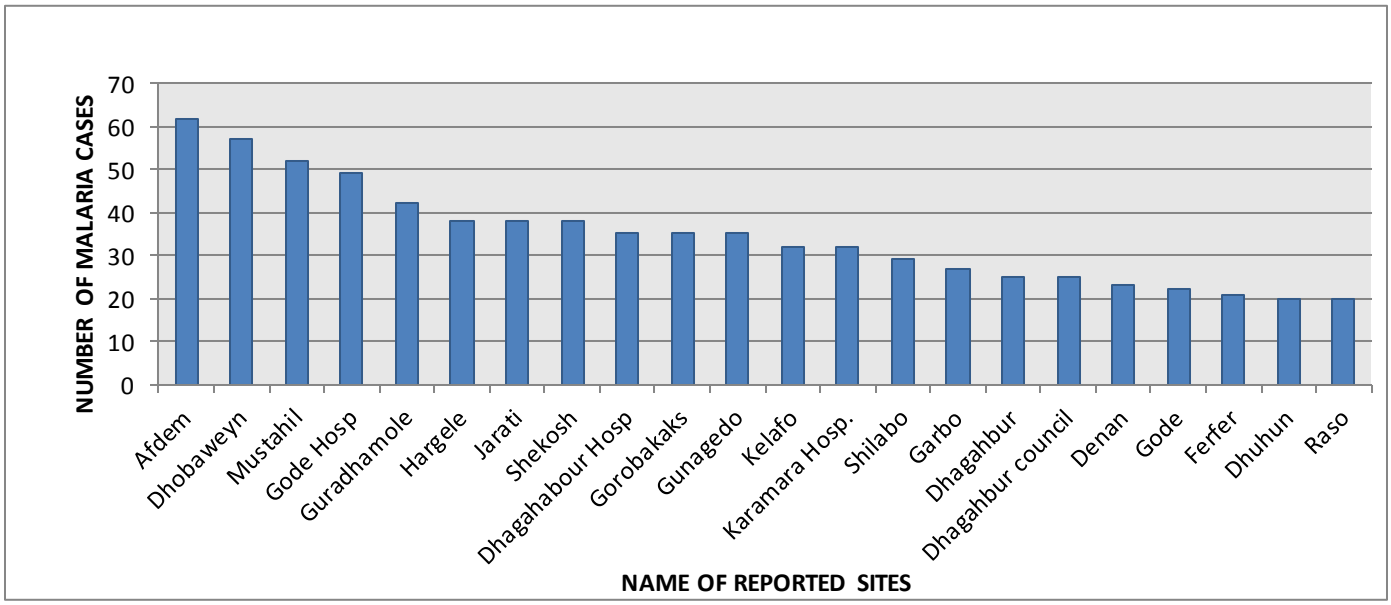


Figure-:9.2.1 Distribution of malaria morbidity by top 20 reporting Woredas in Epi-Week 13, 2016 in Ethio-Somali Region.

Typhoid fever:

This Week, a total of 192 typhoid fever cases with 190 outpatients, 2 inpatients and zero deaths were reported in the Region. The cases were reported from 62 reporting units (50 woredas, 8 Hospitals and 3 Town administrations). Jarati woreda reported 35 cases and followed by Filtu Hosp which were reported 21 cases respectively.. Majority (89%) of the Woredas reported less than 10 typhoid fever, 9% reported 10 to 30 cases and 2% of the woredas reported above 30 cases.

