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

Ethiopia Field Epidemiology Training Program (EFELP)

Compiled Body of Works in Field Epidemiology

By:

Wake Abebe Lemma

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

May, 2015

Addis Ababa, Ethiopia

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Advisors:

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Mr. Tesfaye Deti

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Approval by Examining Board

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Examiner

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Examiner

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My deepest gratitiude goes to my mentors; Dr. Adamu Addissie; at AAU-SPH and Mr. Tesfaye Deti who is Oromia Health Bureau PHEM core process Owner for the constructive and valuable suggestions and comments given to me.

Next I will give my heartfelt thanks to Centers for Disease Control and Prevention (CDC), EFETP and Ethiopian Public Health Association (EPHA) for providing technical and financial support. My appreciation also goes to dedicated Residents Advisor Dr. Lucy Boulanger, Academic Coordinators of Field Epidemiology Training Program Dr Zegeye H/Mariam and Mr. Alemayehu Bekele for their unreserved mentoring, advice and guidance for the completion of this document.

I would like to thank all instructors of the School of Public Health-AAU for their efforts in sharing their knowledge. Finally, I would like to acknowledge staffs of Oromia Public Health Emergency Management core process and Ethiopia Public Health Instutute for their valuable support during the residency period.

Table of Contents

Lists of Figures

Lists of Tables

Lists of Maps

Lists of Annexs

List of Abbreviations

AAU	Addis Ababa University
ANC	Antenatal Care
AR	Attack Rate
BCG	Bacilli Calmette Guerin
CDC	Centers for Disease control and Prevention
CFR	Case Fatality Rate
CSA	Central Statistics Agency
CSF	Cerebro Spinal Fluid
DHO	District Health Office
DHS	Demographic Health Survey
DPT	Diphtheria Pertussis Tetanus
E.C	Ethiopian Calendar
E.F.Y	Ethiopian Fiscal Year
EDHS	Ethiopian Demographic Health Survey
EFETP	Ethiopia Field Epidemiology Training Program
EPHA	Ethiopia Public Health Association
EPHI	Ethiopian Public Health Institute
EPI	Expanded Program on Immunization
ETB	Ethiopian Birr
FETP	Field Epidemiology Training Program
FP	Family Planning
HC	Health Center
HEP	Health Extension Program
HEW	Health Extension Worker
Hib	Hemophilus influenza b
HMIS	Health Management Information System
HP	Health Post
HSDP	Health Sector Development Program
IDSR	Integrated Disease Surveillance System
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IHR	International Health Regulation
LBRF	Louse Borne Relapsing Fever
MB	Multi-Bacillary
MMWR	Morbidity Mortality Weekly Report
MOH	Ministry of Health
MPH	Masters of Public Health
OPD	Outpatient Department
OPV	Oral Polio Vaccine

OR	Odds Ratio
ORHB	Oromia Regional Health Bureau
PB	Pauci-Bcillary
PCR	Polymerase Chain Reaction
PCV	Pneumococcal Conjugate Vaccine
Penta	Pentavalent
PHEM	Public Health Emergency Management
PIHTC	Provider Initiated HIV testing and Counseling
PMTCT	Prevention of Mother to Child Transmission
PSNP	Productive Safety Net Program
RDT	Rapid Diagnostic Test
RHB	Regional Health Bureau
Rota	Rota virus
RRT	Rapid Response Team
SIA	Supplementary Immunization Activity
SPH	School of Public Health
SRS	Simple Random Sampling
TB	Tuberculosis
TFP	Theraphurtic Food Program
TSF	Targeted Supplementary Food
TT	Tetanus Toxoid
TTBA	Trained Traditional Birth Attendant
UNICEF	United Nations Children's Emergency Fund
URTI	Upper Respiratory Tract Infection
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
ZHD	Zonal Health Department

Executive Summary

The Ethiopia Field Epidemiology Training Program (EFETP) is a two year an in-service training program in field epidemiology adapted from the United States Centers for Disease Control and Prevention (CDC) Epidemic Intelligence Service (EIS) program. The program is designed to assist the Ministry of Health in building or strengthening health systems by recruiting promising health workers and building their competencies through on-the-job mentorship and training. Because trainees work in active public health teams that are tackling the most serious and acute problems of the population, their work is exciting and leads to improvements in program implementation even as the trainees are learning. The EFETP program has two main components, each of which contributes to the award of the Masters degree (MPH) in Field Epieemiology. A classroom-teaching component (25%) and practical attachment or field placement component (75%) consisting of disease investigations, surveillance evaluations, surveys, and applied research on national health problems. Residents have the opportunity for public health practice in the real world.

From the beginning of second week of October 2013 up to the end of May 2015, I stayed in Field Epidemiology Training Program, School of Public Health-Addis Ababa University, Oromia Regional Health Bureau (ORHB) field base and Ethiopia Public Helath Intitute (EPHI) field base.

This body of work has nine chapters, including reports of two outbreak investigations, one surveillance data analysis, one evaluation of surveillance system, and one Woreda health profile description, two abstracts for scientific conference, one meher assessment, one research proposal, as an additional output Weekly bulletin and assessment on Hospitals preparedness towards Ebola Virus Diseases (EVD).

Chapter one: Two outreak investigations were conducted. Descriptive and Analytic Epidemiology was used during investigations. These are: measles outbreak investigation in Abun Gindeberet District of West Shewa Zone, Oromia, May-2014; another measles outbreak investigation in Nedjo District, West Wellega Zone, Oromia, February, 2015. We identified several factors that contributed to measles outbreak in both districts. ***Chapter two:*** Four years

(2010 to 2013) relapsing fever surveillance data was analyszed, East Shewa Zone, Oromia, March, 2014. In ***Chapter three:*** Evaluation of surveillance system was conducted in Jimma Zone, Oromia-June, 2014. ***Chapter four:*** Health profile description of Boset District of East Shewa Zone, Oromia-February, 2014. ***Chapter five:*** Scientific Manuscript for Peer Reviewed Journals was done on Measles outbreak investigation in Abuna Gindeberet District, Oromia, Ethiopia-May, 2014. ***Chapter six:*** Two abstracts were submitted for scientific conference (TEPHINET conference that will be held in Mexico-June, 2015). These include: 1) Measles Outbreak Investigation and response in Abuna Gindeberet District, West Shewa Zone, Oromia, Ethiopia-May ,2014. 2) Assessment of hospitals preparedness towards EVD in Addis Ababa, Ethiopia-January, 2015.

Chapter seven: Narrative summary of disaster situation.Meher assessment was conducted in three zone of Oromia region. These include Borena, Guji and West Arsi zones in November, 2014. ***Chapter eight:*** Protocol/proposal for Epidemiologic Research Project was prepared on the title "Assessment of magnitude of immunization coverage and Associated Factors among children Age 12–23 Months in Abuna Gindeberet District, Oromia-July-2015. Finally, in ***chapter nine:*** additional outputs, Assessment of hospitals preparedness towards EVD in Addis Ababa, Ethiopia-January, 2015 and Weekly PHEM bulletin were prepared in public health priorty disease.

CHAPTER-I

Outbreak Investigations

1.1 Measles Outbreak Investigation in Abuna Gindeberet District, West Shewa Zone, Oromia Region, Ethiopia-May, 2014

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Abstract

Title: Measles Outbreak Investigation in Abuna Gindeberet District, West Shewa Zone, Oromia Region, Ethiopia-May, 2014

Background: Measles is a highly contagious, vaccine preventable viral disease. In April, 2014 a measles outbreak was reported from Abuna Gindeberet District and we investigated the outbreak to characterize it, identify risk factors, and implement public health control measures.

Methods: We conducted a descriptive followed by case-control study with 60 cases and 120 matched controls interms of age, sex and place of residences, from Jan.5, 2014 to May.13, 2014. Line lists, observations of cold chain, interviews using standard questionnaire at different levels were used to collect data. We defined suspected cases of Measles as any person presenting with fever and maculo papular rash and cough, coryza or conjunctivitis, while a confirmed case was IgM positive for Measles antibody. P-value and 95% confidence interval for odds ratio were used in deciding the significance of the associations.

Results: We identified a total of 202 measles cases. The outbreak was confirmed by measles IgM antibody.The overall attack rate of this outbreak was 300per 100,000 populations. Age specific attack rate was high in age less than 5 years (407per 100,000). In bivariate analysis: having contact with measles case/s at home [Odds Ratio (OR)=40; 95% CI (14,112)], contact with known measles cases [OR=7.69; 95% CI (3.82, 15.49)], health facility distance greater than one hour walk [OR=13.22; 95% CI (1.55,112.5)], living in unventilated house were significant risk factors associated with contracting measles.

Conclusions: Contact with measles case, health facility distance of more than one hour walk and living in unventilated house were the possible risk factors and increased susceptibility. We recommend strong ongoing active case surveillance of febrile rash illness; health education on treatment and prevention of Measles to be enhanced and continued in the community by health workers.

Key words: Measles, Outbreak, Risk factors, Ethiopia

Introduction

Measles is a leading vaccine preventable contagious infectious disease caused by a paramyxovirus of the genus *Morbillivirus*. Regardless of the availability of a safe, effective and inexpensive vaccine for over the last four decades, measles remain a leading cause of illness and death among children worldwide [**1-3].** Measles is characterized by a prodrome 2-4 days of fever and malaise, cough, coryza and conjunctivitis, followed by an erythematous macula papular rash. The rash begins at the hairline, and then involves the face and upper neck. Over the next days the rash gradually proceeds down wards and outward reaching the hand and feet [**4-5]**.

The incubation period of measles is, from exposure to prodrome averages 10-12 days, and from exposure to rash averages 14 days ranging 7-18 days. Transmission is primarily person-to-person via large respiratory droplets; airborne transmission via aerosolized droplet nuclei has been documented in close areas for two hours after a person with measles occupied the area [**6, 7].** Measles mortality in Ethiopia is believed to have decreased by 78% since initiation of the catch-up measles campaigns using modeling techniques [**1**]. This reduction in mortality is higher than the global estimate which was 60% reduction, and that of the African Region with 75% reduction **[8].** Although remarkable health service expansion and accessibility to the entire community has been achieved during the last years and vaccination coverage of the region is progressively improving, unexpected occurrence of measles outbreak has been recently reported.

For countries that have completed catch-up measles immunization campaigns, WHO-AFRO defines a suspected measles outbreak as the occurrence of five or more reported suspected measles cases in a health facility or district in a 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 assumed to be confirmed when there are 3 or more IgM positive measles cases in a health facility or district in one month **[1].**

In 2001, countries in the World Health Organization (WHO) African Region began accelerated measles control activities to reduce measles deaths by half by 2005 compared to the estimated number of measles deaths in 1999. Implementation of the recommended strategies led to a 75% reduction in estimated measles mortality in the African Region by 2005. Following this progress, in 2006 the African Region adopted a goal to achieve 90% measles mortality reduction by 2010

compared with the estimate for 2000. By 2008 in the African Region, reported measles cases decreased by 93% and estimated measles mortality decreased 91% compared with 2000 **[10].**

The importance of raising measles vaccination coverage, dramatically reducing measles deaths and indeed eliminating measles from most of the world is recognized in several global and regional documents.

Despite the introduction of the Reaching-Every-District approach to strengthen immunization coverage, services have not expanded adequately to ensure enough coverage of the hard-to-reach populations in all districts in the African Region **[11].**

Measles outbreaks appear in communities with low measles vaccination coverage as the measles virus is one of the most infectious human diseases, and the disease is easily recognizable. Measles outbreaks are an early warning signal of low immunization coverage. Countries may use the measles outbreaks to learn the causes of the outbreaks determine problems in the immunization and health system and address these through policy change or improvements in program implementation **[12].** Recently, countries of the Region have seen a substantial improvement in the detection, investigation and case management of measles outbreaks **[13],** surveillance and improvement in surveillance of vaccine preventable diseases. Information from outbreak investigations have helped to identify susceptible groups and targeted supplemental immunization campaigns. Improved measles surveillance has also helped to uncover the previously unrecognized Measles disease burden in Bangladesh, Bhutan, Maldives and Nepal **[14].**

To interrupt endemic transmission of measles, mathematical models indicate that 93%–95% population immunity is needed **[15].** Once a successful measles catch-up campaign has been conducted, measles incidence should immediately decline. However, outbreaks can still occur because of accumulation of susceptible children due to missing routine immunization and the uneven efficacy of measles vaccine for younger children **[16].** On April 23, 2014, West Shewa Zone Health Department (ZHD) Office reported to Oromia Regional Health Bureau (ORHB) suspected measles outbreak in one of the district, Abuna Gindeberet. The regional health bureau sent the a team that included; Ethiopian Field Epidemiology Training Program (EFETP)

residents and expert from the ORHB to investigate and respond to the problem in collaboration with the zonal health department (ZHD), and District Health Office (DHO) on 8 May, 2014.

Objectives

General objective

To assess the magnitude, contributing factors of measles outbreak reported, and undertake appropriate public health control measures, in West Shewa Zone, Abuna Gindeberet District of Oromia Region in May, 2014.

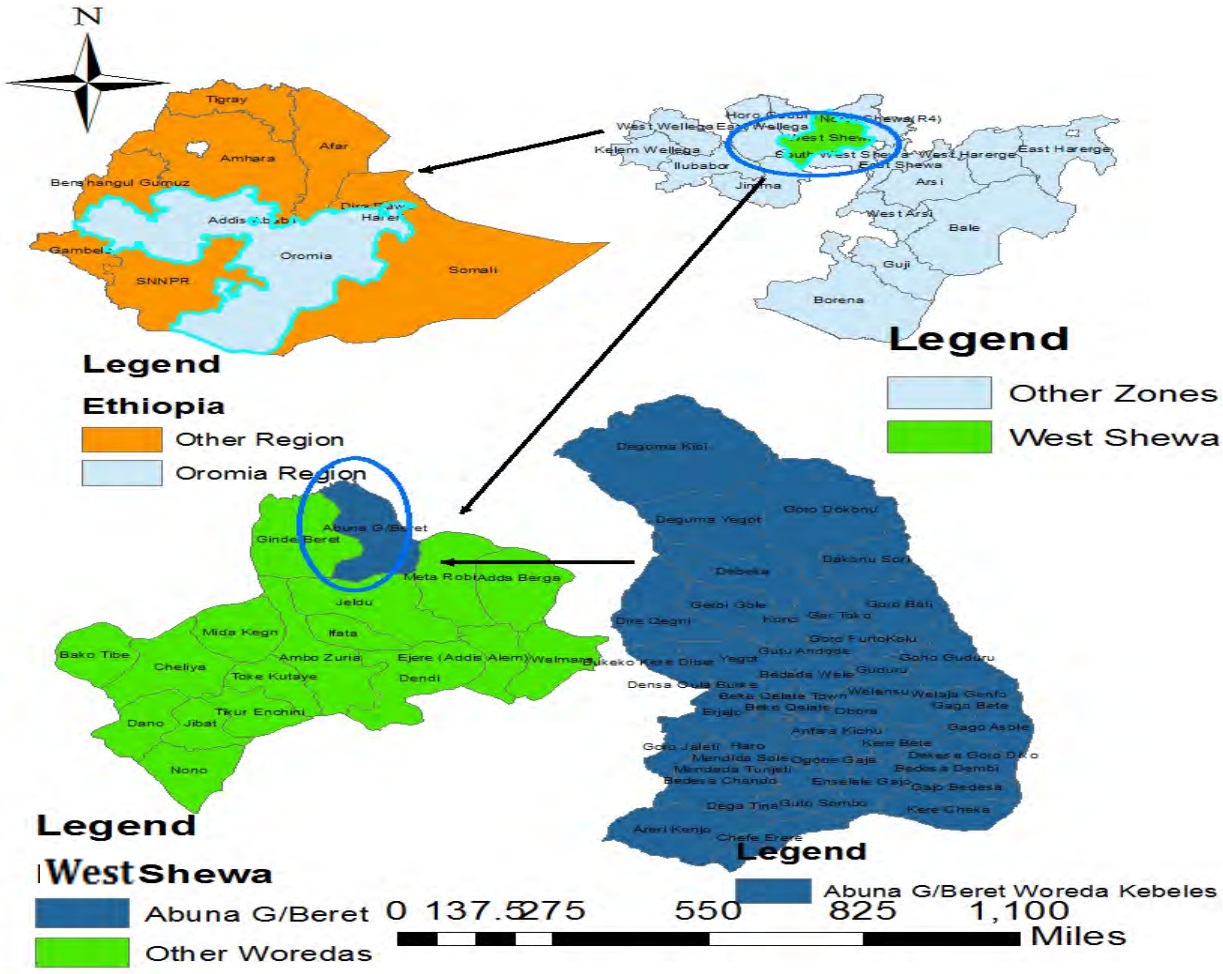
Specific objectives

- To verify the existence of measles outbreak in the district
- To characterize measles outbreak in terms of person, place and time in the zone
- To identify factors contributing to the occurrence of meales outbreak
- To assess the prevention and control interventions to measles infection

Methods

Study area

The outbreak investigation was conducted in Abuna Gindeberet District of West Shewa Zone started on 05-Jan-2014 up to 13-May-2014. Abuna Gindeberet District has 44 Kebeles with an estimated total population of 131,761 in 2014 (Projected from 2007 CSA). The district is agro-climatically divided into Dega (20%), waina daga (10%) and Kola (60%). The altitude varies from 800-2800 meters above sea level. Abuna District is shared boundaries with four districts on North, Were Jarso District (North Shewa Zone) on East, Jeldu District, on West Gindeberet District and on South Amahara Regional State.



Map 1: Map of Abuna Gindeberet District, West Shewa Zone, Oromia, May, 2014

Study design and period

We conducted descriptive study followed by matched case-control study design to identify risk factors that contributed the measles outbreak in the zone 8-20 May, 2014.

Sample size:

Matched case control study with 1:2 ratios, where 60 cases and 120 controls were used. Cases and controls were matched by age, sex and place of residence to control the effect of confounding variables that could distort the true association between the exposure and the outcome.

Source and study population

Target population of the investigation was all patients with measles cases /death come to health facilities and fulfills the case definition/confirmed cases of measles in affected kebeles of Abuna Gindeberet District.

Data collection

Data was collected with line list, observation of cold chain management and case management; and purposively selected key informant; Surveillance focal person and community leader interview at all levels from Zone to Kebele and discussion on health seeking behavior with community.

Cases were defined using WHO standard measles case definition, for analytic analysis 60 measles cases and 120 controls (case to control ratio of 1:2) were interviewed using standard questionnaire that includes; socio-demographic, Knowledge to disease, exposure, and risk factors were included.

Active case search was conducted, cold chain management of the district health office was assessed and vaccination status of the district was obtained.

Discussion were conducted with the Zonal Health Office, District Health Office, district health personnel, teachers, community members, and the district administrative cabinet both prior and exit of the investigation.

Case Definitions

Suspected measles cases at community level: Any community member should report when he/she comes with a person with fever and rash, to the health workers and should be adviced to visit health facility.

Suspected measles case:

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

Laboratory confirmed measles 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 e.g. A trauma or chronic disease.

Index case:

Suspected measles case (case that met the criteria for standard measles case definition) that initiates the public health attention (may or may not visit health facility) and of course, the first case who possibly the source of infection for the other cases emerging.

Data processing and analysis

The data were entered and analyzed using Epi Info Version7.1.3.0 and Microsoft Excel 2007. Results were presented using descriptive table, chart and spot map. Attack rate and case fatality rate were also calculated. P-value and 95% confidence interval (CI) for odds ratio (OR) were used in deciding the significance of the associations.

Data quality control

We used case based and line listing for describing measles cases interms of time, place and person. However, all data were checked for compeletness before entry and cleaned before analysis.

Inclusion criteria

Cases: Any resident of Abuna Gindeberet district who tested positive for measles IgM and/or epidemiologically linked to laboratory confirmed cases and had symptoms of measles from 05th Jan to 13th May 2014 and who agreed to participate in the study was included.

Control: A control was any resident of Abuna Gindeberet during the study period who was a neighbor to a case and who did not develop signs and symptoms of measles and agreed to participate was included.

Exclusion criteria

Cases: Those cases that refused to participate or were not conscious and family members in the same household were excluded

Controls: Those who refused to participate were excluded as well as family members from same household.

Ethical issues

A support letter was obtained from Oromia Regional Health Bureau and supportive letter were obtained from the Zonal Health Department to respective District Health Office. As this was an emergency epidemic investigation conductted as part of public health intervention, no ethical approval was obtained. Oral informed consent was obtained from participants or from their parents to participate in the study. Confidentiality was assured and no personal details were recorded or produced in this documentation.

Results

Laboratory result

Five blood samples were collected from patients in a district in 27/01/2014 and sent to the EPHI for confirmation. All five (100%) specimens were tested positive for measles IgM during the specified outbreak period. Hence, based on the laboratory result typical measles clinical manifestation and epidemiologically linked with laboratory confirmed cases, and the outbreak was confirmed and cases were treated as measles.