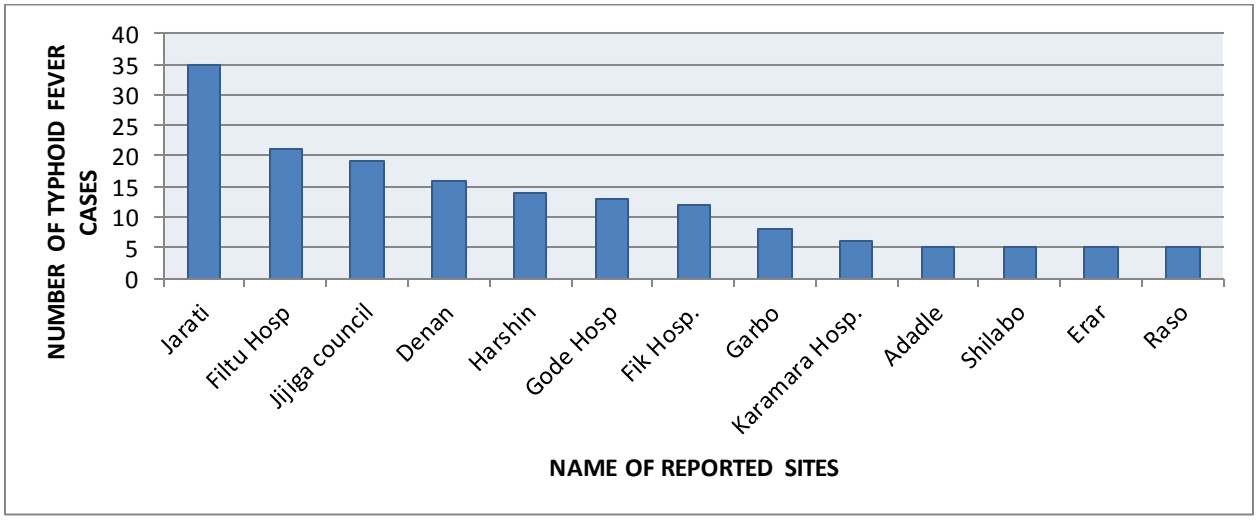


Figure:-9.2.2.Typhoid fever case distribution by top 12 reporting units of Ethio-Somali Region, Week 13/ 2016

Dysentery:

This week, a total of 252, dysentery cases with 252 outpatients, 0 inpatient and zero deaths were reported in the region. The cases were reported from 62 reporting units (50 woredas, 8 hospital and 3 town administrations). Harshin Woreda reported 23 cases followed by Gungado and Shinile woredas which were reported 19, and 18 cases respectively. Majority (91%) of the Sites reported less than 10 dysentery cases, 10% reported 10 to 30 cases and 0% of the woredas reported above 30 cases

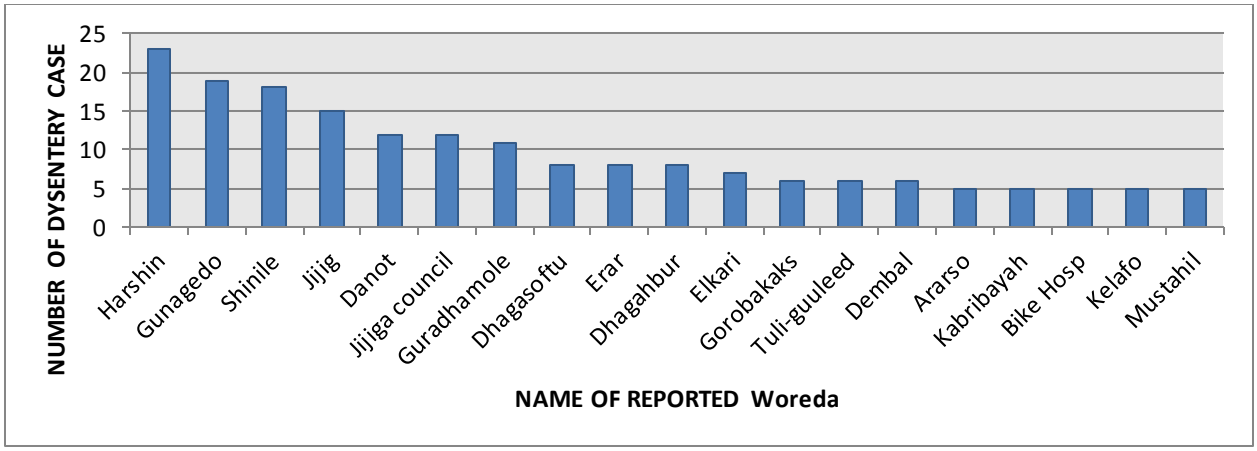


Fig:-9.23.shows that number reported case of dysentery in week 13, for 2016

Severe Acute Malnutrition (SAM):