Descriptive Epidemiology

We identified a total of 202 measles cases and no deaths (CFR=0.0%) from 05th -January up to 13th-May-2014. Mean age of 7- year and median 6-year [ranging: 5 month and 57-year]. Of total cases 114(56%) males and 88 (44%) were females. (**Figure 3)**

Description of measles cases by person

Most cases 88(44%) were age 0-4 year followed by age 5-9 year of age 49(24%) and 10-14 year of age 43(21%), and greater than 25 year was with the least frequency of cases that were only two cases.(**Figure-1)**

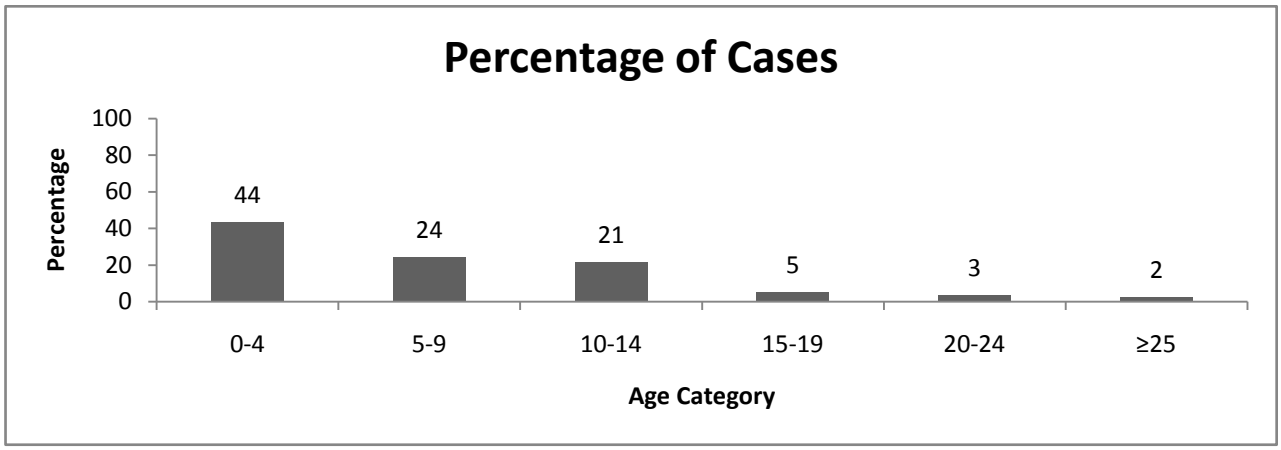


Figure 1: Distributions of measles suspected cases by age group in Abuna Gindeberet District, West Shewa, Oromia May-2014

The highest Attack Rate was in children less 5 years of age (407 per 100,000 Population) followed by 10-14 years was (235 per 100,000 population) and the least were in age older than or equal 25 years (12/10,000 population).**Figure-2.**

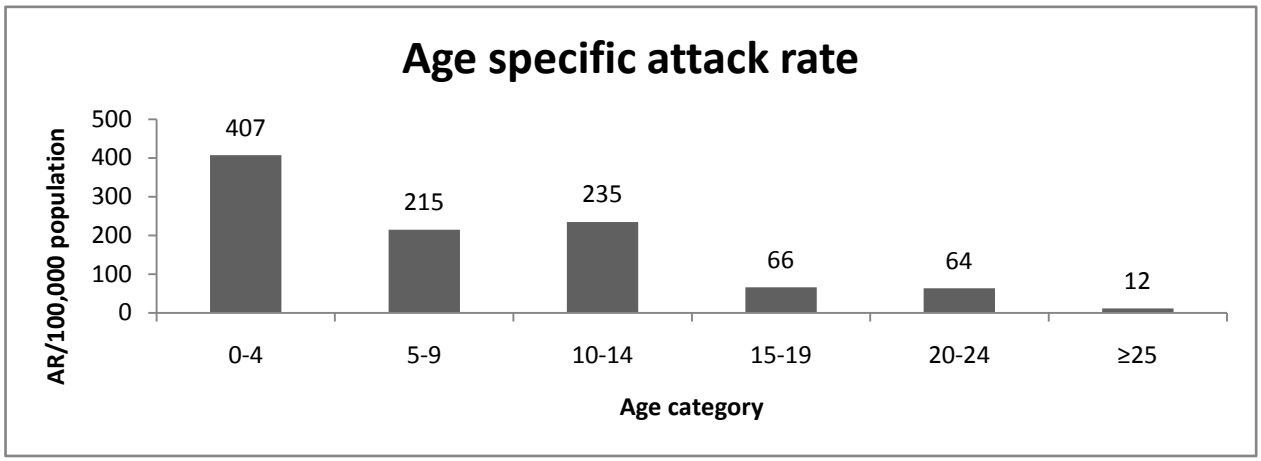


Figure 2: Age specific Attack rate in Abuna Gindeberet District, West Shewa, Oromia, May-2014

Malas are more affected 114(56%) than female 88(44%).

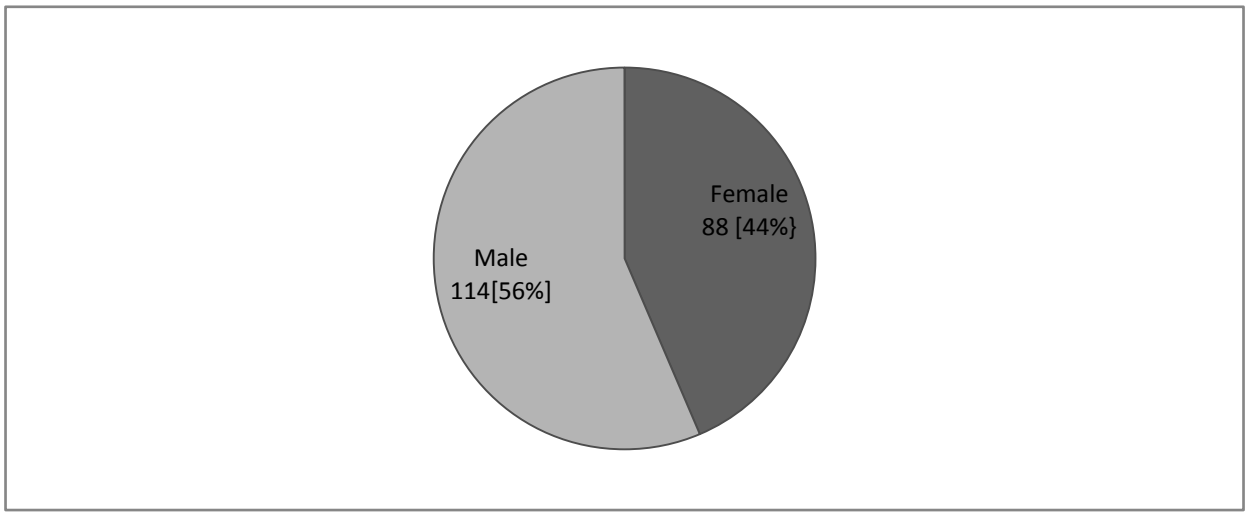


Figure 3: Distributions of measles suspected cases Abuna Gindeberet District, West Shewa, Oromia, May-2014

Description of measles cases by place

Most cases were reported from Goro Furto Kebele with an Attack Rate of 20 cases per 1000 population followed by Goro Jalate 8 cases per 1,000 populations **Figure-4.** An overall AR=3/1000 Population.

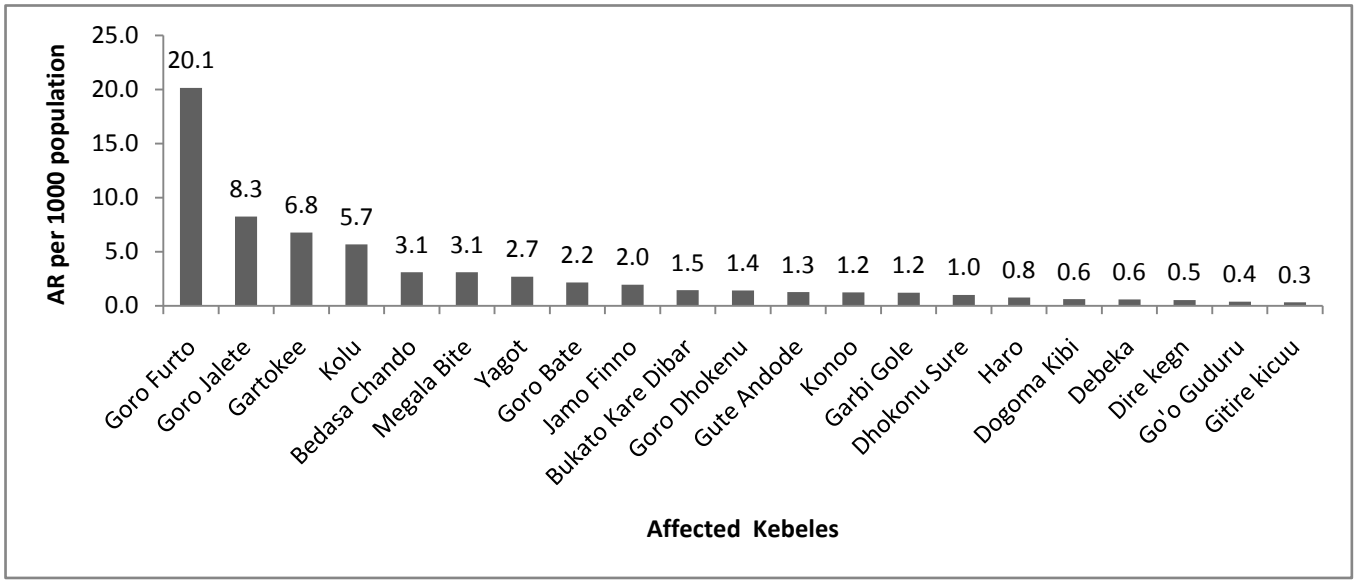


Figure 4: Cumulative Attack Rate of measles by Kebele in Abuna Gindeberet District, West Shewa, Oromia May-2014

Descriptions of measles cases by time

Index case:

The index case was seen in Goro Furto Kebele on 05-Jan- 2014. The case was a 17-year old unvaccinated female (whose 5 other members of her family get sick at different time and 2 of confirmed cases were in this group) who have a travel history out of her home village to the School where she is living there in the Kelate Town and she was attending Grade 9th in Kelate Secondary School. She later admitted to Gindeberet Hospital and later come back to her home where there was a ceremony sometime in her convalescent period in which many people were invited to attend the ceremony that was held in her family home. **Figure-5 and Figure-6.**

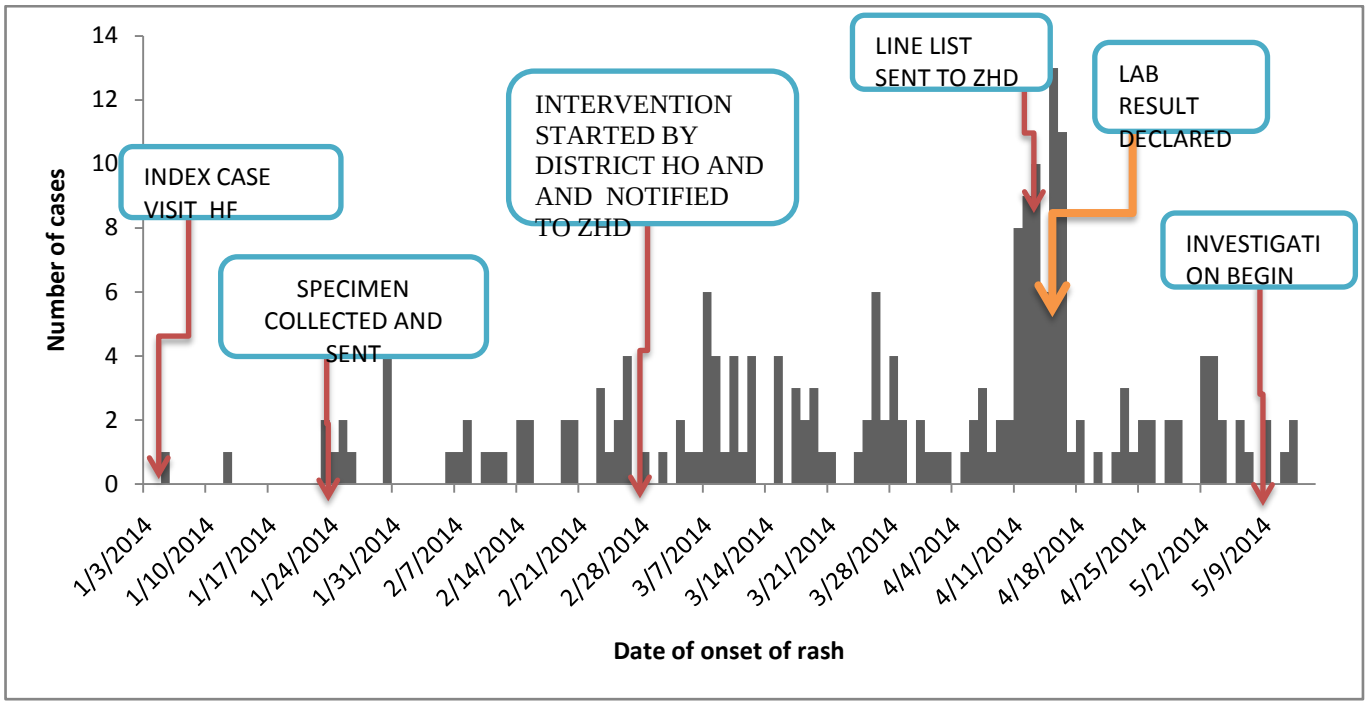


Figure 5: Epi-curve based on date of onset of rash Abuna Gindeberet District, West Shewa, Oromia, May-2014

The outbreak occurred between January 05, 2014 and May 13, 2014 with several peaks and stayed for about 20 weeks. The index case was seen so early at health facility but the district health office had started intervention lately after three weeks delay. Additionally, late notification of the outbreak to the zonal level which in turn delayed early intervention which results a prolonged type of outbreak. **Figure-5.**

Vaccination status of the cases

Out of total cases 44% (88/202) were vaccinated with 2 or more doses of measles vaccination in routine and campaign EPI activities followed by 24%(49/202) of cases had vaccinated with a single dose, 24% (48/202) of cases were not having vaccination history, and 8% (17/202) of all reported cases have an unknown or missing their vaccination status.**Figure-6.**

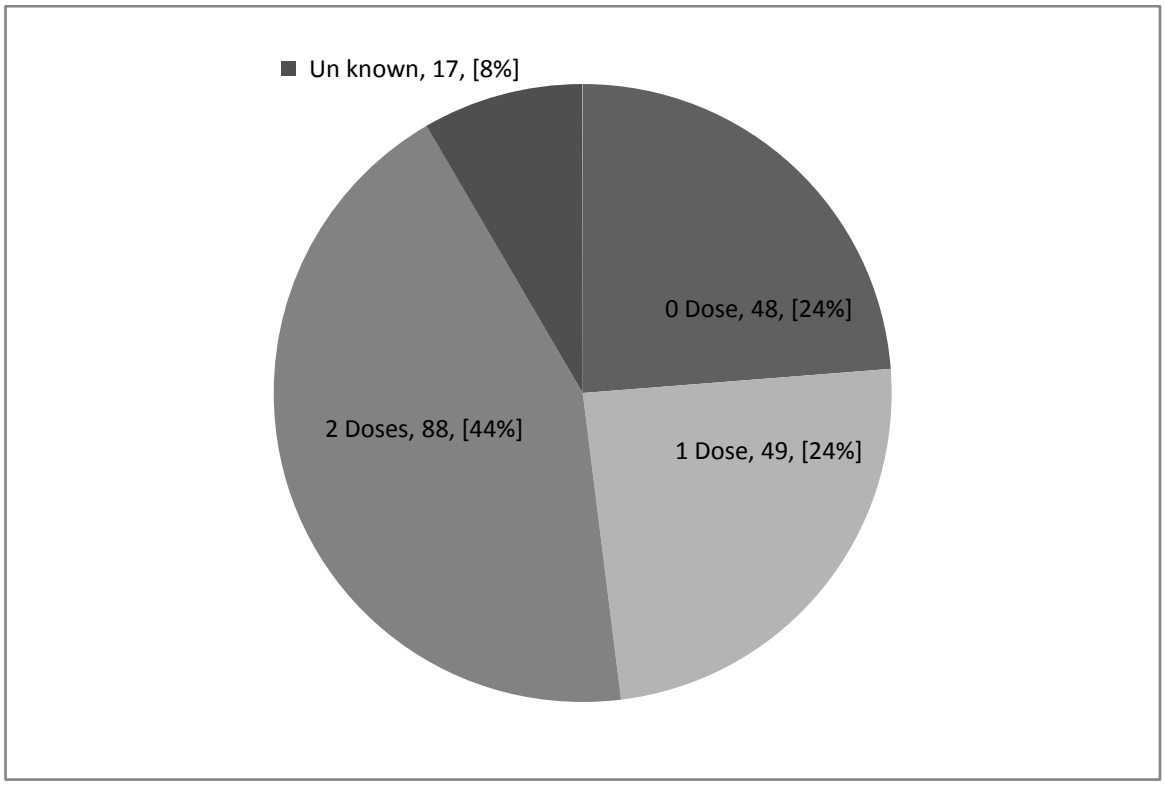


Figure 6: Previous vaccination status of measles cases in Abuna Gindeberet District, West Shewa, Oromia, May-2014

Cold chain management

The cold chain management of zonal health department and district health offices for drug and vaccine storage was good during our visit. The temperature monitoring chart for cold chain was done on a regular manner. However, there was no precise temperature measurement that there is shortage of temperature monitoring devices; refrigerators temperature was read by only built in digital reading; this may not ensure the correct temperature. Vaccine storage was in questionable situation in a one of visited health center where there was an expired measles vaccine accumulated in the refrigerator.

Analytic Epidemiology

A total of 60 measles cases and 120 apparently healthy controls were included into this study. Participants were matched by; age and sex as shown in Table 1. The mean age of cases and controls were 7.6 and 8.3 years respectively. The median age of both cases and controls were 8 years (ranging from three months up to 25 years). Among sixty cases interviewed thirty three (55%) were female and twenty seven (45%) were male. The most reported symptoms were macula-papular rash, fever, red eyes, cough in 60(100%), sore mouth 55(92%) and the least was coryza 50(83%). The major complications reported were diarrhea 44 (73%), pneumonia 33(55%), change of vision 25(42%), Convulsion 25(42%) ear infection 14 (23%), and none of them developed blindness. Out of the total 60 cases interviewed thirty one (52%) visited health facility for medical treatment; of these only 19/31 (91%) sought medical treatment within 3 days of onset of illness.

In bi-variate analysis, having contact/staying with known active measles case within the house hold[Odds Ratio(OR)=40; 95% CI (14,112), P=0.000], contact with known measles cases [OR=7.69; 95% CI (3.82,15.49), P=0.000], access to health facility; distance more than one hour walk [OR=13.22; 95% CI (1.55,112.5), P=0.002], housing condition that is lacking ventilation were significant risk factors for contracting measles [(OR)=2.24; 95% CI (1.18,4.24), P=0.012], being vaccinated for measles containing vaccine (MCV) was found to be associate but lack statistical significance [OR= 0.64; 95% CI [0.32,1.28, P=0.21] ,and there was no significant knowledge difference between the cases and control groups this might be due to the intervention given during the active surveillance and investigation process. as shown in Table 2 bellow.

Table 1: Socio-demographic characteristics of cases and controls: Abuna Gindeberet District, West Shewa Zone, Oromia-May, 2014

Variables		CASES (%) n=60	CONTROLS (%) n=120
Age in years	**Mean**	**7.6**	**8.3**
	Median age	8	8
	Ranges	0.26-25	0.0-25
	<5	21(35)	35(29)
	≥5	39(65)	85(81)
Sex	Male	27(45)	58(48)
	Female	33(55)	62(52)
Marital status	Single	1(2)	3(3)
	Married	3(5)	2(2)
	Note Applicable	56(93)	115(96)
Ethnicity	Oromo	60(100)	120(100)
Religion	Protestant	40(67)	86(72)
	Orthodox	20(33)	32(27)
	Others	0(0)	2(2)
Occupation	Farmer	1(2)	3(3)
	House wife	1(2)	1(1)
	Merchant	1(2)	1(1)
	Student	29(48)	66(55)
	Pre-School children	28(47)	49(41)
Respondent's education	Pre-School	30(50)	50(42)
	KG	3(5)	9(8)
	Primary	26(43)	55(46)
	Secondary	1(2)	6(5)
Number of persons per/HH	<5/HH	9(15)	29(24)
	≥5/HH	51(85)	91(76)
Mother's education	Illiterate	40(67)	82(68)
	Literate	20(33)	37(31)
Father's education	Illiterate	32(53)	59(49)
Vaccination status	Yes	15(25)	41(34)
	No	45(75)	79(66)

Table 2: Identified Socio-demographic factors and risk factors for measles outbreak in Abuna Gindeberet District, West Shewa Zone, Oromia-May, 2014

Variables		CASES (%) (n=60)	CONTROLS (%) (n=120)	OR(95%CI)	P-value
Respondent's education	Yes	30(50)	70(58)	0.7[0.38,1.33]	0.280
	No	30(50)	50(42)		
Marital status	Married	3(5)	2(2)	3.1[0.50,1.90]	0.190
	Single	57(95)	118(98)		
House head occupation	Farmer	49(82)	95(79)	1.17[0.53,2.57]	0.690
	Others	11(12)	25(21)		
Mother's education	Illiterate	40(67)	82(68)	0.9[0.46,1.75]	0.760
	Literate	20(33)	37(31)		
Knowledge to measles transmission	Yes	26(43)	39(47)	1.18[0.63,2.22]	0.590
	No	34(57)	61(73)		
House hold contact	Yes	38(63)	5(4)	**40[14.00,112.00]**	**0.000****
	No	22(37)	115(96)		
Contact with known measles case	Yes	38(63)	22(18)	**7.69[3.82,15.49]**	**0.000****
	No	22(67)	98(82)		
Health facility distance >1hrs Walk	Yes	6(10)	1(1)	**13.22[1.55,112.5]**	**0.002****
	No	54(90)	119(99)		
Having vaccinated against measles	Yes	15(25)	41(34)	0.64[0.32,1.28]	0.210
	No	45(75)	79(66)		
Housing condition (lack of ventilation)	Yes	30(50)	37(31)	**2.24[1.18,4.24]**	**0.012****
	No	30(50)	83(69)		
History of travel 2-3 weeks prior to onset of illness	Yes	5(8)	8(7)	1.27[0.39,4.07]	0.680
	No	55(92)	112(93)		

** Variables significantly associated with contracting measles infection.

Public health Intervention undertaken to contain the outbreak

The investigation team identified and characterized the measles outbreak along with the provision of health education, around 200 households were visited home to home with an estimated 1,500 people were given health education. Technical assistance was given for health workers on case management, recording and reporting situation.

Active cases were treated to prevent further spread, and to reduce morbidity and mortality attributed to measles pathogenesis. Routine surveillance system was enhanced and closely followed at each level on a daily bases. Health education was given for the community members and students in school to prevent the transmission of the disease, to maximize the health seeking behavior and treat if there is sign and symptoms of measles.

Discussion

Prolonged measles outbreaks occurred in Abuna Gindeberet District which lasted for five months starting from Jan.05, 2014-May 13, 2014 and resulted 202 cases. This could be explained that delayed in notification of the outbreak indicates that there was poor active surveillance system at the district level and late response to the outbreak had contributed for the chance of widened expansion of the outbreak to the nearby kebeles. An overall attack rate of the outbreak was 300 cases per 100,000 populations. A similar study conducted in Abaya District, Oromia Region has documented an overall AR=390 cases per 100,000 population [17] which is comparable to our finding but much more higher than the finding documented at national level outbreak that was 4.1 per 100,000 in 2008[1]. This might be due to low vaccine potency despite the highest vaccination coverage reported at the district level that was 91% [Abuna Gindeberet district, administrative report 2013]. The most affected age group was <5 years of age (attack rate 407 cases per 100,000) this might additionally be explained that as there may be vaccine failure or less vaccination coverage in the study area. Measles outbreak could frequently occurred in area with low measles immunization coverage and poor cold chain management even with high vaccination coverage [1]

In case-control part of our study, factors such as: education, marital status and education between cases and control were not different this might be due to awareness created through health education given by health workers during active case searching and field investigation. During the time of investigation we have tried to identify the communities' awareness towards measles, modes of transmission, prevention and control measures were equally low. The health seeking behavior is also minimal as it was indicated that only 52% of case visited health facility within three days of onset of illness. This is lesser than the observations in Zaka District, Zimbuwabe where 91.8% of cases sought medical treatment within 3 days of onset of illness [19]. This difference could be lack of awareness on the need of visiting health facility whenever there is an illness with in the household.

The most powerful relationship was observed for "contact history" this was consistent with study conducted in Zaka district, Zimbuwabe, 2010 [19]. This reveals that contact with measles cases was contributing much in measles transmission. Health facility distance greater than one hour

walk was the other likely contributing factor a study in India support this[18]. Measles transmission was strongly associated with ventilation of the house this means living in unventilated room has 2.24 fold at risk of developing measles infection than persons living in ventilated room. This is consistent with the study conducted in Abaya district, Borena Zone, Oromia, Ethiopia [17].

It has also been suggested that large inoculums can increase the risk of vaccine failure. Furthermore, total protection against measles might not attainable, even among revaccinees when children are confronted with intense exposure to the virus [20, 21, 22].

Limitations

- Absence of child immunization card at household level poses difficult to get exact date of vaccination and other relevant information.
- Measles line-List was not properly filled by the district health workers until the correction was made by the deployed team from regional health bureau.
- Lack of immunization coverage data by Kebeles.
- Cases subjects/guardians might forget the exact evidence about their own or their Children health condition (Recall bias).
- This study might be subjected to misclassification bias as a result of similarity between rubella and measles as well as classification is only with clinical presentations.

Conclusions

The outbreak was confirmed based on laboratory diagnosis. Contacts with measles case, health facility distance more than an hour walk and living in unventilated house were the possible risk factors and increased susceptibility. We recommend strong ongoing active case surveillance of febrile rash illness; health education on treatment and prevention of Measles to be enhanced and continued in the community by health workers.

Recommendations

Ongoing active febrile-rash illness surveillance should be enhanced and continued in community by health extension workers. Improving health seeking behavior of the community through awareness creation towards modern treatment and the important of vaccine for vaccine preventable diseases in collaboration with community leaders should be mandatory. Strengthen routine immunization through awareness creation on the importance and benefits of routine immunization services. Improve measles active surveillance by training the health workers on active surveillance system. Non selective immunization campaign should be planned targeting age group of 6 months up to 14years.

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1.2. Measles Outbreak Investigation in Nedjo District, West Wellega Zone, Oromia Region, Ethiopia-February, 2015

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Abstract

Introduction: Measles is a leading vaccine preventable contagious infectious disease caused by a paramyxovirus of the genus *Morbillivirus*. On Feb 15, 2015, a suspected measles outbreak was reported from West Wellega Zone, Nedjo District. We conducted investigation to confirm the outbreak, identify risk factors and implement control measures.

Materials and Methods: we defined a case and controls as per WHO case definition, any person in Nedjo District, with fever and maculo-papular, cough, Coryza, or conjunctivitis or any person that a clinician had suspected as measles and controls defined as any person without sign and symptoms of the disease. A 1:1 ratio unmatched case control study was conducted in Feb, 2015 and structured questionnaire used to collect data from 60 cases and 60 controls. We analyzed data using Epi-Info-7

Results: A total of 251 measles cases were identified from six Kebeles. There were no deaths reported. The median age was 10-years [ranging: 6 month and 70-year]. Of total cases 154(61%) female and 97 (39%) were male. The overall attack rate (AR %) was 1.6%. In multivariate analysis the factors that remained statistically significantly associated with measles illness were being unvaccinated for measles [Adjusted Odds Ratio (AOR) =7.37; 95% CI (1.74, 31.17)], P=0.006], Travel history 2-3 weeks prior to onset of illness [AOR=10.34; 95% CI (1.87, 57.1)], presence of measles case/s at home [AOR=3.29; 95% CI (1.15, 9.47)].

Conclusion: A confirmed measles outbreak occurred in Nedjo District, West Wellega Zone of Oromia Region. It primarily affected under 15 years of age. Being unvaccinated was the major risk factor identified. We recommend enhancing supplementary immunization activities, strong ongoing active case surveillance of febrile rash illness; health education on treatment and prevention of Measles to be enhanced and continued in the community by health workers.

Key Words: Measles, Outbreak, Nedjo District, Ethiopia.

Introduction

Measles is a leading vaccine preventable contagious infectious disease caused by a paramyxovirus of the genus *Morbillivirus*. Regardless of the availability of a safe, effective and inexpensive vaccine for over the last four decades, measles remain a leading cause of illness and death among children worldwide [**1-3].** Measles is characterized by a prodrome 2-4 days of fever and malaise, cough, coryza and conjunctivitis, followed by an erythematous macula papular rash. The rash begins at the hairline, and then involves the face and upper neck. Over the next days the rash gradually proceeds down wards and outward reaching the hand and feet [**4-5]**. The incubation period of measles is, from exposure to prodrome averages 10-12 days, and from exposure to rash averages 14 days ranging 7-18 days. Transmission is primarily person-to-person via large respiratory droplets; airborne transmission via aerosolized droplet nuclei has been documented in close areas for two hours after a person with measles occupied the area [**6, 7].** Measles mortality in Ethiopia is believed to have decreased by 78% since initiation of the catch-up measles campaigns using modeling techniques [**1**].

This reduction in mortality is higher than the global estimate which was 60% reduction, and that of the African Region with 75% reduction **[8].** Although remarkable health service expansion and accessibility to the entire community has been achieved during the last years and vaccination coverage of the region is progressively improving, unexpected occurrence of measles outbreak has been recently reported. For countries that have completed catch-up measles immunization campaigns, WHO-AFRO defines a suspected measles outbreak as the occurrence of five or more reported suspected measles cases in a health facility or district in a 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 assumed to be confirmed when there are 3 or more IgM positive measles cases in a health facility or district in one month **[9].**

In 2001, countries in the World Health Organization (WHO) African Region began accelerated measles control activities to reduce measles deaths by half by 2005 compared to the estimated number of measles deaths in 1999. Implementation of the recommended strategies led to a 75% reduction in estimated measles mortality in the African Region by 2005. Following this progress,

in 2006 the African Region adopted a goal to achieve 90% measles mortality reduction by 2010 compared with the estimate for 2000. By 2008 in the African Region, reported measles cases decreased by 93% and estimated measles mortality decreased 91% compared with 2000 **[10].** The importance of raising measles vaccination coverage, dramatically reducing measles deaths and indeed eliminating measles from most of the world is recognized in several global and regional documents.

Despite the introduction of the Reaching-Every-District approach to strengthen immunization coverage, services have not expanded adequately to ensure enough coverage of the hard-to-reach populations in all districts in the African Region **[11].** Measles outbreaks appear in communities with low measles vaccination coverage as the measles virus is one of the most infectious human diseases, and the disease is easily recognizable. Measles outbreaks are an early warning signal of low immunization coverage. Countries may use the measles outbreaks to learn the causes of the outbreaks determine problems in the immunization and health system and address these through policy change or improvements in program implementation **[12].**

Recently, countries of the Region have seen a substantial improvement in the detection, investigation and case management of measles outbreaks **[13],** surveillance and improvement in surveillance of vaccine preventable diseases. Information from outbreak investigations have helped to identify susceptible groups and targeted supplemental immunization campaigns. Improved measles surveillance has also helped to uncover the previously unrecognized Measles disease burden in Bangladesh, Bhutan, Maldives and Nepal **[14].**

To interrupt endemic transmission of measles, mathematical models indicate that 93%–95% population immunity is needed **[15].** Once a successful measles catch-up campaign has been conducted, measles incidence should immediately decline. However, outbreaks can still occur because of accumulation of susceptible children due to missing routine immunization and the uneven efficacy of measles vaccine for younger children **[16].** On Feb 15, 2015, Oromia Regional health bureau reported to Ethiopia Public Health Institute (EPHI) suspected measles outbreak in West Wellega Zone, Nedjo District. A team from EPHI deployed to the area to investigate and respond to the problem in collaboration with the zonal health department (ZHD), and District Health Office on Feb, 20, 2015.

Objectives

General objective

To assess the magnitude, contributing factors of measles outbreak reported, and undertake appropriate public health control measures, in Nedjo District, West Wellega Zone of Oromia Region Ethiopia-Feb.2015.

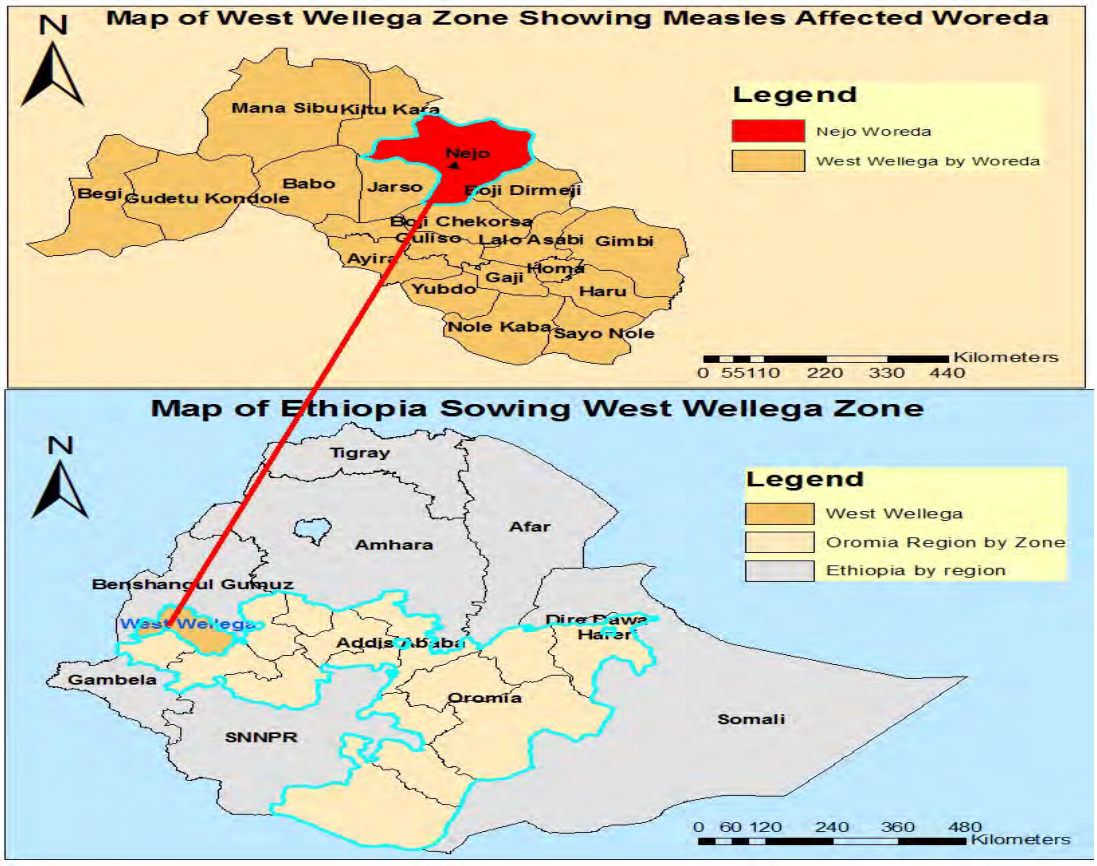
Specific objectives

- To confirm the existence of measles outbreak
- To characterize measles outbreak in terms of person, place and time in the zone
- To identify factors contributing to the occurrence of measles outbreak
- To provide control measures towards measles infection

Methods

Study area

Nedjo District is one of the 21 administrative districts of West Wellega Zone of Oromia Regional state, 600 Km far to the West of Addis Ababa. The district has 53 Kebeles (49 rural and 4 urban) with a total population of 146,950 of which 73,092(49.2%) male and 73,858(50.8%) are females (Projected from 2007 Census). The district's agro-climatically divided into Dega (60%), waina daga (20%) and Kola (20%). The altitude varies from 800-2800 meters above sea level. Nedjo District bounded by Agalo Meti and Kamashi Districts of Benishagul Gumuz Regional State to the North, Bodji Dermeji District to the East, Bodji Cokorsa District to the South, Jarso and Kiltu Kara Districts to West and North western.



Map 2: Map of Oromia showing Nedjo District, Feb, 2015

Study design and period

We conducted descriptive study followed by unmatched case-control study design to identify risk factors that contributed the measles outbreak in the district from Feb, 21-March-6, 2015.

Sample size:

Unmatched case control study with 1:1ratio (60 cases and 60 controls) were used. Cases and controls were choosen based on the convenience of accessibility.

Source and study population

Target population of the investigation was all patients with measles cases /death come to health facilities and fulfills the case definition/confirmed cases of measles in affected kebeles of Nedjo District.

Data collection procedure

Data was collected with line list, observation of cold chain management and case management; and purposively selected key informant; Surveillance focal person and community leader interview at all levels from Zone to Kebele and discussion on health seeking behavior with community.

Cases were defined using WHO standard measles case definition, for analytic analysis 60 measles cases and 60 controls (case to control ratio of 1:1) were interviewed using standard questionnaire (Annex 2) that includes; socio-demographic, Knowledge to disease, exposure, and risk factors were included.

Active case search was conducted, cold chain management of the district health office was assessed and vaccination status of the district was obtained.

Discussion were conducted with the Zonal Health Office, District Health Office, district health personnel, teachers, community members, and the district administrative cabinet both prior and exit of the investigation.

Case Definitions

Suspected measles cases at community level: Any community member should report when he/she come with a person with fever and rash, to the health workers and should advice to visit health facility.

Suspected measles case:

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

Laboratory confirmed measles 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, who 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 e.g. A trauma or chronic disease.

Data processing and analysis

The data were entered and analyzed using Epi Info Version7.1.3.0 and Microsoft Excel 2007. Results were presented using descriptive table, chart and spot map. Attack rate and case fatality rate were also calculated. P-value and 95% confidence interval (CI) for odds ratio (OR) were used in deciding the significance of the associations.

Data quality control

We used case based and line listing for describing measles cases interms of time, place and person. How ever, all data were checked for compeletnes before entery and cleaned before analysis.

Inclusion criteria

Cases : Any resident of Nedjo District who tested positive for measles IgM and epidemiologically linked to Laboratory confirmed cases and had symptoms of measles from 15th January to 3rd March, 2015 and who agreed to participate in the study was included.

Controls: A control was any resident of Nedjo District during the study period and who did not develop signs and symptoms of measles and agreed to participate was included.

Exclusion criteria

Cases: Those cases that refused to participate or were not conscious and family members in the same house hold were excluded

Controls: Those who refused to participate were excluded as well as family members from same house hold.

Ethical issues

A support letter was obtained from Ethiopia Public Health Institute and Oromia Regional Health Bureau and supportive letter were obtained from the Zonal Health Department to respective District Health Office. Oral informed consent was obtained from participants or from their parents to participate in the study. Confidentiality was assured and no personal details was recorded or produced on this documentation.

Results

Descriptive Epidemiology

We identified a total of 251 measles cases from 15th January to 3rd March, 2015 from six Kebeles. There were no deaths reported (CFR=0%). The median age is 10-years [ranging: 6 month and 70-year]. Of total cases 154(61%) females and 97 (39%) were males.

The overall attack rate(AR%) was 1.6% and the highest attack rate was observed in Yembal Gara Oli Kebele 5.33% followed by Amuma Degero Kebele 0.66% and the least attack rate was in Both Daco Michael and Amuma Mana Bishani 0.05%, see **(Figure-8)**. The sex specific attack rate (SSAR) for females was 1780/100,000 and males 1380/100,000.