This week, a total of 584 SAM cases with 565 outpatients, 19 Inpatients and no death were reported in the Region, the reported cases slightly increased than last week report and the cases were reported from 50 woreda, 8 Hospitals and 3 Town administrations. The highest report were reported from Hadhigala Woreda as of 98 cases followed by Shinile and East Imay Woreda which were reported 94 and 31 cases respectively.

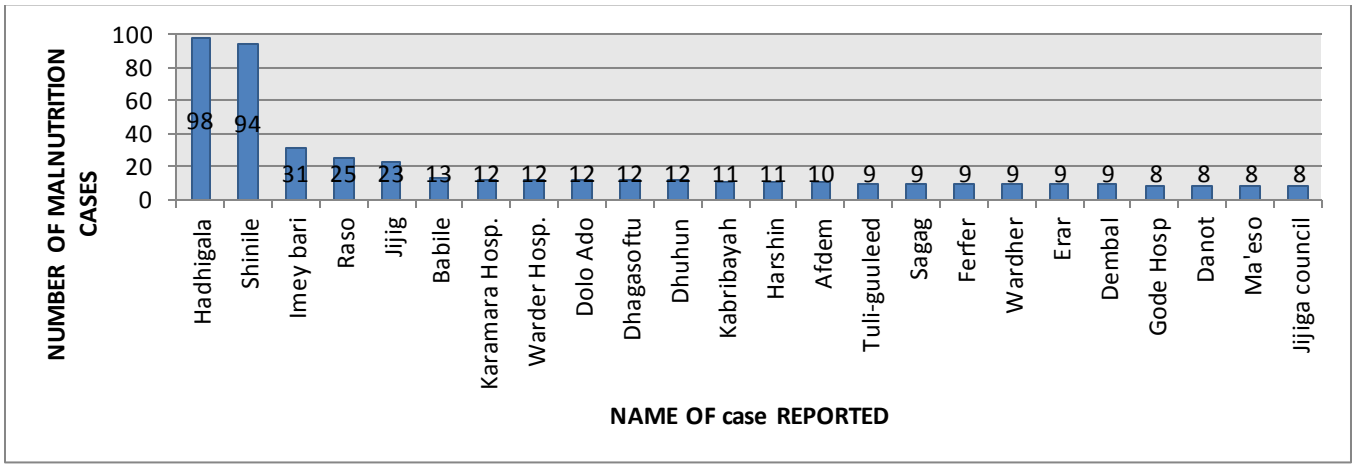
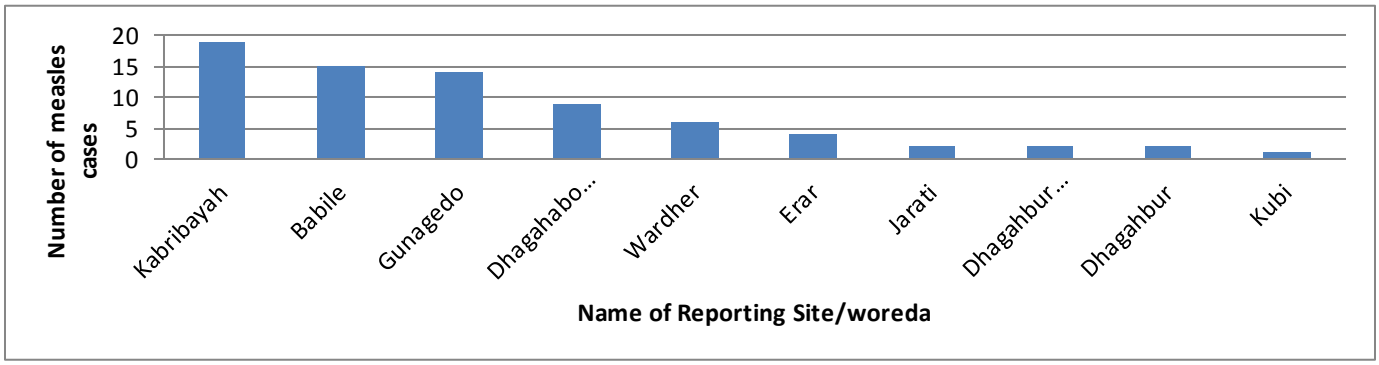