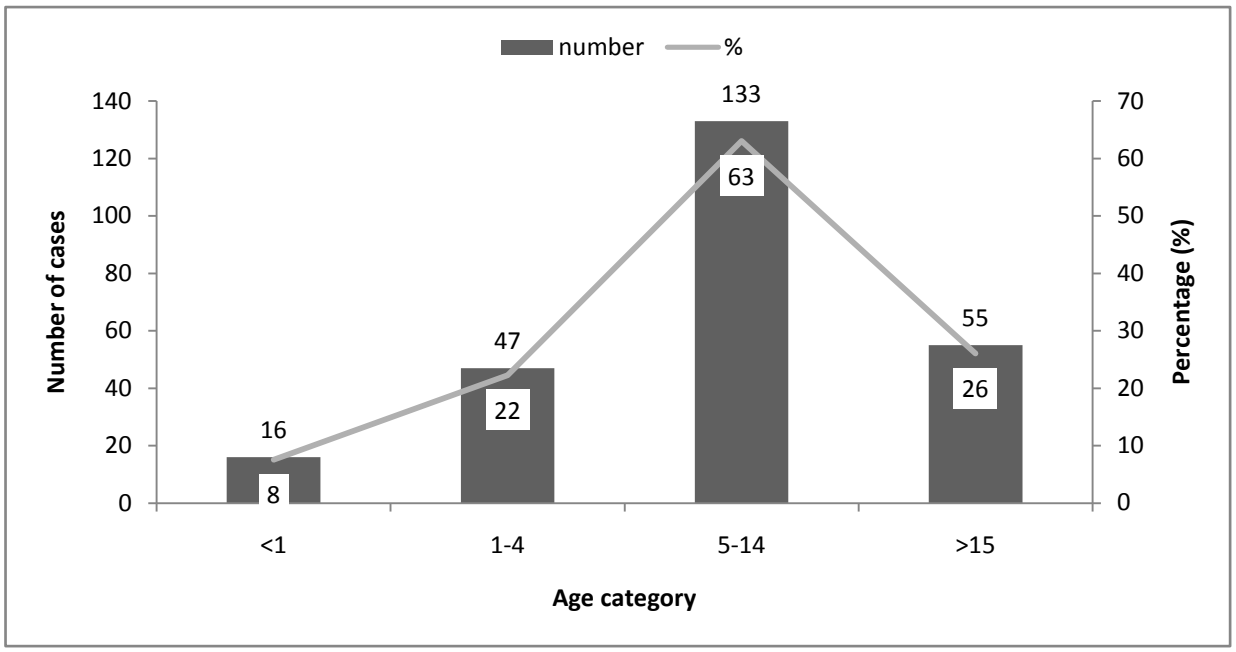


Figure 7: Distributions of cases by age in Nedjo District, Oromia, Ethiopia, Feb, 2015

The highest Attack Rate was in children 5-14 years of age (290 cases per 100,000) followed by 0-4 years was (260 per 100,000 population) and the least were in age older than or equal 15 years (71/10,000 population). Over all, the most affected age groups are individuals under 15 years of age that is 280 cases per 100,000, **(Figure-7).**

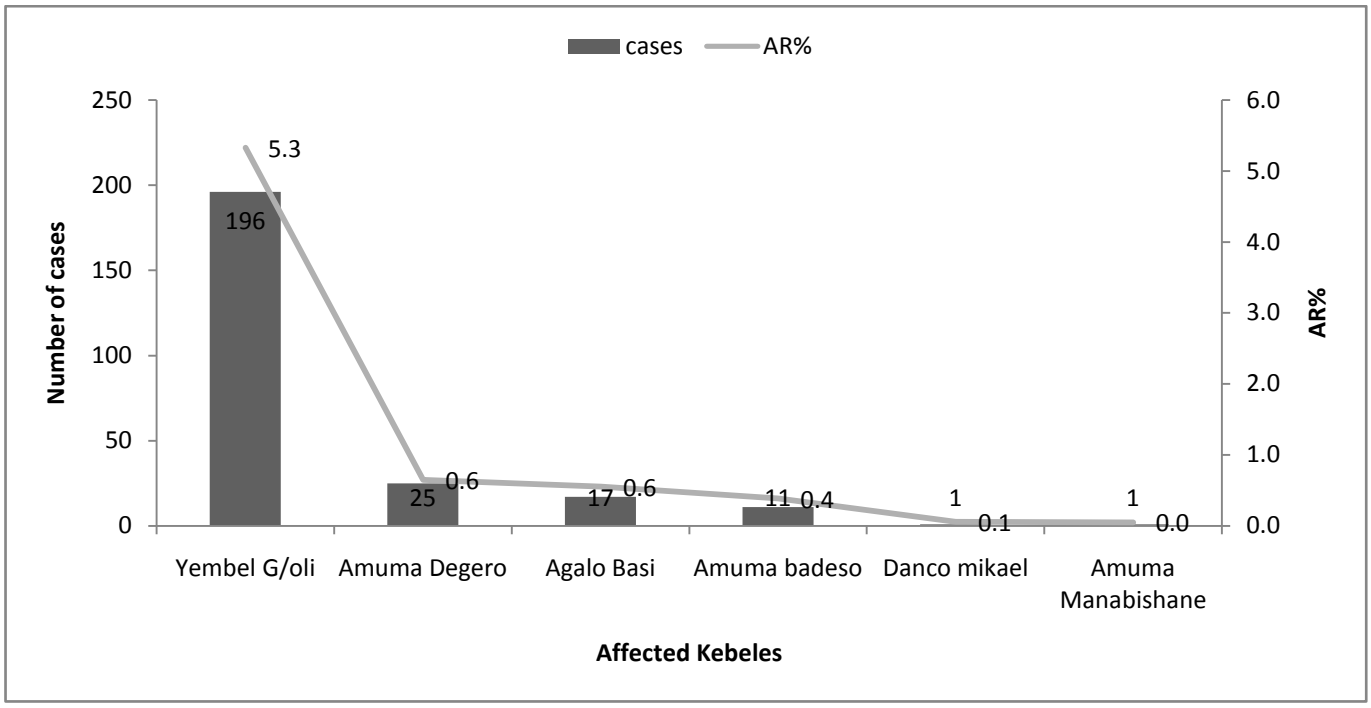


Figure 8: cases and cumulative Attack Rate of measles by Kebele in Nedjo District, West Wellega, Oromia, Feb, 2015.

The epidemic curve showed that the outbreak has several peaks of onset which stated for 15th of January to 3rd March, 2015. The index case started in around 15th of January, 2015, however the cases were not reported and didn't come to the attention of health facilities until 1st of February, 2015, **(Figure-9).**

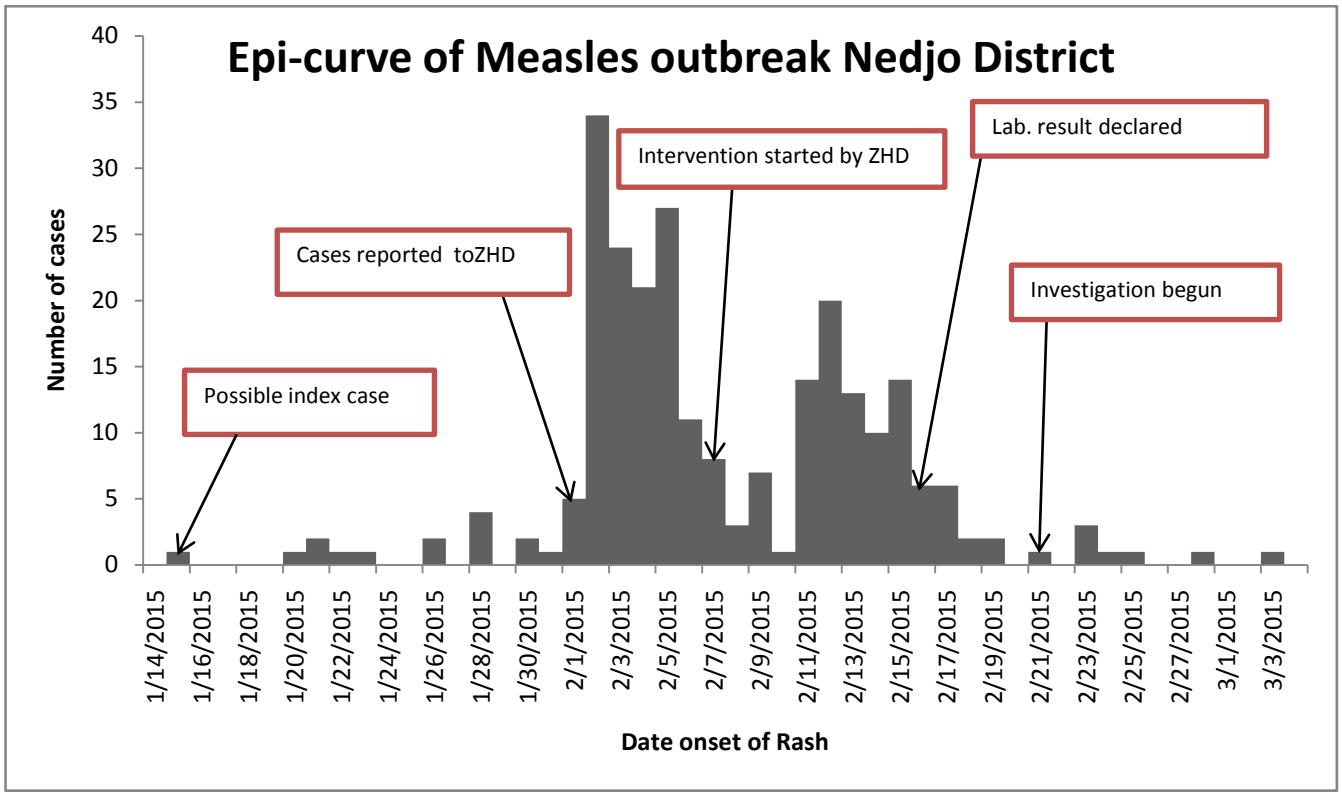


Figure 9: Epi-curve based on date onset of rash Nedjo District, West Wellega, Oromia, Feb, 2015.

Vaccination status of the cases

Majority of reported cases were not vaccinated 186(74%) while only 65(26%) of the cases have reported a history of vaccination, **(Figure -10).**

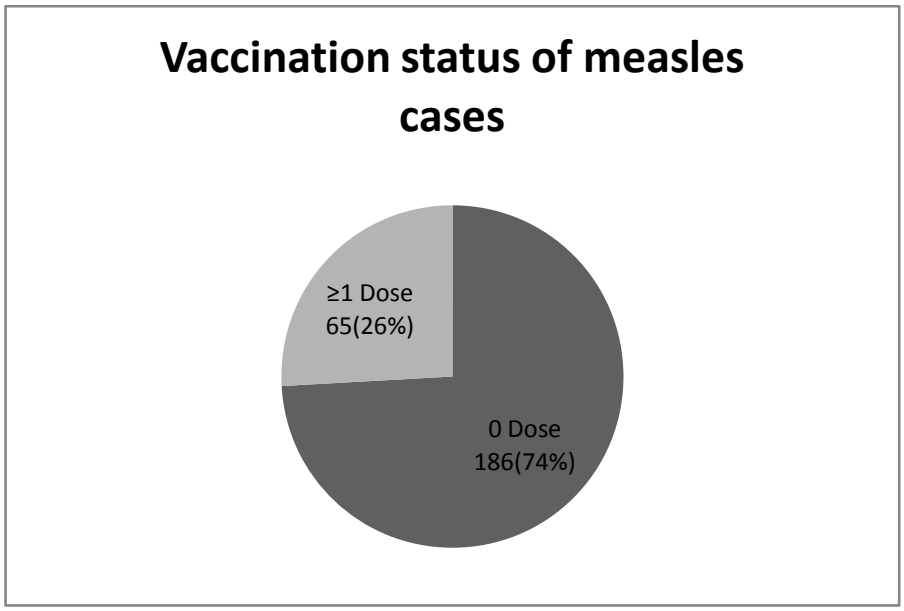


Figure 10: Previous vaccination status of measles cases in Nedjo District, West Wellega, Oromia, Feb, 2015.

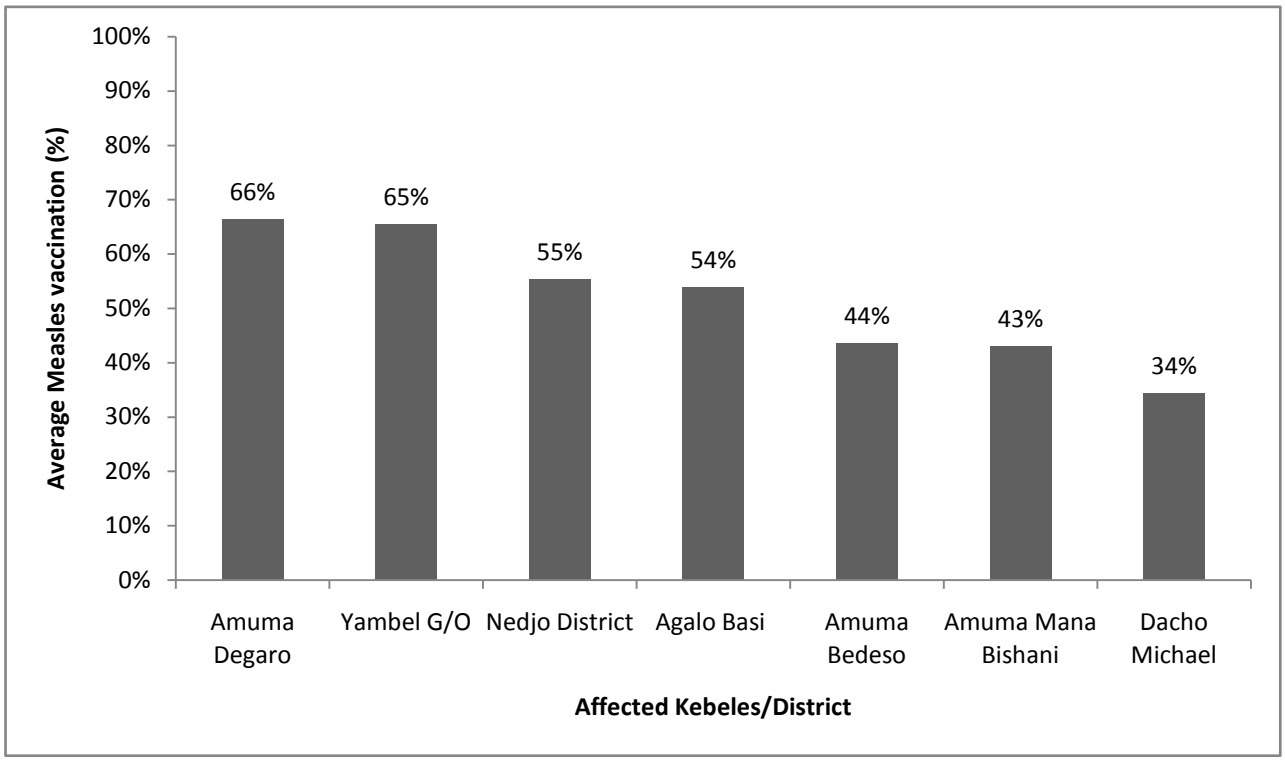


Figure 11: The average five years adminstrative coverage of measles affected Kebeles, Nedjo District, Oromia, 2015

The affected Kebeles demonstrated with maximum of 66% in Amuma Degero Kebele, the least was Dacho Michael Keble(34%), **(Figure-11).**

Laboratory result of the outbreak

Three blood samples were collected from patients February, 2015 and sent to the EPHI for confirmation. All three (100%) specimens were tested positive for measles IgM during the specified outbreak period hence, based on the result of the laboratory test in the district, typical measles clinical manifestation and epidemiologically linked with laboratory confirmed cases, the outbreak was confirmed and cases were treated as measles.

Analytic Epidemiology

A total of 60 measles cases (median age of 10.9 years) and 60 apparently healthy controls (median age of 10.8 years) were included into this study, **(Table-3).** On bivariate analysis measles illness was statistically significantly associated with being unvaccinated [Odds Ratio (OR) =40; 95% CI (14,112)], having contact/presence of active measles case within the house hold [OR =5.04; 95% CI (2, 13)], Travel history 2-3 weeks prior to onset of illness [OR =12.4; 95% CI (2.7, 56.4)], attending school during the outbreak time [OR =6.83; 95% CI (2.3,19.6)], **(Table-4).**

Table 3: Socio-demographic characteristics of cases and controls: Nedjo District, West Wellega Zone, Oromia-Feb, 2015.

Variables		CASES (%) n=60	CONTROLS (%) n=60
Age in year	Mean	10.96	10.83
	Median age	7	12
	Ranges	0.26-25	0.0-25
	<5	7(12)	11(18)
	≥5	53(88)	49(82)
Sex	Male	22(37)	28(47)
	Female	38(63)	32(53)
Marital status	Single	18(30)	14(23)
	Married	0(0)	2(3)
	Note Applicable	42(70)	44(73)
Ethnicity	Oromo	60(100)	60(100)
Religion	Protestant	58(97)	60(100)
	Orthodox	2(3)	0(0)
Occupation	Farmer	0(0)	2(4)
	House wife	0(0)	1(1)
	Student	51(86)	40(66)
School ever	Schooling	52(87)	41(68)
	Non-schooling	8(13)	19(32)
Mother's education	Illiterate	20(33)	46(77)
	Literate	40(67)	14(23)
Father's education	Illiterate	19(32)	13(22)
	Literate	41(68)	47(78)
Father's occupation	Farmer	60(100)	60(100)

Table 4: Identified Socio-demographic factors and risk factors for measles outbreak in Nedjo District, West Wellega Zone, Oromia-Feb, 2015.

Variables		CASES (%) (n=60)	CONTROLS (%) (n=60)	OR(95%CI)	P-value
Sex	Male	22(36)	28(47)	0.66[0.31,1.37]	0.2
	Female	38(63)	32(53)		
Age	<5	7(12)	11(18)	1.6[0.6,4.7]	0.3
	≥5	53(88)	49(82)		
Attending school during outbreak time	Yes	52(87)	39(65)	**3.5[1.4,8.7]**	**0.005****
	No	8(13)	21(35)		
Father' s education	Illiterate	51(85)	60(100)	Undefined	
	Literate	9(15)	0(0)		
Mother's education	Illiterate	20(33)	14(23)	0.6[0.27,1.35]	0.2
	Literate	40(67)	46(77)		
Knowledge to measles transmission	Yes	49(82)	46(77)	1.35[0.5,3.2]	0.5
	No	11(18)	14(23)		
Presence of Measles case/s at home	Yes	24(40)	7(12)	**5.04[2,13]**	**0.0003****
	No	36(60)	53(88)		
Contact with known measles case	Yes	29(48)	13(22)	**3.38[1.5, 7.4]**	**0.0000****
	No	31(52)	47(78)		
Being unvaccinated	Yes	55(92)	37(62)	**6.83[2.3,19.6)]**	**0.0001****
	No	5(8)	23(38)		
Travel History	Yes	18(30)	2(3)	**12.4[2.7,56.4]**	**0.0000****
	No	42(70)	58(97)		

** Variables significantly associated with contracting measles infection at the level of P=0.05.

However, in multivariate analysis the factors that remained statistically significantly associated with measles illness were being unvaccinated for measles [Adjusted Odds Ratio (AOR) =7.37; 95% CI (1.74, 31.17)], Travel history 2-3 weeks prior to onset of illness [AOR=10.34; 95% CI (1.87, 57.1)], presence of measles case/s at home [AOR=3.29; 95% CI (1.15, 9.47)].

Public health Intervention undertaken to contain the outbreak

Active cases were treated with oral antibiotics to prevent bacterial infections, tetracycline eye ointment, oral rehydration salt (ORS), anti-pyretics, and vitamin A as the complaint per individual patients to prevent further spread, and to reduce morbidity and mortality attributed to measles pathogenesis. Routine surveillance system was enhanced and closely followed at each level on a daily bases. Health education was given for the community members and students in

school to prevent the transmission of the disease, to maximize the health seeking behavior and treat if there is sign and symptoms of measles.

Discussion

Our investigation revealed measles outbreak in Nedjo District, West Wellega of Oromia Regional State. The outbreak primarily affected under 15 years of age group and Yembel Gara Oli Kebele was highly affected with an attack rate of 5.3%. This could be possibly explained that this Kebele has very low measles immunization coverage in the last five years. This agreed with the fact that Measles outbreak could frequently occurred in area with low measles immunization coverage and poor cold chain management even with high vaccination coverage [1].

The index case was reported from Agalo Basi kebele where expanded to nearby kebeles due to population movement and social interaction. The epidemic seems started at around 15th of January,2015 even though, the cases were not reported and did not come to the attention of health facilities 1st of February, 2015. This might reveal the delayed in notification of the cases to the next higher level by the health care providers and may also indicates poor active surveillance system in the this District.

Low measles vaccination coverage of affected Kebeles significantly contributed for the existence of the outbreak and its severity. Study done in the Netherlands also revealed that, 94% of affected children by measles outbreak were unvaccinated [15]. Measles outbreaks continue to occur, and failure to vaccinate has been identified as the primary cause of infection [19].

being unvaccinated was the major risk factor for having measles infection in Nedjo district this can be explained that Measles outbreak could frequently occurred in area with low measles immunization coverage and poor cold chain management even with high vaccination coverage [1].

Several factors may maximize the chance of developing measles infection. Being unvaccinated is one of the possible risk factors to develop the disease. Delayed in notification of the outbreak indicates that there was poor active surveillance system at the district level and which in turn aggravate and enhance the expansion of the disease transmission to the nearby Kebeles using the normal human movement for various social activities.

In both bivariate and multivariate analysis the risk factor statistically associated with measles illness were being unvaccinated and having contact with measles cases. These agreed with study conducted in Zimbabwe in 2010 and Nigeria in 2013 [18, 20]

Limitations

- Absence of child immunization card at household level poses difficult to get exact date of vaccination and other relevant information
- Cases subjects/guardians might forget the exact evidence about their own or their Children health condition (Recall bias)

Conclusions

Measles outbreak occurred in Nedjo District, West Wellega Zone, Oromia. The outbreak was confirmed based on laboratory diagnosis. It primarily affected under 15 years. Being unvaccinated was the major risk factor identified. We recommend enhancing supplementary immunization activities, strong ongoing active case surveillance of febrile rash illness; health education on treatment and prevention of Measles to be enhanced and continued in the community by health workers.

Recommendations

Ongoing active febrile-rash illness surveillance should be enhanced and continued in community by health extension workers.

Improving health seeking behavior of the community through awareness creation to ward modern treatment and the important of vaccine preventable disease in collaboration with community leaders will be mandatory.

Strengthen routine immunization through awareness creation on the importance and benefits of routine immunization services.

Improve measles active surveillance by training the health workers on active surveillance system.

Non selective immunization campaign should be planned for age group of 6month up to 14year.

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CHAPTER-II

Surveillance Data Analysis Report

2.1. Relapsing Fever Surveillance Data Analysis Report, East Shewa Zone, Oromia Regional State, Ethiopia, 2010-2013

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Abstract

Background: Relapsing fevers (RF) are acute infections caused by an arthropod borne *Borrela* species. RF has an epidemic potential, making it a public health priority disease in Ethiopia. In February 2014**,** we conducted a relapsing fever surveillance data analysis to describe the trend, incidence, and prevalence of relapsing fever in the, East Shewa Zone, Oromia.