Figure:-9.2.4 Malnutrition case distribution by top reporting woreda of Ethio-Somali Region, Week 13/ 2016

Vaccine Preventable Diseases

(Suspected Measles Cases): This week, a total of 74 cases with no death were reported in the Region, the reported cases slightly increased than the last week report and the highest cases were Reported from Kabribeyah (19), and Babile (15) woredas as shown in the figure below, While the report from Dhagahabour Hosp and Kabridaher Hosp shows the subsiding of Measles case due to well organized effect of response established and the awareness of the community increased. Similarly, the Measles outbreak in Fik District has subsided, with no cases recorded after 7/3/2016. (Week)



Suspected AFP Cases): This week, zero cases were reported in the Region.

(Suspected NNT Cases): This week, zero cases with zero death were reported in the Region.

(Suspected Meningitis Cases): This week, zero cases with zero death were reported in the Region.

(Suspected Maternal Death): This week, zero death was reported in the Region.

Animal bites (Suspect human rabies): This week, zero cases with zero death were reported in the region.. AWD from Hudat Woreda from AWD Response activities in hudat and Moyale Districts are ongoing and the situation is under control, According to the Wereda health bureau & supporting teams Response activities are ongoing with task force meetings, health education, active surveillance and contact tracing, case management, WASH, and regulatory. This week, Moyale and Hudat, 7 and 2 cases were Reported Respectively.

9.2 Public health emergency management Training

Introduction

PHEM is designed to ensure rapid detection of any public health threats, preparedness related to logistic and fund administration, and prompt response to and recovery from various public health emergencies, which range from recurrent epidemics, emerging Infections, nutritional emergencies, chemical spills, and bioterrorism.

The activities under this core process are to be implemented by appropriately trained and capable professionals. This core process is comprised of four sub-processes which are: had three sub-processes which are Public Health Emergency Preparedness, Early Warning, Response, and Recovery.

The Country, therefore, formulated this dependable system to detect unusual health events Timely, and to insure the appropriate response measures promptly. While designing this process, best practices from around the world have been adapted, tailored to the country's context taking into consideration the national threats and The Mission of federal ministry of health. The modern principles of emergency management and the implications of the International Health Regulation (IHR) 2005 are also clearly reflected in the system. Particular emphasis was placed on risk based preparedness and capacity building which is Considered to be a critical approach.

Thus, based on the supportive supervision undertaken by regional health bureau and partners reported that there were lack of trained PHEM focal person. Therefore, in order to improve the preparedness system and skill of the participants in our region, training had given to PHEM focal person working in different woredas. The training includes public health emergency management system and selected priority and epidemic potential diseases

General Objective:

- To strengthen the capacities of PHEM focal person working at woreda and health facility level on public health emergency management process.

Specific Objectives:

To build capacity of health professionals working in the health facilities by:-

- Improving their skills on implementation and coordination of response activities of epidemic prone diseases
- To improve the health workers' ability on case management on selected epidemic potential diseases
- To strengthen epidemic preparedness and planning process
- To strengthen the recording and reporting capabilities of the health workers

Methodology

PHEM focal person and IRC staffs were selected and called from their respective zones to participate the training in Dire Dawa MA Hotel on PHEM and selected priority and epidemic potential diseases.

The training schedule and logistics was prepared to achieve the best quality training standard.

Sr. No.	Date of training	Place of training	Participating zones	Remark
1	April 4-6, 2016	Dire Dawa MA hotel	4 zones and IRC staffs	1 Halls

Training materials was prepared and presenters in from regional health bureau and Field Epidemiology residents involved.

The training was conducted using detailed presentation on each selected disease. During and after each presentation discussion was undertaken with trainees. The methods of conducting the training was involve introducing each title presentation, working on the exercises, discussion in small groups with the

support of facilitators, group presentation and discussion. Pre and post-tests was given to the participants to evaluate the significance of the training given.

Since each trainee has responsibility to sensitize staffs in their respective woredas, each has received a complete set of the training material.

The training was given from April 4-6, 2016 in Dire Dawa MA Hotel. The quality, process and outcome of the training were continuously monitored using collect comments from participants and attendance was followed daily.

Out came of training

- 26 Health worker in both woreda and IRC workers was trained
- Technical capacity of public health emergency management activities was achieved

Topics of the training:-

- Over view of PHEM and Epidemic disease situations
- Introduction to Basic epidemiology and application in public health
- Public Health Surveillance and Early warning
- Outbreak investigation and response
- Recovery and Rehabilitation
- Introduction to preparedness and preparedness plan preparation
- Acute Malnutrition and their management
- Measles surveillance and outbreak investigation
- AFP Surveillance
- Neonatal surveillance and case based investigation
- Maternal death surveillance and response

Training schedule

Public Health emergency management training participants , Dire-Dawa , MA Hotel , April 4-6/2016			
Time	Activity	Remark	Facilitator
Day 1- PHEM Training for IRC			
9:00 - 9:15	Registration	Training organizers	-
9:15 - 9:30	Welcoming address and Opening remark		IRC/RHB
10:00 - 10:30	Tea Break		Organizer
10:30 - 11:00	Introduction of epidemiology	Presentation using slides	Kayse
12:30 - 2:00	Lunch break		
2:00 – 3:30	Report priority Diseases, conditions and Events	Presentation	Ashanafi
3:30 - 4:00	Tea Break		
4:00 - 5:00	On-going	Presentation	
Day 2 –			

8.00 – 8.15	Review the previous day activities and points	Participants	Mubark/Rajah
8.15 – 9:30	overview of the out break	Slide presentation	Ashanafi/kayse
9.00 - 10:00	Class discussion	Group-work	Mubarak/rajah
10.00 - 10:30	Tea Break		
10.30 – 12:30	Principle of surveillance	Presentation	Ashanafi
12.30 – 2:00	Lunch		
2:00-3:00	On-going	Group work	Kayse/ashanfi
3:00- 3:3:30	Group	The role of your surveillance	Mubarak/rajah
3.30-4:00	Tea break		Organizer
4.00 – 5:30	VPD-for priority of Somali Region	Slide presentation	Kayse/ashanafi
Day 3 – PHEM Training			
8.00 - 8.15	Summary of yesterday lesson	Participants	Mubarak/Rajah
8:15-4:00	VPD-	Presentation	Kayse/Ashanafi
10.00– 10:30	Tea Break		Organizer

10.30–12:30	Demonstration of format	Exercise	Ashanfi/kayse
12.30–2..00	Lunch break		
3.00 – 3.30	Over all discussion of streghenthen of surveillance		Kayse/ashanfi
3.30– 4.00	Tea Break		Organizer
4.00 – 4.30	Closing		RHB/IRC

9.3. Personal information personal information

Annex:-9.3.1. Personal information

Personal information	
First name(s) / Surname(s)	Kayse Aydid Abdi
Address(es)	P.O.Box 1305, CityJigJiga, country Ethiopia
Telephone(s)	
Fax(es)	
E-mail	Kayse_1449@hotmail.com
Nationality	Ethiopian
Date of birth	01/07/1986
Gender	Male
Desired employment / Occupational field	(public health and related activities Capacity building and preparedness coordinator
Work experience	**6 years**
Dates	18/06/2012-1/1/2014 nutrition officer at Somali regional health bureau 4/2/2014---2/615-----early warning and communication acting case team for Ethiopian Somali Regional Health 3/2/2015-----4/5/2015---acting for public health emergency management cores process Ethiopian Somali Regional health bureau 5/5/2015---up to now------Public Health emergency core process