Methods: We conducted descriptive cross sectional study on relapsing fever surveillance data of the years from (2010-2013). We reviewed Integrated Disease Surveillance and Response system database and Public Health Emergency Management unit of the zone trend analysis, incidence, and prevalence rates were calculated. Data was analyzed using Excel-2007.

Results: We identified a total of 1,041 relapsing fever cases and no deaths (CFR=0.0%) from respective ten Districts and three Towns in East Shewa Zone. The mean number of case was 260 cases each year, ranging from 138-318 cases. The average annual prevalence rate per 100,000 population decreased to 10 per 100,000 in 2011 from 22 per 100,000 in 2010 and again raises to 21 per 100,000 and further increased to 23 per 100,000 in 2013. More than 50 % of cases were reported within the months of June to November each year 2010-2013, 52% of cases in 2010, 72% in 2011, 69% in 2012, and 82% in 2013.

Conclusions: The trend of relapsing fever seems to be seasonal with endemicity throughout the districts. The incidence was higher in towns and increasing from time to time even though the case fatality rate was totally zero in all reported years. Hence,proper public health intervention such as health education regarding personal hygiene and proper case management so as to alleviate the problem from the community.

Key words: Borrella, Louse borne relapsing fever, incidence, Ethiopia

Introduction

Etiologies

Relapsing fevers are a group of acute infections caused by arthropod borne spirochets of the genus Borrela. There are two epidemiological forms. These are louse born relapsing fever (LBRF) and tick born relapsing fever (TBRF). Louse born relapsing fever is caused by *Borella recurrentis* however, tick born relapsing fever caused by several different Borrela species (1).

Reservoirs and Transmission

Man is the only reservoir of louse borne relapsing fever. The body louse, pediculus humanus transmits it. Lice are infected when they feed on an infected person. Ingested spirochetes enter the gut and cross the epithelium into the hemolymph, where they multiply. The spirochete is transmitted to another person when an infected louse is crushed onto the skin, and enters the circulation through abrasions in the skin.

Clinical Features

The incubation period ranges from 5-10 days. There is wide variation in the spectrum of clinical manifestations ranging from mild to severe cases. The typical patient develops abrupt onset of high fever, accompanied by headache, joint, backache, and dry cough. In the untreated patient, spirochetes are cleared from the circulation in 3-5 days due to production of opsonizing antibodies. 4-7 days after clearance of fever and spirochetes, a repeat wave of spirochetemia with new antigenic variants occurs, with recurrence of clinical symptoms. Up to 3-5 relapses may occur; successive relapses tend to be clinically milder (2).

Epidemiology

During the first half of the 20th century, relapsing fever was a disease of major worldwide importance; it caused epidemics affecting around 50 million and was associated with death rates of 10% to 40% (3). During the 1930s, approximately one third of the population in Africa was devastated by an epidemic attributed to relapsing fever. Since 1967, the epidemic form of louse borne relapsing fever has been largely confined to areas of extreme poverty in East Africa (4).

Many now believe that louse borne relapsing fever can be assigned to the history books; however, considerable disease-endemic foci of infection remain in areas of Ethiopia, which spill into neighboring countries such as Sudan (5).

Louse-borne relapsing fever (LBRF) is most common in Asia, Africa, and Central and South America. It has been restricted to countries with poor socio economic status, the most important foci being Burundi, Rwanda and Ethiopia. For the first time the endemicity of louse-borne relapsing fever in Ethiopia had been reported by Italian investigators as early as 1915 and several thousands of cases were reported annually to the Ministry of Health (MOH) between 1981 and 1990 with the largest number in 1983 (43727 cases) as it was shown on an epidemic report of Wolayta Zone, South Nation Nationality Peoples Region (SNNPR) (6). Louse borne relapsing fever is endemic in Ethiopia, the Sudan and Rwanda, whereas, tick borne relapsing fever is widely spread in Africa. Ethiopia is the main endemic focus of louse borne relapsing fever. Over 9,000 cases were reported in 2002/3 to the Ministry of Health, and it ranked the seventh cause of top 10 leading admissions, and sixth of top 10 leading causes of death among adults in the country (7). Five years retrospective study conducted in Jimma Hospital revealed that comparison was made on seasonal variation and found that the number of cases during dry season was generally higher than those during the wet season in the same year and this variation was statistically significant ($p<0.05$, $n=5$), regarding the mortality rate in 1997 it was 2%, and decreased to 1% in the subsequent 2 years reaching to a point where no mortality case was recorded in 2000. However, the mortality rate suddenly increased to 6% in the year 2001, higher than the 5% mortality rate reported in literature for louse-borne relapsing fever (8). Between August 2012 and November 2012, there was an outbreak in Wolanchiti town East Shewa Zone 95 cases of LBRF (Attack rate: 5 per 1,000) and no death (9).

Rationale of the study

An ongoing surveillance data analysis is important for detecting outbreak and unexpected increase or decrease in disease occurrence will help monitoring of diseases trends and evaluating the effectiveness of disease control program in the surveillance system and policies.

It was known that in the study area there is lack of organized data in the past specifically on Relapsing fever surveillance data analysis therefore, the current study will provide baseline data for further activities.

Objectives:

General Objective

To describe the magnitude of relapsing fever in East Shewa Zone, Oromia Regional State, over four years from 2010-2013.

Specific Objectives

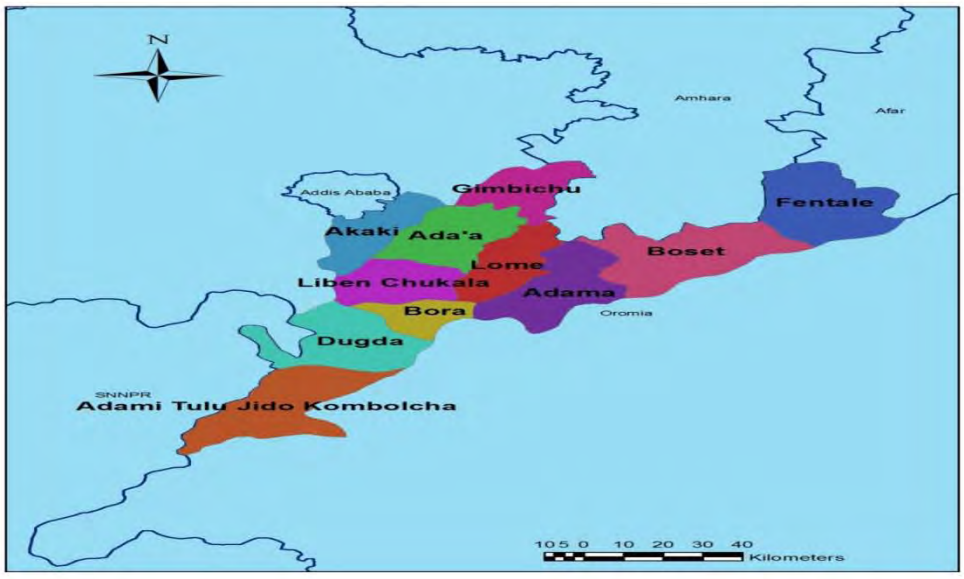
- To describe the distributions of relapsing fever in East Shewa Zone
- To determine the magnitude of relapsing fever in the zone
- To describe the trend of relapsing fever in the zone

Methods

Study area

The study was conducted on Relapsing fever surveillance data collected from East Shewa Zone in Oromia Regional State. The Zone has an estimated area of 9788.13 Km^2, a total population of 1,584,024 (Projected from 2007 CSA). The Study was conducted in 10 Districts (Fentale, Bosat, Adama, Lumme, Gimbichu, Ada'a, Adami Tulu Jido kombolcha, Bora, Dugda and Liban) and 3 Towns (Mojo,Batu,Metehara). East Shewa Zone has a population density of 148 persons per Km^2. The rural population accounts for 62% of the zone total population. The zone has three geo climatic zones, highland "Dega" > 2500m altitude accounts for 5%, Mid-land "Weyinadega" 2000-2500m altitude) constitutes 25% and low land "Kola" <2000m accounts for the remaining 70%. The zone town, Adama, is 100 kms east of Addis Ababa. In 2013, there were, two Governmental Organization hospitals, one Non Governmental Organization NGO hospital, 58 health centers, 288 health posts, three Pharmacies, 94 drug stores and 34 rural drug vendors. The potential health service coverage of the zone was estimated at 100%**.**

Map of East Shewa Zone, Oromia-Ethiopia Jan. 2014



Map 3: Map of East Shewa Zone showing adminstrative districts, 2014

Study design and period

We conducted retrospective secondary data review of surveillance data from East Shewa Zone. Four consecutive years (2010-2013) relapsing fever surveillance weekly report data from zone IDSR and PHEM weekly report was obtained in January 2014, analyzed and interpreted from January-February, 2014.

Source population

Population of Oromia Regional State

Study unit

Total population of East Shewa Zone

Data collection procedure

We collected secondary data on relapsing fever for the last consecutive four years using checklist from zonal health office PHEM unit.

Case definition

Suspected case

Any person presented with an abrupt onset of rigors with fever, usually remittent, headache, arthralgia and myalgia, dry cough, epistaxis

Confirmed case

A suspected case with demonstration of Borrelia in peripheral blood film

Data processing and analysis

We entered and analyzed the data by using Epi-info 7, and Microsoft Excel 2007

Ethical consideration

We obtained written support letter from the Regional Health Bureau prior to the arrival to the study area.

Data dissemination

We communicated the study finding through power point and submission of hard copy and electronic copy to zonal Health Office, AAU (SPH). Oral communication was already made to East Shewa Zone Heath Office.

Results

We identified a total of 1,041 relapsing fever cases and no deaths (CFR=0.0%) reported to East Shewa Zonal (PHEM) department from respective 10 Districts and 3 Towns. The mean number of cases per year was 260 ranging from 138-318 cases reported.

The number of cases was: 294(28%) in 2010, 138(13%) in 2011, 291(28%) in 2012, and 318(31%) in 2013. The average annual prevalence was 10 per 100,000 populations in 2010, 22 per 100,000 in 2011, 21 per 100,000 populations in 2012, and 23 per 100,000 populations were reported in 2013. **(Figure -12and Table-5)**

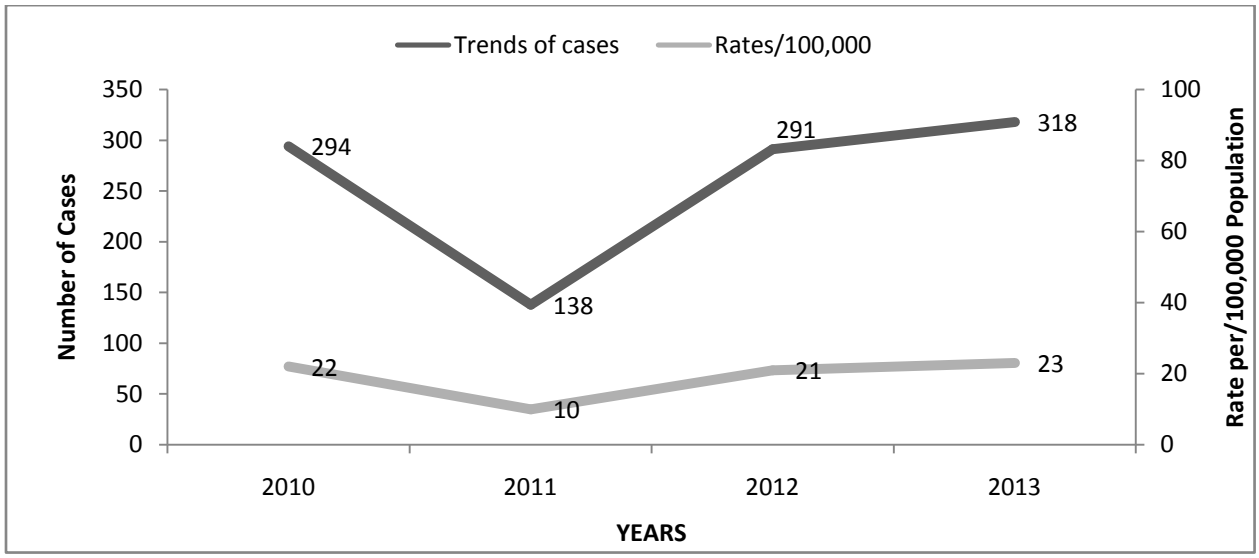


Figure 12: Trends of relapsing fever cases by year in East Shewa Zone, Oromia, from 2010-2013

Table 5: Distributions of relapsing fever cases and deaths by years in East Shewa Zone, Oromia, from 2010-2013

Years	Population at risk	No. of cases	No. of deaths	Percent		Prevalence		Case fatality rate
				Cases	**Deaths**	**Cases/100,000**	**deaths/100,000**	
2010	1,311,423	294	0	28%	0%	22	0.0	0.0
2011	1,326,277	138	0	13%	0%	10	0.0	0.0
2012	1,368,124	291	0	28%	0%	21	0.0	0.0
2013	1,408,626	318	0	31%	0%	23	0.0	0.0
Total	**4,074,126**	**1041**	**0**	**100%**	**0%**	**26**	**0.0**	**0.0**

The highest and lowest monthly incidences of relapsing fever cases respectively were: 8 per 100,000 population in January, and no cases in April,2010; 2 per 100,000 in October, and 1 per 100,000 in February,2011; 3 per 100,000 in October and no cases in January,2012; 4 per,100,000 in October and no cases in January and February,2013. For the consecutive three years (2011-2013) there was peak in October except in 2010 that was in January. **(Figure-13)**

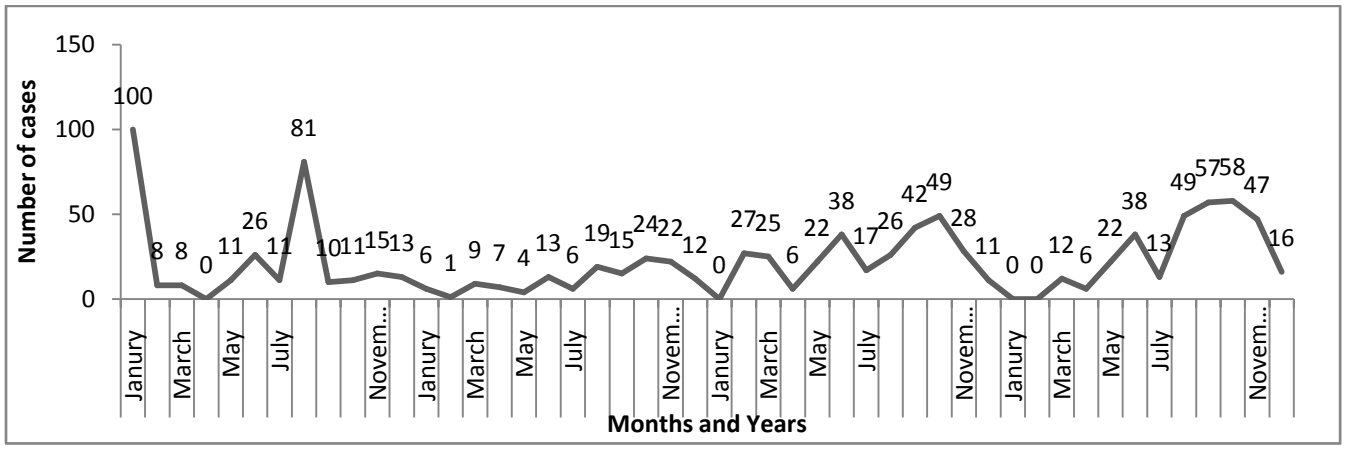


Figure 13: Trends of relapsing fever cases by months East Shewa Zone, Oromia, from 2010-2013

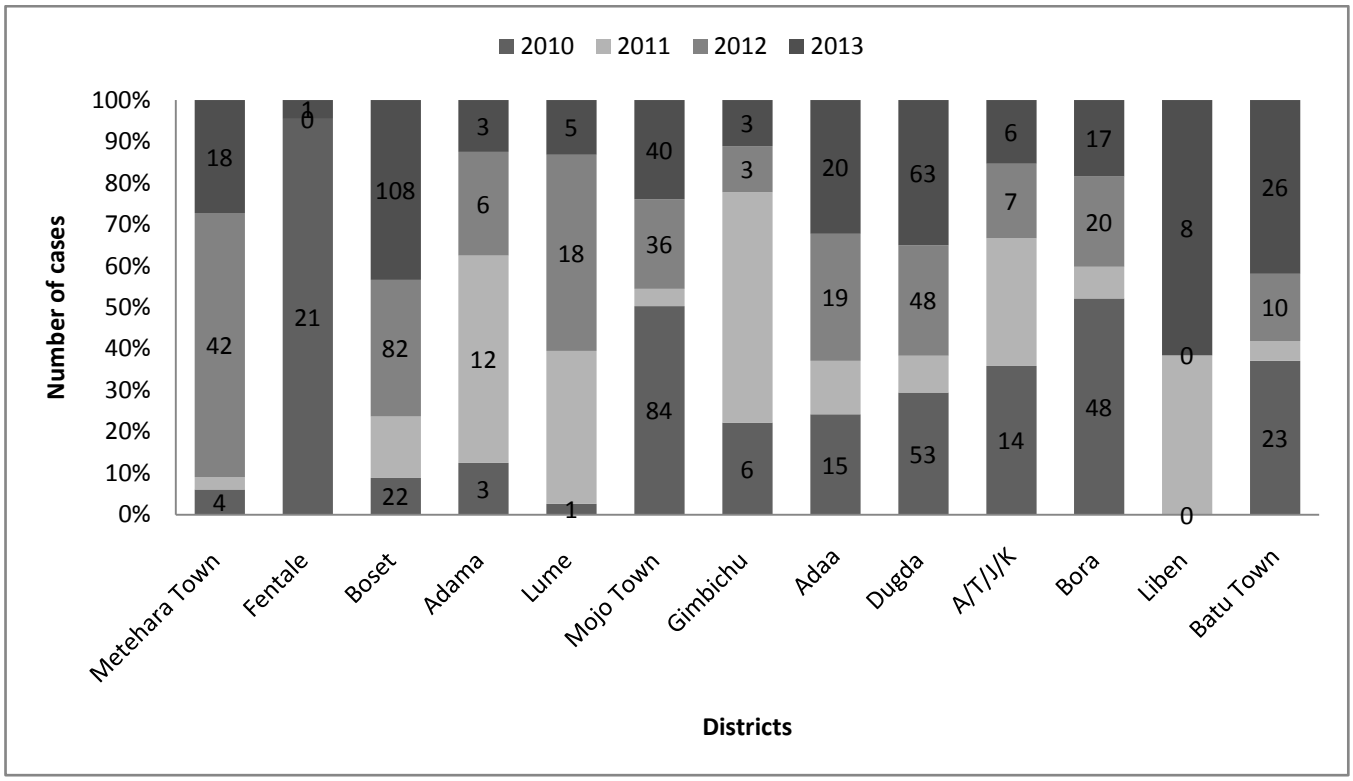


Figure 14: Distributions of relapsing fever cases by districts, East Shewa Zone, Oromia from 2010-2013

The highest incidence of relapsing fever cases were reported from Mojo Town 244 cases /100,000 populations in 2010 followed Bora District 74 per 100,000 populations and the lowest incidence was Liben District. In 2011 highest incidence were in Boset District 23 per 100,000 population the next was Mojo Town 20 per 100,000 populations and in 2012 Metehara Town was with highest Incidence Rate 166 per 100,000 population per year followed by Mojo Town 99 per 100,000 population By 2013 the highest incidence were reported from Mojo Town 105 cases/100,000 followed by Metehara Town 68 per 100,000 population, Boset District 64 per 100,000 population and the lowest cases were from Fentale District 1 per 100,000 population. **(Figure14 and Table 6)**