Occupation or position held	**Major responsibility**
Main activities and responsibilities	✓ Receive & complaining Monthly and weekly Nutrition report ✓ Gathering & providing information to core process owner ✓ Leading health and cluster co. ordination ✓ Asses/investigate, prepare& summiting of reports. ✓ Implementing, monitoring & preparing of action plans for all activities of PHEM ✓ Providing technical support & management to district & provinces Somali regional state, for nutrient ion and surveillance activities ✓ Ana lays trend of malnutrition and OTP for all hot spot woreda ✓ Assessing the process owner of the bureau in according the emergency health response& integrating it with over all cross sectoral assistance. ✓ Over all communication of partner ✓ Implementation of EOS/CHD for Somali Region and compiling screening report ✓ Flow up and evaluate CMAM project specially those implementing partners ✓ Flow up and stoke management specially plume net, routine medication and emergency drug kit ✓ Facilitator of CMAM training, infant young child feeding and baby friendly hospital initiation
Name and address of employer	Somali Regional Health Bureau, P.o.Box 238 JIJIGA, Ethiopia
Type of business or sector	Government sector
Education and training	✓ MPH-Epidemiology for Addis Ababa university -Feb-2014- Mayc-20016 ✓ BSc. nursing degree in haramaya university---------Feb, 208-tojuly 2012 ✓ Attend jigjiga senior secondary school ----------Nov-203--July 208 ✓ Kabridahar primary school ----------Dec-1996---feb-203
Dates	✓ (IYCF) TOT for Assosa----------2/2/2014-14/2/2014. ✓ Baby friendly Hospital Initiation(BHFI)--------- 4/4/2013-11/4/2013 ✓ Health and coordination training for Hamda hotel 1/2/2015-4/2/2015 ✓ Surveillance training---------- 3/4/2015—9/4/2015
Name and type of organisation providing education and training	Haramaya university and Addis Ababa university.

Level in national or international classification	Regular/international classification
Personal skills and competences	MPH-Epidemiology
Mother tongue(s)	**Specify mother tongue** (Af-somali)

Other language(s)

Self-assessment	**Understanding**				**Speaking**				**Writing**	
European level (*)	Listening		Reading		Spoken interaction		Spoken production			
Language	Amharic	Excellent		Good reading		Good		Good		Good
	English	Excellent		Good reading		Good		Good		Good

Technical skills and competences

- Excellent in basic computer application programs like Word, Excel, Access, PowerPoint ,GIS software and EP-info- and trained by CDC Atlanta

From Addis Ababa University.

- Very good knowledge of some engineering software like AutoCAD. 1' Very good knowledge in using some special instruments like Global Positioning System (GPS) Supported by CDC Atlanta
- Excellent report writing, documentation and dissemination skills of Public health emergence Problems acquired from Somali Regional Health Bureau, Ethiopia.
- Knowledge and understanding both government and partner-both local and international

Additional information	Ali Abdi Salah Public health emergency management core process(PHEM); Mobile # +251-915749766 Mahamud jidhon Regional ENCU coordinator Mobile # +0929472380 Abdi Rahman ubed-Regional nutrition officer for Regional health bureau 0915774082

Declaration

The undersigned, I 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 acknowledged.

Name: - Kayse Aydid Abdi
Place: - Addis Ababa University
Date of Submission: - May, 20, 2016
Signature: - _____

The thesis has been submitted for examination with my approval as a university advisor.
Name of Advisor: - prof. Ahmed Ali
Signature: _____
Date: - May, 30, 2016