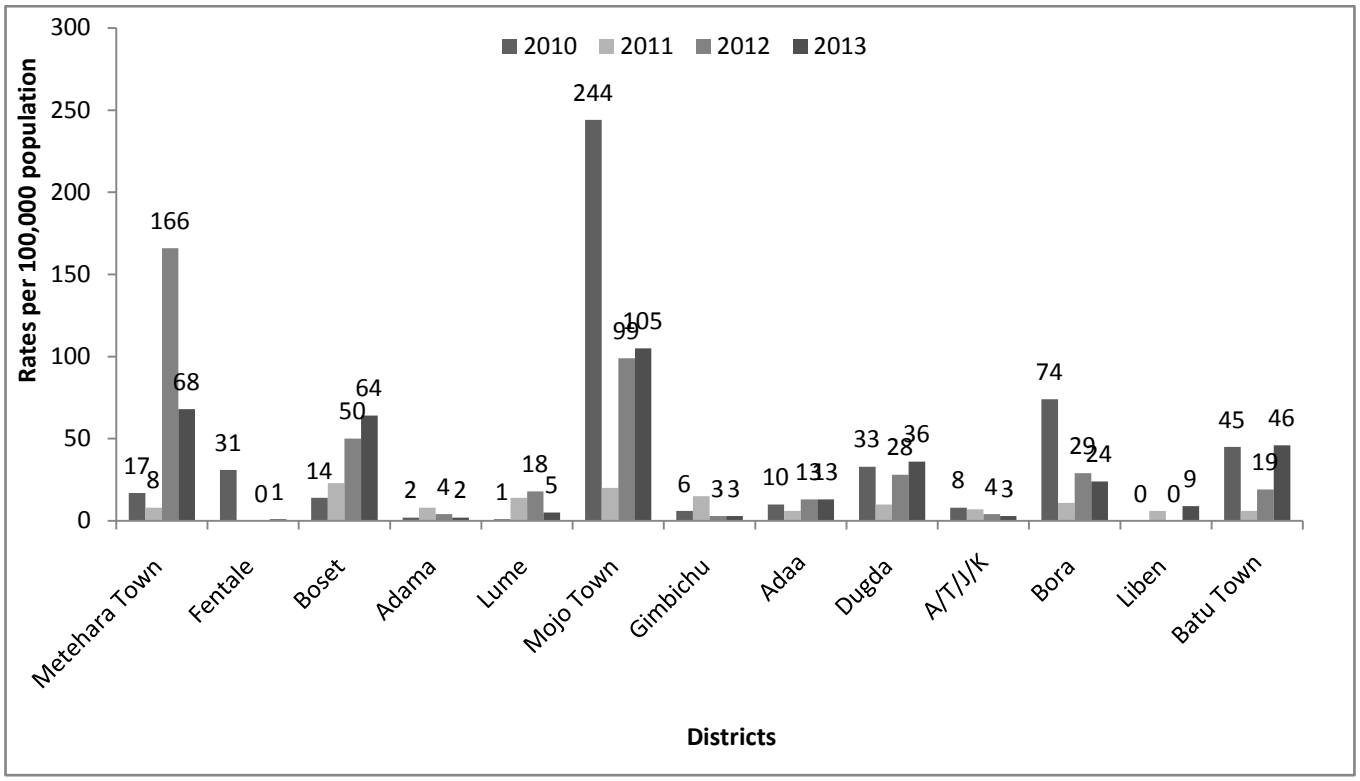


Figure 15: Incidence of relapsing fever cases by districts East Shewa Zone, Oromia from 2010-2012

Table 6: Incidence of relapsing fever morbidity by districts per year, East Shewa Zone, Oromia 2010-2013

	Total Population Per year				Number of cases each year				Rates per 100,000 population			
DISTRICTS	**2010**	**2011**	**2012**	**2013**	**2010**	**2011**	**2012**	**2013**	**2010**	**2011**	**2012**	**2013**
Methara Town	23912	24183	25285	26343	4	2	42	18	17	8	166	68
Fentale	67224	67985	69881	71722	21	0	0	1	31	0	0	1
Boset	157833	159621	164624	169467	22	37	82	108	14	23	50	64
Adama	156851	158628	163599	168412	3	12	6	3	2	8	4	2
Lume	96739	97835	100755	103585	1	14	18	5	1	14	18	5
Mojo-Town	34428	34818	36404	37928	84	7	36	40	244	20	99	105
Gimbichu	95852	96938	99773	102522	6	15	3	3	6	15	3	3
Ada'a	143107	144728	148763	152681	15	8	19	20	10	6	13	13
Dugda	161559	163389	168700	173836	53	16	48	63	33	10	28	36
Adami Tulu Jido Kombolcha	173731	175699	181033	186202	14	12	7	6	8	7	4	3
Bora	65277	66016	68094	70106	48	7	20	17	74	11	29	24
Liben	84038	84990	87421	89779	0	5	0	8	0	6	0	9
Batu Town	50872	51448	53793	56044	23	3	10	26	45	6	19	46
Total	**1311423**	**1326277**	**1368124**	**1408626**	**294**	**138**	**291**	**318**	**22**	**10**	**21**	**23**
					Total number of cases(n=1041)							

The highest number of relapsing fever cases were reported from Boset District 249/1041(24%) followed by Dugda District 180/1041(17%), Mojo Town 167/1041 (16%), and the least cases were from Liben District 13/1041 (1%). **(Figure -16)**

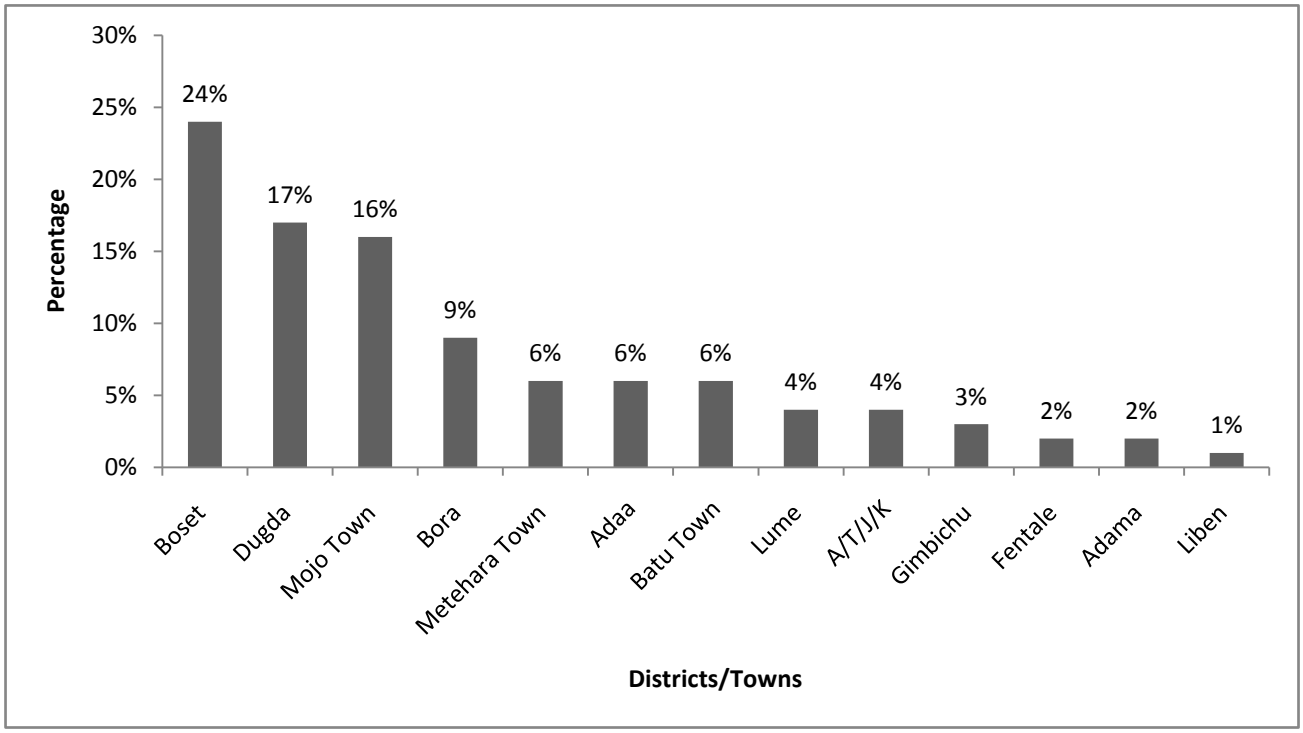


Figure 16: Distribution of relapsing fever cases by District, East Shewa Zone, 2010-2013

Discussion

Our data analysis indicated that the average annual prevalence was decreased to 10 per 100,000 populations in 2011 from 22 per 100,000 in 2010 and again rises to 21 per 100,000 populations in 2012, and the highest numbers of cases 23 per 100,000 populations were reported in 2013. The decrease in 2011 might due to weak repoting rate in that particular year.

As it was indicated in studies that, louse borne relapsing fever is endemic in Ethiopia (3, 4). This is why it is included among public health priority diseases (disease under surveillance) list of the country. In Oromia Region, East Shewa Zone was amongst the zones reporting relapsing fever cases as one of weekly reportable diseases throughout the year. Although the load of cases decreased to 138(13%) in 2011 from 294(28%) cases per year in 2010 but, rises again to 291(27%) cases per year in 2012 and further increased to 318 (31%) cases per year in 2013.

It seems seasonal patterns of transmission were observed, except in 2010 which were 40%; More than 50 % of cases were reported in August to November each year 2010-2013: (80/138) 66% in 2011, (145/291)50% in 2012, and (211/318) 82% by 2013. The overall proportion of cases within this period was (553/1041) 53% from 2010-2013. The highest and lowest monthly incidences of relapsing fever cases respectively were 8 per 100,000 population in January, and no cases in April,2010; 2 per 100,000 in October, and 1 per 100,000 in February,2011; 3 per 100,000 in October and no cases in January,2012; 4 per,100,000 in October and no cases in January and February,2013. For the consecutive three years (2011-2013) there was peak in October except in 2010 that was in January. The case fatality rate decreased to zoro level in that there was no death reported this disagrees with the study conducted in Jimma where the case fatality rate were 6% (6).

The incidence rate was high in towns than in the district as it was seen; Mojo Town was with highest burden of relapsing fever cases in 2010 and 2013: 244 cases /100,000 populations in 2010, and 105 cases/100,000 in 2013. In 2011 highest incidence were in Boset District 23 per 100,000 population, In 2012 Metehara Town was with highest incidence 166 per 100,000 population. The reason for the increasing of the incidence rate is related to temporary migration to this towns for job searching beginning from pre harvesting time up to harvesting time that is from late August up to November in most areas of the zone, in which more than have of the cases, 553/1041(53%) from 2010-2013. Seasonality can also be explained with coinciding evidence of outbreak investigated in town (Wolinchiti) within Boset District in, 2012 (7).

Crowding and unhygienic condition increase the risk of transmission of LBRF. In this study the crowding index was not measured. The control of RF, like the control of many other tropical diseases, is multifaceted. It includes delousing measures, health education on personal hygiene and case management. It has been shown in previous studies that delousing measures significantly contribute to the control of LBRF (10).

Limitations

- Lack of demographic data to analyze the data by age and sex, because the IDSR reporting format lacks this variable.
- Lack of consistent data before 2010 to see the long term pattern of the disease.
- No enough recent literatures on louse born relapsing fever to discuss more about the burden of the disease.
- Data was not disaggregated by residence in to either urban or rural.
- We have used the secondary data

Conclusions

Relapsing fever cases were reported from all reporting stake holders in the zone with varying magnitude that the incidence was higher in towns and increasing from time to time even though the case fatality rate was totally zero in all reported years. We recommend proper public health intervention such as regular health education and proper case management.

Recommendations

Incidence of relapsing fever cases has increased from time to time hence, appropriate intervention should be given.

Regional Health Bureau has to manipulate Surveillance data on regular basis to see the trend. Further study has to be conducted to identify risk factors.

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CHAPTER-III

Evaluation of Surveillance System

3.1. Evaluation of Surveillance System for Malaria and Measles in Jimma Zone, Oromia Region-June2014.

Executive Summary

Introduction: 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 and mortality, and to improve health. This is through revealing disease burdens and guiding the action to be taken, the health policy, planning, evaluation of health programs, we conducted the evaluation to describe the surveillance system of malaria and measles, evaluate the system attributes and determine the surveillance system is meeting its target.

Methods and Materials: we conducted cross-sectional descriptive study in Oromia Region of Jimma zone, from 07-22 June-2014. The zone was selected purposively. The study subjects were health facilities, Woreda Health Office and ZHD. A total of 19 study units; the Regional health bureau (RHB), one zonal health department (ZHD), six district health offices, six health centers and six health Posts was assessed. The surveillance system attributes examined in this evaluation were usefulness, simplicity, acceptability, flexibility, data quality, stability, timeliness and Representativeness of the surveillance system. Each attribute was rated using a separate set of criteria as described in the CDC Surveillance System Evaluation Framework. Data analyzed using Epi Info and Microsoft Excel 2007.

Results: A total of 19 sites, health centers accounts 6(32%) health posts, 6(32%) health centers, 6(32%) Woredas and 1(5%) zone were visited. A total of 354,991 confirmed malaria cases with 209,656(59%) were tested for *plasmodium falcuparum*, and 145,426(41%) were *Plasmodium vivax,* the slide positivity rate (SPR) of 25% which was 35% and 30% in 2004 and 2005 EC respectively. Jimma Zone has reported 38,360 confirmed malaria cases and share around 10.8 % of the total malaria cases reported per anual burden to Oromia. In the last six months malaria trend the higest was in WHO week 13, 2014. From all reporting sites around 3,925 measles cases were reported to Oromia Regional Health Bureau PHEM in 2006 among which Jimma Zone contributed 66 (1.6%) of reported cases. Standard case definitions for all prioritized diseases are available at Zonal, visited districts and 6 (100%) Health Center in the zone. During the last six months, there was no shortage of weekly PHEM reporting formats. Jimma zone is

using telephone and internet to report weekly surveillance activities to next level. All visited districts are using telephone to report for zonal health office while the regional health bureau used email to send to the national PHEM. At zonal level, measles and malaria data are analyzed weekly by person, time and place. At visited districts, analysis is performed weekly only for malaria disease. For other diseases, it is performed once or twice per year. This may be due to lack of awareness, training, commitment and resources such as computer and printers. Among 6 visited health posts, four of them are performing only trend analysis (line graph) for malaria in weekly basis.

Jimma zone health department has given written feedback for all districts in 2013/14. However this activity was not regularly done for all districts at this level. The zonal health department has given written feedback for all districts in 2013/14. However this activity was not regularly done for all districts at this level. It was identified that the current surveillance system is helpful for early detection of outbreaks. Respondents at all level told that it takes 10 - 15 minutes to fill weekly reporting format on morbidity and mortality of priority disease. Annual average report completeness was **75%** which is below National minimum expected level (80%) in 2006 EFY., among visited sites the highest annual completeness 100% was by Sokoru and the least (60%) was by Limu Seka. Finally, Surveillance system was found to be flexible and acceptable by all assesses sites.

Conclusiton: Periodic assessment of public health surveillance system is a key activity to identify strengths and weakness of the existing system. This will be more effective if it was done in collaboration with key stakeholders. In Jimma zone the surveillance system was not satisfactory and efforts should be exerted to improve the system mainly on supervisory activities, proper and timely feedback, data management and analysis of prioritized diseases. Finally, the surveillance system of measles and malaria are usful to detect outbreaks, estimate magnitude of the morbidity and mortality of the disease in the area. These surveillance systems are simple and flexible and acceptable by all assessed sites. We recommend, continous data monitoring, timely feed back system, refreshment training and close supportive supervision should be conducted.

Back ground:

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 and mortality, and to improve health. This is through revealing disease burdens and guiding the action to be taken, the health policy, planning, evaluation of health programs, providing a basis for research and so on (1). It is carried out through a system which has legal support and extending from the central health authorities down to the peripheral health facilities and community level through sets of communication channels. These sets include upward and down ward reporting and feedback mechanism (1, 2).

Ethiopia underwent different strategies to have functioning and effective surveillance system. Too often, however, surveillance data for communicable diseases are neither reported nor analyzed on time. As a result, the opportunity to take action with an appropriate public health response and save lives is insignificant. However, in cases where adequate information is collected; it is often not available for use at the local level. Cognizant of these problems African States adopted integrated disease surveillance (IDS) as a regional strategy(resolution AFRO/RC48/R2) for early detection and efficacious response to priority communicable diseases for the African region in September 1998, during the 48th Regional Committee for Africa meeting in Harare, Zimbabwe(2). Ethiopia as member state also endorsed this initiative and is using it with frequent revision of the list of priority diseases (1).

Currently, since 2008 the Federal Ministry of Health 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. This helps the surveillance of priority disease to be a dependable system as Public Health Emergency management (PHEM) center. This new structure is extended down to the district level in their capacities. This is designed as a cutting edge for better tracking and monitoring of diseases of public health concerns. Moreover, as member state of the WHO, Ethiopia is on preparatory phase to implement the International Health Regulation (IHR) which was declared by member states in 2005. These all are good opportunities to strengthen surveillance (2).

The FMOH of Ethiopia identified 20 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 a 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 and routine surveillance which are to be reported weekly (3).

Malaria and measles are within 20 priority diseases reported weekly. They are significant disease burdens to the public.

The overall purpose of surveillance of these 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 reduction actions like vector control and so on (2).

For these purposes, each of these diseases has case definition(s) and integrated diseases reporting formats defined by the FMOH and the WHO; and reporting is institutionalized into the health facilities and health offices. The general frame of work flow is shown in **figure-17** (1).

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

Therefore this study was conducted to evaluate public health surveillance systems in Oromia region Jimma Zone to determine how well they operate to meet their stated purpose and goal as well to provide specific recommendation towards improving surveillance quality, efficiency and usefulness of the system.

Figure 17: Data and Information flow in IDSR indicating varying cycles (Source: National PHEM, Guideline, Ethiopia, 2012)

General objective

To describe the surveillance system for measeles, malaria and evaluate the key system attributes of Jimma Zone, Oromia Region-June 2014.

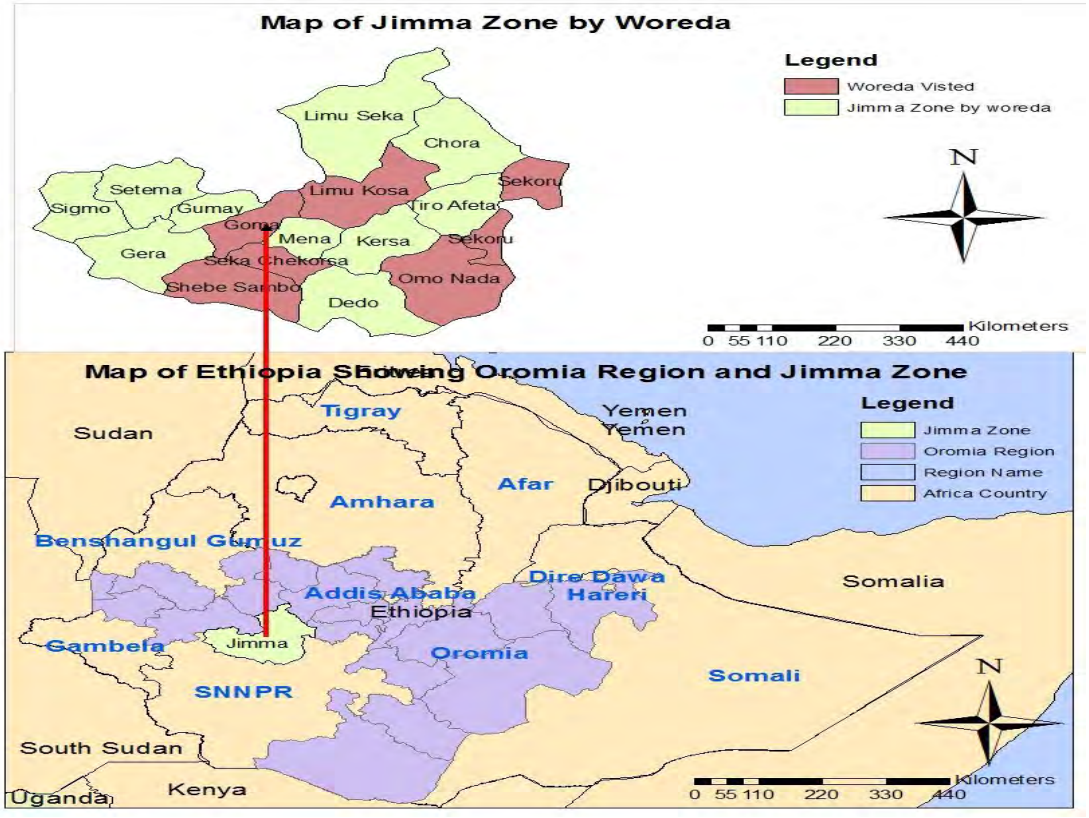
Specific Objectives

- To assess the core activities (case detection, reporting, data analysis and response) of the surveillance system in Jimma Zone
- To evaluate the key attributes of surveillance system
- To assess the challenges of quality of surveillance system

Methods

Study Area

The evaluation was carried out in Jimma administrative Zone of Oromia Regional State. The Zone further divided in to 18 districts and has 554 Kebeles (512 Rural and 42 urban). The zone bounded by West-Shewa on North; South Nation Nationality People (SNNPR) on south, South-West Shewa Zone on east and SNNPR, on west East-Wollega Zone and Illu Ababora Zone. The capital town is Jimma Town, 356 kilometer far in south west from Addis Ababa. A total population of 3,083,421(projection from the 2007 census) with potential health service coverage of 87% based on functional health centers in 2005 EFY. The climate and topography of the zone: annual mean temperature varies from 10-33^{0}C with maximum annual rain fall of 2000mm (high land). Altitude varies 880-2600meter above sea level. The climate includes 16% high land, 62% temperate, and 22% low land. This zone is selected for its easy accessibility and the relative high burden of malaria for evaluation. The whole population is under surveillance for these diseases.



Map 4: Map of Jimma Zone showing assessed districts, 2015

Study design and period

We conducted retrospective secondary data review, from 07-22 June 2014

Study unit

The study subjects were the health facilities (Health Centers, and Health Posts), health offices (District Health Offices, Zonal Health department, and the Regional Health Bureau).

Sample Size:

A total of 19 study units; the Regional health bureau (RHB), one zonal health department (ZHD), six district health offices, six health centers and six health Posts were assessed.

Selection of the districts and the district health facilities was done as in the steps below:

Sampling Technique:

A convenience sampling was used to select one Administrative Zone from the region then from the total District in the zone (35% of the health facilities), six districts were selected by simple random sampling method and the district health offices of the selected districts were included in the study from each selected district one health center was selected by simple random sampling method. From the 6 health posts under each selected health center, one was selected by simple random sampling (SRS).

Data collection Method

Data were collected using questionnaire and observation of some practical tools for surveillance. Data were collected by the principal investigator using the WHO guidelines, protocol for the assessment of national communicable disease surveillance and response systems. The questionnaire was adapted from the generic questionnaire in annex 12 of these protocols, and from the CDC surveillance Evaluation guideline according objectives settled (1).

Data Analysis

Data were entered and analyzed using the Microsoft Excel.

Data quality assurance

Questionnaires were developed after review of CDC surveillance system evaluation guideline and interview with key informants were conducted and all questionnaires were administered by a single interviewer to keep the consistency of administering the questions.

Dissemination of the Study

The result of the study was be submitted to the SPH- AAU and the respective zonal and regional health bureau with a hard copy, and other stakeholders working. The finding was presented to regional Health Bureau.

Ethical Considerations

Written support letter was obtained from Oromia Regional Health Bureau to zone. Discussion was made about the purpose and method of the study with zonal health office head and PHEM department, and convincing them to write a letter for selected districts.

Operational Definitions

Accuracy: Degree to which a measurement or an estimate based on measurements represents the true value of the attribute that is being measured.

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

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

Simplicity; the simplicity of a public health surveillance system refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives.

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

Flexibility: A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds. Flexible systems can accommodate, for example, new health-related events, changes in case definitions or

technology, and variations in funding or reporting sources. In addition, systems that use standard data formats (e.g., in electronic data interchange) can be easily integrated with other systems and thus might be considered flexible.

Sensitivity: The sensitivity of a surveillance system can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease (or other health-related event) detected by the surveillance system. Second, sensitivity can refer to the ability to detect outbreaks, including the ability to monitor changes in the number of cases over time.

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

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

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

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

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

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

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

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

Suspected Measles: Any person with fever and maculopapular (nonvascular) generalized rash and cough, coryza or conjunctivitis (red eyes) OR any person in whom clinician suspects measles.

Confirmed Measles: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed Cases in an epidemic

Results

Case definition

As per PHEM guideline there are two types of case definition

Standard Case Definitions

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

Measles:-Any person with fever and maculopapular (non-vesicular) generalized rash and cough, coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles.

Community Case Definitions

Malaria:-Any person with fever OR fever with headache, back pain, chills, rigor, sweating, muscle pain, nausea and vomiting OR suspected case confirmed by RDT.

Measles:-Any person with fever and rash starts from face.

Case Detection, Registration and Case definitions

Standard case definitions for all prioritized diseases are available at Zonal, visited districts and 6 (100%) health center in the zone. However, at visited two health centers and all health posts, case definitions are available including Measles and Malaria. In these health facilities, these case definitions were posted on the wall. At visited districts and health facilities, recent outbreak was detected within less than two days after date of onset of first case. At all visited health facilities, there is clinical registration. In addition, it was identified that diseases are correctly filled in clinical registration. At visited health post, health extension workers were responded correctly on standard case definitions of some diseases such as measles and malaria.

Population under Surveillance

According to scope of National PHEM guideline, surveillance system is applicable in all population of country for prevention and control of diseases in PHEM. Following established regional PHEM since 2009, activities are implementing in all setting of the regional population.

Table 7: Population under surveillance of Jimma zone and visited districts, June-2014

S.N	Region/Zone/District	Total Population (projected from 2007 census)
	Jimma Zone	3,014,783
1	Seka Chokors District	251,171
2	Shebe sombo District	135,465
3	Goma District	257,870
4	Omo nada District	299,076
5	Sokoru District	165,633
6	Limu kosa District	192,795

Table 8: List of PHEM immediately and weekly reportable diseases

Immediately reportable diseases	Weekly reportable diseases
1. Acute Flaccid Paralysis (AFP) /Polio	14. Dysentery
2. Anthrax	15. Malaria
3. Avian Human Influenza	16. Meningococcal Meningitis
4. Cholera	17. Relapsing fever
5. Dracunculiasis / Guinea worm	18. Severe Malnutrition
6. Measles	19. Typhoid fever
7. NNT	20. Typhus
8. Pandemic Influenza A	
9. Rabies	
10. Smallpox	
11. SARS	
12. VHF	
13. Yellow fever	

Table 9: Lists of sites assessed in Jimma Zone, Oromia Region, June-2014.

S/N	Visited site	No. of HC (n=6)	No. of HP (n=6)	Districts Health office (n=6)	Total (n=20)
1	Seka Chokors	1(16%)	1(16%)	1(16%)	3(16%)
2	Shebe sombo	1(16%)	1(16%)	1(16%)	3(16%)
3	Goma	1(16%)	1(16%)	1(16%)	3(16%)
4	Omo nada	1(16%)	1(16%)	1(16%)	3(16%)
5	Sokoru	1(16%)	1(16%)	1(16%)	3(16%)
6	Limu kosa	1(16%)	1(16%)	1(16%)	3(16%)
7	Jimma Zonal Health office	-	-	-	1(5%)
	Total	6(32%)	6(32%)	6(32%)	19(100%)

Table 10: Health facilities with Public Emergency management Guideline in Jimma Zone, Oromia Region-June, 2014

S/No	Name of health facility	Health Facility with manual	Health Facility without manual	%
1	Zonal	1	0	100
2	Districts	6	0	100
3	HC	5	1	16
4	HP	4	2	66
	Total	16	3	84

As indicated in (Table 10) from 19 visited sites 16/19 (84%) of them were with at least one nationally identified diseases guidelines. However, the rest 3(16%) of the visited sites were without any of the nationally identified reportable diseases guide lines during observations.

To Verify and evaluate the Performance of public health Emergency management system in the zone we took the glance summary of the two selected nationally identified diseases as indicated below.

Malaria: Nearly 52 million people (68%) are living malaria-endemic areas in Ethiopia, mainly at altitudes below 2,000 meters in the same way, in Oromia region, around 75% of the land mass is malarious putting down 21 million of the population at risk of infection. A total of 354,991 confirmed malaria cases with 209,656(59%) were tested for *plasmodium falcuparum*, and 145,426(41%) were *Plasmodium vivax*, the slide positivity rate (SPR) of 25% which was 35% and 30% in 2004 and 2005 EC respectively. Jimma Zone has reported 38,360 confirmed malaria cases and share around 10.8 % of the total malaria cases reported per anual burden to Oromia. In the last six months malaria trend the higest was in WHO week 13, 2014. (Figure 18)

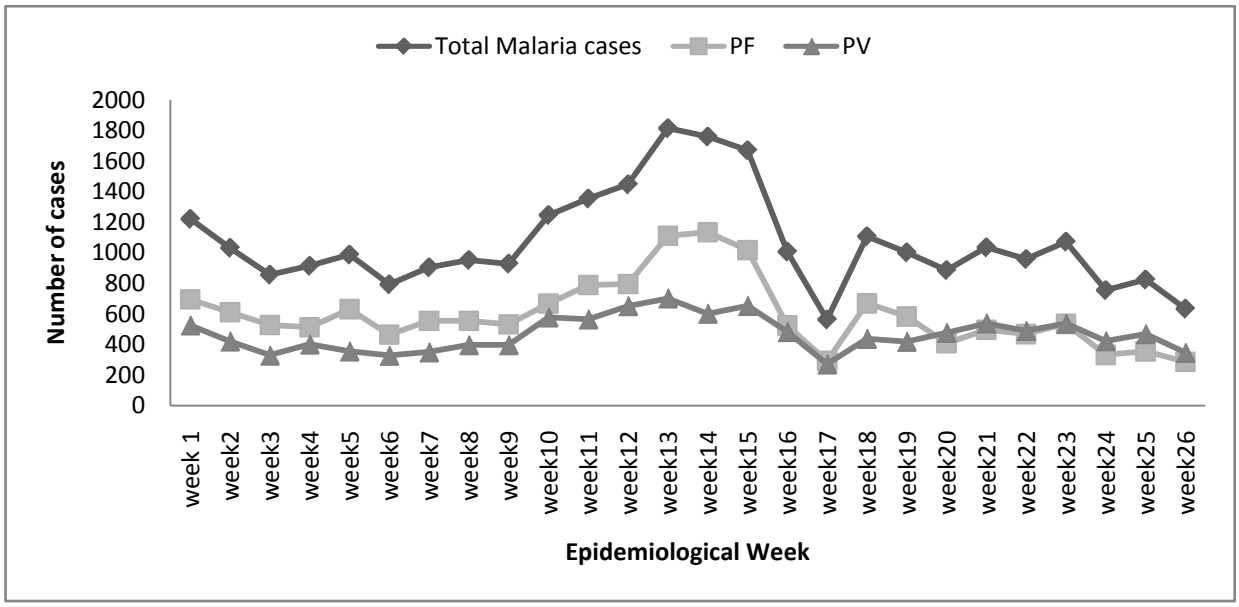


Figure 18: Trends of malaria cases reported from January to June in Jimma Zone, Oromia, 2014

Measles

From all reporting sites around 3,925 measles cases were reported to Oromia Regional Health Bureau PHEM in 2006 among which Jimma Zone contributed 66 (1.6%) of reported cases, **(Figure 19).**

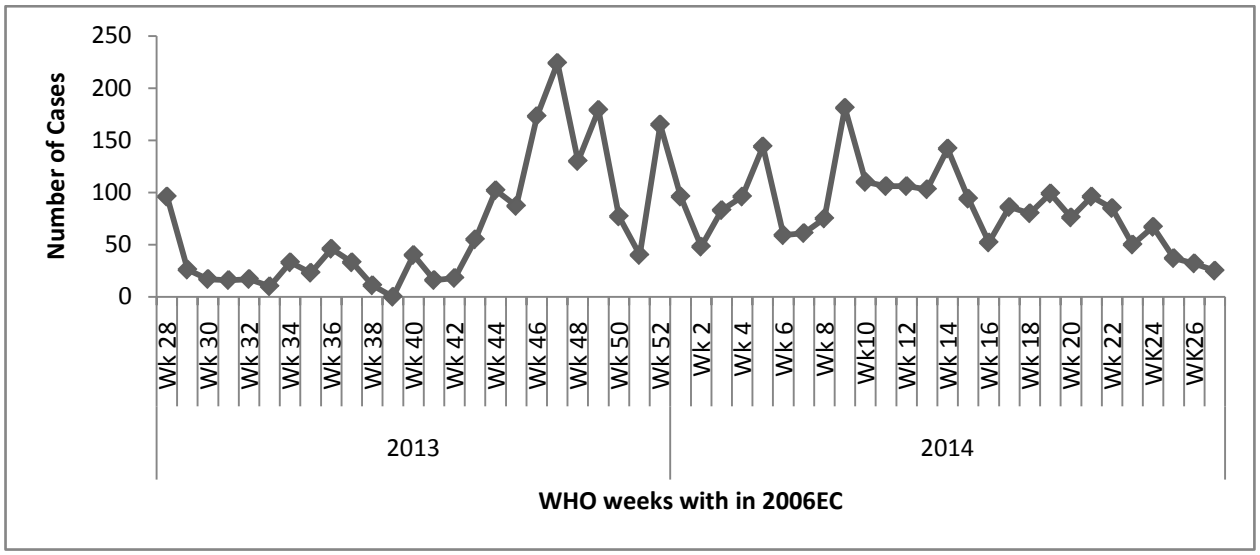


Figure 19: trends of measles cases by week in Oromia from 8/04/2013 - 1/07/2013

Data Reporting

Federal Ministry of Health and its stakeholders are responsible for designing and preparation of PHEM reporting formats. Zonal health office has provided these formats through Regional Health Bureau and NGOs. During the last six months, there was no shortage of weekly PHEM reporting formats. Jimma zone is using telephone and internet to report weekly surveillance activities to next level. All visited districts were using telephone to report for zonal health office while the regional health bureau was using email to send to the national PHEM.

Data Analysis

At zonal level, measles and malaria data are analyzed weekly by person, time and place. At visited districts, analysis is performed weekly only for malaria disease. For other diseases, it is performed once or twice per year. This may be due to lack of awareness, training, commitment and resources such as computer and printers. Among 6 visited health posts, four of them are performing only trend analysis (line graph) for malaria in weekly basis. Other two health posts, analyisis was not done totally. At all levels, PHEM and malaria focal persons are responsible for data analysis of selected diseases.

Existence of Action Threshold Levels

Action threshold level is available at Zonal and all visited district level on National PHEM Guideline. In addition, in all visited health centers there are action threshold levels for all selected diseases. Even though there are thresholds of 20 prioritized diseases on National PHEM guideline, some health facility focal persons did not know/understand it properly. For example, among 21 health professionals who were asked for threshold levels for selected diseases, 16 (76%) of them were respond correctly. This exhibited that utilization of surveillance manuals and guidelines was not good at districts and health facilities level.

Epidemic Preparedness and Response

There is written epidemic preparedness and response plan at zonal level. However, shortage of emergency drugs and supplies were encountered in the past one year at this level. There was no written epidemic preparedness and response plan at all visited districts. In addition, there was a shortage of medical drugs and supplies for emergency management in some districts during the past one year.

Regarding existence and activities of epidemic management committee and rapid response team, there is established committee at zonal and visited districts. During this assessment, it was identified that established committee at these levels is not working regularly.

Resources and availability of budget for Surveillance Activities

There is budget allocated from government source for PHEM activities at regional level. Unlikely, there is no allocated budget from government source for public health emergency activities at zonal level. This problem is extended to the districts and they are depending on zonal or regional support. Due to this reason, district PHEM focal persons were discouraged to surveillance activities. Even though, all visited districts had computers and its accessories, they did not have for PHEM activities separately rather they use it for all activities. Stationery is not enough at some health posts. In addition shortage of hygiene and sanitation materials was observed at some health facilities, **(Table 11).**

Table 11: Availability of resources for surveillance activities at zone, district and health facility level, Jimma Zone, Oromia, 2014

S/N	Resources	Zone		District		Health Centers		Health Posts	
		N(n)	%	N(n)	%	N(n)	%	N(n)	%
1	Electricity	1(1)	100	6(6)	100	6(4)	66	6(1)	17
2	Computer	1(1)	100	6(4)	66	6(4)	66	6(0)	0
3	Printer	1(1)	100	6(6)	100	6(3)	50	6(0)	0
4	Stationery	1(1)	100	6(6)	100	6(6)	100	6(6)	100
5	Vehicle	1(1)	100	6(6)	100	6(0)	0	6(0)	0
6	Motor Cycle	1(1)	100	6(6)	100	6(4)	66	6(0)	0
7	Fax	1(1)	100	6(0)	0	6(0)	0	6(0)	0
8	Telephone	1(1)	100	6(6)	100	6(3)	50	6(0)	0

Feedback

Jimma zone health department has given written feedback for all districts in 2013/14. However this activity was not regularly done for all districts at this level. Many districts give written feedback for health facilities with integration of other activities that consists few indicators of surveillance activities quarterly. In majority of observed districts, producing and dissemination of written feedback for health facilities is very poor. In other hand, PHEM focal persons at zonal and district level have been giving feedback for health facilities orally and writing on their registration book during their field visit.

Supportive Supervision

During the past six months, Jimma zonal department conducted supportive supervision only once on surveillance activities for districts and health facilities. Shortage of vehicle, budget and logistics were attributed for incapability of conducting regular supportive supervision at zonal level. Many districts have conducted integrated supportive supervision for health facilities with limited number of surveillance indicators. Of visited health posts, none of them were supervised regularly in the past 6 months by higher levels. WHO surveillance officers made regular supportive supervision of districts.

Training of Surveillance Activities

Provision of training on disease surveillance, outbreak investigation, Surveillance data analysis and response is the back bone for early detection and control of any health events in this, 2(100%) zonal PHEM focal persons were trained on public health surveillance system. again, 6(100%) of districts and 5(83%) health centers were already get training on surveillance system. While the some HEWs in the health post did not get training regarding some of the components of surveillance.

Laboratory

Districts and health facilities have the capacity to collect and transport biological specimens such as: blood and stool to the national laboratory accompanied with case based reporting form for further analysis and confirmation. Ethiopia Public Health Institute is responsible to test the specimen and inform the result based on the standard time on the national guideline to the national Public Health Emergency Management (PHEM).

Attributes of the Surveillance System

Usefulness

At zonal level, all visited districts and health facilities, it was identified that the current surveillance system is helpful for early detection of outbreaks. Government and non-government organizations have used surveillance data to make decisions and take actions. However, surveillance guidelines were not distributed uniformly in all health facilities and there was poor utilization of guidelines at this level. Respondents at zonal, all visited districts and health facilities believe that the system is good enough to estimate magnitude of morbidity and mortality of selected diseases, identify factors associated with these diseases and able to evaluate of prevention and control programs. However, late or no feedback from central laboratory on sent specimen for confirmatory test has being a challenge in early detection and management of outbreaks.

Simplicity

All respondents at zonal, district and health facility agreed that case definitions of selected diseases (measles and malaria) are easy and applicable for case detection by all level professionals. In all health facilities, 100% of asked professionals were responded correctly for case definitions of selected diseases; malaria and measles. All respondents at each level were familiar with when and for whom report will be sent. PHEM focal persons at zonal and district level thought that additional data collection on cases are not time consuming rather it is important to deal with. Respondents at all level told that it takes 10 - 15 minutes to fill weekly reporting format on morbidity and mortality of priority disease. Similarly, respondents at zonal

and district levels agreed that it takes about 10-15 minutes to disseminate weekly reports through phone.

Flexibility

As the current reporting format contains additional spaces at the end for both weekly and immediately reportable diseases that could be namely and others, it can accommodate newly occurring health events/diseases to fill on without any difficulty. Also, weekly reporting format can be modified based on current situation and different concerns. Existing reporting format was updated in 2009 to include newly emerged diseases such as Avian Influenza, Pandemic Influenza and SARS. Zonal and district level respondents agreed that implementation of National PHEM guideline did not pose difficulty with changes in existing procedure of case detection, case definition and report forms. However, respondents at zonal and most districts and health facilities believe that changes in allocating funds will affect implementation of surveillance system.

Data Quality

Reporting formats of weekly and immediately reportable diseases are well understood at zonal, district and health center levels. But, due to lack of training some health extension workers were observed to be confused with this format. Even though training has been conducted at regional and zonal level for PHEM officers on data quality management, some problems occurred regarding reporting system that resulted from lack of attention. Additionally, reporting sites and data collectors did not supervised regularly. At health post level, due to many health extension workers are not good in English they did not understand some variables and phrases on reporting formats. Major problems identified at different levels on filling reporting format are:

- Date of sent and received, reporter and receiver information did not written on reporting formats
- Blank spaces that should be filled with zero (0) number but not observed at district and health facility level. This problem is insignificant at regional and zonal level

- Duration of activity report(week at which activities were performed) is missed during report compiling mainly at health post level
- Documentation of copies of report in sequential manner is poor at district and health facility levels

Acceptability

Active participation of agents in reporting system of surveillance activities in regular pattern is a major attribute for system's acceptability. In 2006 EFY, PHEM weekly reporting rate was 75% for Jimma zone health department. Of all facilities, NGO and privates are less likely to send weekly PHEM report. This can be due to lack of understanding the relevance of data by these facilities and poor monitoring system of governmental organizations. Also, some governmental institutions did not send a report timely and completely. Different stakeholders like WHO, CDC and others are participating in strengthening surveillance system in collaboration with Regional and Zonal health offices.

Representativeness

Representativeness refers to the degree to which the reported cases reflect the occurrence and distribution of all the cases in the population under surveillance. Geographical representativeness and health service physical accessibility in the zone is particularly greater important in an early warning system to ensure detection of outbreaks nationally notify-able diseases. In addition it is related to the potential health service coverage of visited districts in the zone was above 85-100%, provide that the surveillance system in zone was representative.

Timeliness and Completeness

Timely report of surveillance data is important for early public health interventions. Timeliness is a speed between steps in a public health surveillance system. As per standard of National PHEM the expected level of report timeliness is 80% and above. Early case detection is another key attribute of timeliness assessment. It was unable to describe weekly PHEM report timeliness for districts since date of sent and received were not filled properly at zonal level.

In Jimma Zone, annual average report completeness was **75%** which is below National minimum expected level (80%) in 2006 EFY, among visited sites the highest annual completeness 100% was by Sokoru and the least (60%) was by Limu Seka. (Table 20)

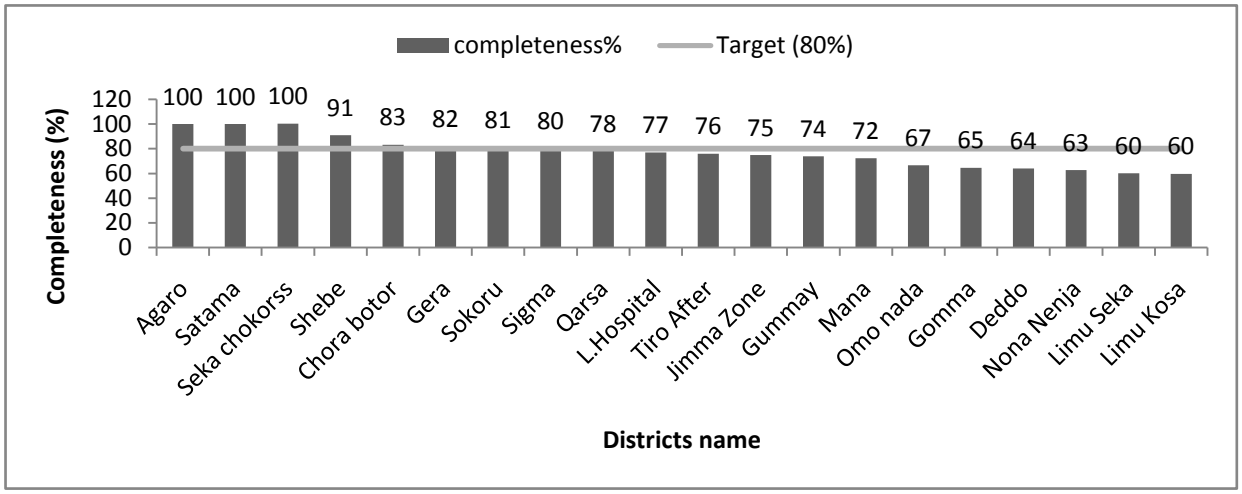


Figure 20: The Average percentage of weekly PHEM report completeness, Jimma, Oromia-2006 EFY.

At some visited health centers, it was difficult to get some copies of weekly PHEM report to assess their completeness. Of six visited health posts, 4 of them sent all (12) weekly report in the last three months (March to May), one sent 11 reports. As regional health bureau the least (78%) in WHO week-1 and the highest (92%) was in WHO week-21.

Sensitivity

Sensitivity is the proportion of cases of a disease (or other health-related event) detected by the surveillance system. It was difficult to evaluate sensitivity of the system without knowing false negatives and positives that identified by the system. Even though there are false positives those are confirmed as negative by Gold Test/Microscope/, there are no false negatives identified by system and later confirmed by Gold test as true negative. Due to this reason, it was difficult to measure sensitivity of the system at each level.

Predictive Value Positive (PVP)

The total number of individuals who are actually with the disease was not determined, therefore we cannot calculate the PVP.

Stability

Stability is reliability and availability of the public health surveillance system without interruption. Some lines of budget are available at regional level from donors which enhance PHEM activities. Availability of PHEM focal persons at Zonal, district and Health facility level is a good opportunity for running surveillance system even with limited resources. Except a few budget distributed for specific activities for zone and some districts, there is no specific budget line/source for surveillance activities at zonal and district level. Shortage of budget and logistics is hindering supervision and capacity building activity at zonal and district level.

Discussion

The main goal of performing public health Surveillance is to assess the health status of the community, establish public health priorities and reduce the burden of disease in a community by making necessary public health actons.

Epidemic preparedness refers to the existing level of preparedness for potential epidemics and includes availability of preparedness plans, stockpiling, designation of isolation facilities, setting aside of resources for outbreak response. There is no written epidemic and preparedness and response plan at all visited districts. This may cause weak case detection and response during epidemics. The aim of preparedness is to strengthen capacity in recognizing and responding to public health emergencies through conducting regular risk identification and analysis, establishing partnership and collaboration, enhancing community participation and implementing community-based interventions and strategic communication during the pre-emergency phase and ensuring their monitoring and evaluation [3]. Feedback is a key function of public health surveillance system. At all visited level there is no strong written feedback. As region and zone are essential role player in preparing and disseminating feedback of surveillance activities for zones and districts in different method, it was not done well mainly in written forms. Current

practice of the region on preparation and dissemination weekly bulletin is a good starting point to strength feedback system.

Absence of budget line either from government or non-governmental organizations for surveillance activities at zonal and district level is remains a major problem to run tasks under PHEM towards their objectives. Additionally shortage of resources for data management is being a challenge to generate and disseminate PHEM reports timely through maintaining their quality. Visited districts and health centers have a capacity to collect, handle and transport specimen of measles to central laboratory which is an opportunity for early case detection and management.

There were no problems on the simplicity of the system regarding case definitions of selected diseases, reporting system and additional data collected on cases at all visited levels. It was agreed by all respondents that the surveillance system is flexible for newly occurring health and health related events. Reporting formats of priority diseases are easy and clear to fill for data collectors at zonal level however, some gaps were observed on quality of reporting system at district and health facility levels. This problem is high at health post level since health extension workers did not get training on surveillance activities. Timeliness and completeness of report is important for timely public health interventions. Except in some districts and health facilities, the average annual completeness of weekly report at zonal level is below expected national level (80%). Due to poor handling and management of data, it was unable to get timeliness of districts at zonal levels.

Conclusion

Periodic assessment of public health surveillance system is a key activity to identify strengths and weakness of the existing system. This will be more effective if it was done in collaboration with key stakeholders. In Jimma zone the surveillance system was not satisfactory and efforts should be exerted to improve the system mainly on supervisory activities, proper and timely feedback, data management and analysis of prioritized diseases. Finally, the surveillance system of measles and malaria are usful to detect outbreaks, estimate magnitude of the morbidity and mortality of the disease in the area. These surveillance systems are simple and flexible and well accepted by all assessed sites.

Limitations

Sometimes there was electric power interruption at zonal and some districts to collect and generate requested data.

Lack of reporting agencies document that shows the time of report

Recommendations

Training should be given for health extension workers on surveillance activities to improve active case search and reporting system. Data quality assessment should be conducted at all levels as many problems were identified on reporting system during this evaluation. Data analysis for prioritized diseases at district and health facility level should be performed regularly. Utilization of National PHEM guideline and different manuals for management of prioritized diseases should be optimized at all levels; mainly at health facilities. Results of laboratory confirmation should be communicated to the Districts and health facitlty on timly basis. Strong supportive supervision and feedback should be maintained in regular basis at all levels.

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CHAPTER-IV

Health Profile Description Report

3.2. Boset District Health Profile Descriptions, East Shewa Zone, Oromia Region, Ethiopia,2012/13

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Abstract

Introduction: Health profile description is a system of collecting, organizing and summarizing health and others health related events to describe health and others health related conditions. We conducted district a health profile description to summarize the health and health related profile of Boset District.

Methods: we conducted a cross-sectional descriptive study in Boset District, East Shewa Zone-March, 2014. We used Interview and standard check-list to collect health and other health related data from the district offices: Health, Agriculture and Rural Development, Water, Education, Culture and Tourism, and other sector offices of the district. Data were compiled and analyzed using Microsoft Excel-2007.

Results: Boset District was established in 1939 and 125 kilometers away from Addis Ababa. Boset District has 33 rural, 5 urban, and 4 government Farm Kebeles. The projected population of the district for 2013 was 169,467 of which 86,357 (50.5%) were females. Around 85% of the populations were living in the rural areas. Boset District has 72 primary schools with 36 1st cycle, and 36 2nd cycle and 4 secondary schools. A total of 34,887 students were enrolled to school with nearly equal ratio of (1:1) male to female in 2012/13. Primary health care coverage was 100% with 7 Health Center, 33 Health Posts, and 2 Government Farm Clinics. The proportion of pregnancies received ANC service were 117% and delivery attended by skilled health personnel was 28% in 2012/13. Acute febrile illness was the top leading causes of morbidity both in adult and pediatric OPD visits with 21% and 19 % respectively. Malaria is endemic in the district; ranking 2nd and 5th as top leading causes of morbidity in adult and pediatric OPD respectively and its prevalence was 4%. Of 23,938 clients screened for HIV 1% were positive for HIV.

Conclusions: Acute febrile illnesses (AFI) were the leading cause of morbidity in both adult and pediatric OPD. Malaria was ranking second among adults in the outpatient department and still within top 10 causes of morbidity in children less than five years. We recommend proper utilization of ITNs should be encouraged; TB detection has to be improved. Antenatal care and delivery attended by skilled health personnel has shown improvement but more work needs to be done on further improvement. Attention should be given to improve mothers and child health and public awareness has to be enhanced regarding HIV transmissions and sanitation and hygiene practice in general.

Key words: District Health profile, Boset District, East Shewa Zone, Ethiopia.

Introduction

Health profile description is a system of collecting, organizing and summarizing health and others health related events to describe health and others health related conditions such as demographic, socio-economic, political, cultural and others aspect of a particular geographic areas of interest, and are useful for designing and preparation of development plans as well as for monitoring and evaluation of the impact of the implementation of the development plans. It is known that the health and socioeconomic well being of the community are fundamentally connected to their natural and built environment. It is difficult to prepare meaningful developmental plan (4). The main sources of data used for the preparation of the document was district administration, Culture and Tourism, Health, Educational, Water Resource and Energy Office and Finance Office.

In epidemiologic point of view, it is crucial to prioritizes health and others health related condition occurred within the communities. These summarized and prioritized data is important for public health surveillance officials, as they can uses it as a baseline for planning, implementation and evaluation of public health surveillance program conducted at communities level. Therefore, the main objectives of this document are to present compiled information concerning physical and socio-economic condition of the district and its health profile constraints. The document covers almost the data and activities of the period on 2012-2013.

Rationale of the Study

It is very crucial to prioritizing prominent health and health related problems of the community in any level. It is fundamental for planning and helps to provides appropriate intervention and will be an entry point for operational research. It is know that there is no compiled information on the district health profile before; a well compiled district health profile will help to access evidence based information and hence, it will deliver broad overview of demographics, social, economic and geographic status and also will help to produce a health profile document for Boset District East Shewa Zone, Oromia Region.

Objectives

General Objective

To assess and compile the health and health related profile of Boset District, in Oromia Region, 2012/13.

Specific Objectives

- To describe the demographic, social, economic and geographic profile of the district.
- To determine the diseases burden and priory health problem of the district
- To set baseline health profile for the district

Methods

Study Area

The study was conducted in Boset District, East Shewa Zone, Oromia Region; the district has an estimate total population of 169,467 as of July 1, 2013 population projection.

Study Period

Data was collected, entered, analyzed and interpreted from March - May, 2014

Study Design

A cross-sectional descriptive study was conducted that included interview and standard check-list were used to collect data from Health, Agriculture, and rural Development, Water, Education, Culture and Tourism, and other sector offices of the district.

Study Population

Total population of the Boset District

Data Collection Procedures

Both qualitative and quantitative data collection mechanisms were used, such as key informant interview by using semi-structured questionnaire, and reviewing of legally approved documented reports and documents. Questionnaires were adapted from WHO (Annex 4).

Ethical Consideration

Written support letter from the Regional Health Bureau and zonal health department was obtained prior to the arrival to the study area.

Data Dissemination

Upon completion of this study finding the study will be communicated through power point and submission of hard copy and electronic copy to East Shewa Zonal Health office, Boset District Health Office, AAU (SPH), further effort will be made to publish on scientific journal but, the oral feedback was communicated to the district health office.

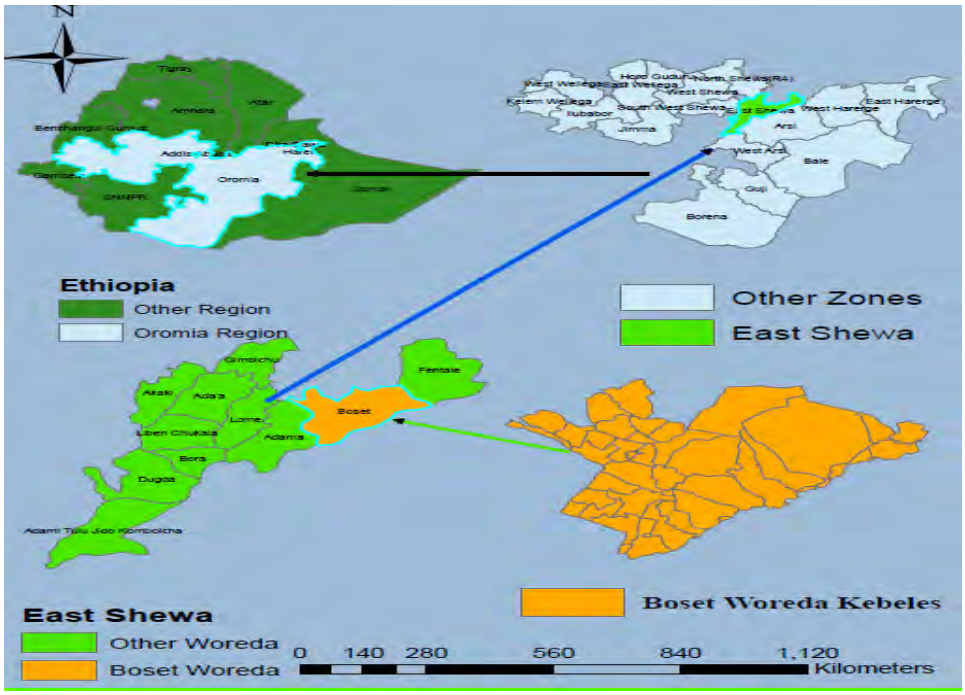
Results

Historic Aspects and Establishment of Boset District

Boset District has been established as an independent district in 1993 which was earlier merged with other district as Adama-Boset District. The name Boset has come from, ones up on a time "a woman has begged the God to give her child and she had got child finally she brought this child to elders in her village and ask them to propose name to her child and they called him name as 'Boset'" The Capital Town "Welenchiti has established in 1944. (**Source:** Boset District Culture and Tourism Office, 2012/13).

Geography and Climate

Boset District is one of the district in East Shewa Zone, located 125 kilometers in the south East from Addis Ababa and the district has a total of land mass of 1450 square kilometer. The Capital Town of the district is Welenchiti Town. The district is bounded on South Arsi Zone, on North Amhara Regional State, on West Adama District, and on East Fentale District. The overall elevation of the district with an Altitude of 1050 meters and 2500 meters above sea level. Average annual rain fall and temperature varies from 600-900mm and 12^0C-34^0C respectively. There are three climatic conditions in the District, 79% Low land "Kola", 20% Mid-land "Woyinadega", and 1% high land "Dega".



Map 5: Map of the Boset District, Ethiopia, 2012/13

(Source: prepared by: ARC GIS)

Administrative and Political Structure

Boset District has a total of 42 Kebeles (33 rural and 5 Urban) and 4 Government Farm Kebeles. All Sector offices located in capital town Welenchiti.

Demographic Information

Boset District has a total population of 169,467 in 2012/13 (projection 2007 census), of these 86,357 (50.5%) are Female and 88,101 (49.5%) were Male; male to female ratio was 1:1. Urban and Rural residents are 26,724 (15.3%) and 147,734(84.7%) respectively. Out the total population 5,932 (3.4%) were under 1 year, under 5 years were 28,611(16.3%) and women of child bearing age 15-49 years accounts 6,455 (3.7%) of the District population.

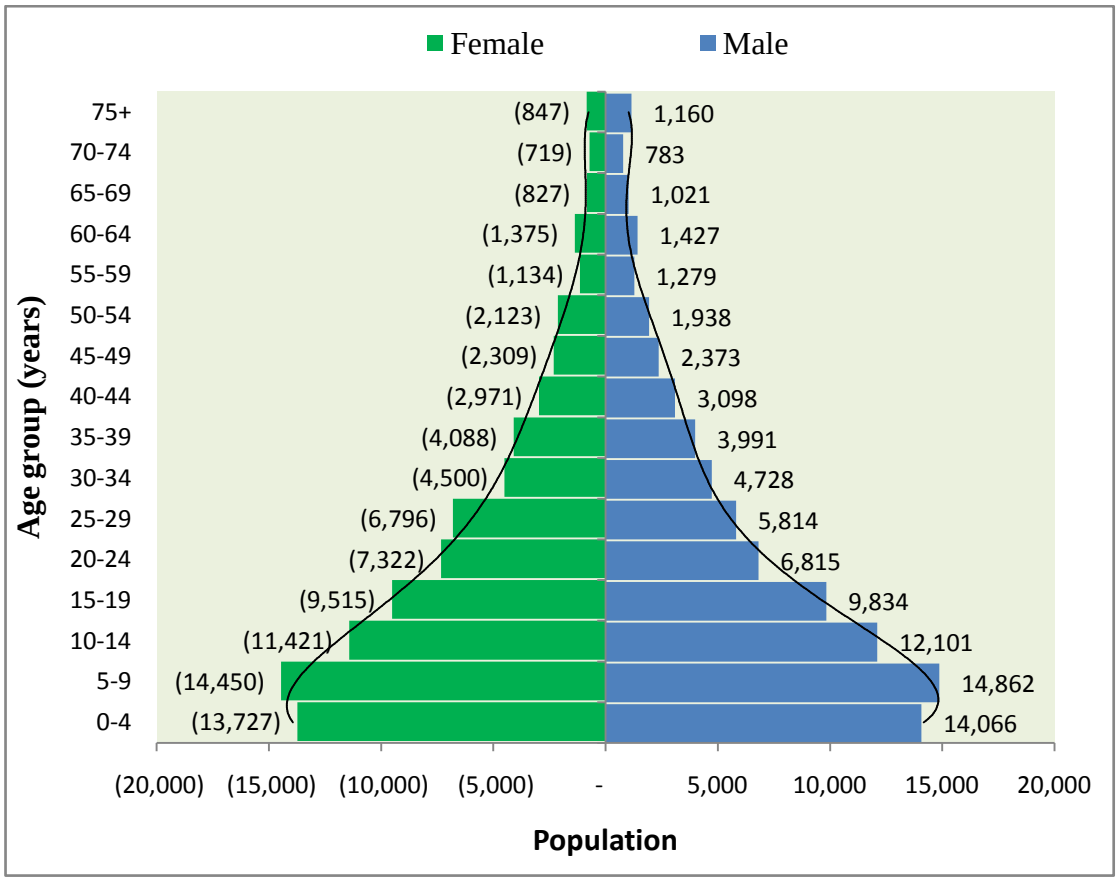


Figure 21: Population pyramid of Boset District, Ethiopia, 2012/13

Ethnic Compositions

Oromo ethnic is the majority in the district and it constitutes 80 % and the other 20% constituted for Amhara and other ethnic groups. Afan Oromo language is the dominant that most people speak it and it is the official language in the district.

Productivity and Income

The rural community income is based on agricultural products. Taffe, Maize, Haricot bean, Wheat and others are the commonly cultivated crop products in the district. An estimated 40,177(27%) Hectors of land was used for cultivation and the rest were about 3,724 hectors of land was used by state farm (Nura Erea; which is owned by Government investment) and nearly half of the land mass of the district remained as a bush land. (Source: Boset District Agricultural and rural development office, 2012/13)

Education and School Distribution

In 2012/13(2005 EFY) Boset district has a total 77 schools, 76 (98.7%) were Government schools while 1(1.3%) were private school. There are total of 660 teaching staff with respective qualification; 61(6%) accounts for TTI, 429(65%) Diploma, and 107(16%) were holding ther Degree. Of 34,887 students enrolled during 2005EFY: 18,301 (52.4%) were males and 16,586(47.5%) were females with annual promotion rate of 63.1%, dropout rate was 9.31%. Regarding school health all of the schools have latrine with only 4 of them have separate for male and female. All of schools have clubs such as: anti-HIV/AIDS, natural resources, music, and sport clubs**. (Table 12)**

Table 12: Distributions of schools, teachers and students in Boset District-Ethiopia,2012/13.

Levels	N^{o} schools	Type	N^{o} of teachers				N^{o} of students			Ratio Male: Female	%age
			TTI	Diploma	Degree	**Total**	Male	Female	**Total**		
1-4	36	Government	43	147	2	192	11,950	10,686	22,636	1:1	65
5-8	36	Government	14	321	12	347	4,429	4,439	8,868	1:1	25
1-8	1	Private	4	15	1	20	136	149	285	1:1	0.8
9-10	3	Government	-	8	75	83	1619	1218	2,837	1:1	8
11-12	1	Government	-	1	17	18	167	94	261	2:1	1
Total	**77**		**61**	**492**	**107**	**660**	**18,301**	**16,586**	**34,887**	**1:1**	**100**

Source: Boset District Education Office, 2012/13.

Infrastructures (Public Service Facilities)

Communications

The wireless net-work coverage is 100% across the District. There are small towns such as Doni, Bole, Bofa, Nura era, and the capital town Welenchiti, all of them have an automatic telephone services. Almost all Kebeles have got wireless telephone services.

Transportations

Overall there is 5772.2 Kilometers (Kms) of all types of road, of which a total of 203 Kms all weather type roads in the district of these 46kms is the main asphalt that cross the district from Addis Ababa to Djibouti, 45.5 KMs is Gravel road that connect rural Kebeles and towns to the district and 111.7 KMs long Gravel road. There are also 1262.7 Kms of dry weather road (427 Kms length are feeder road, while 835.7 Kms length are dry weather road). Regarding health facilities all (100%) Health Centers have roads and 31/33 (93%) of Health Posts have accesses to the road.

Water Supply

In Boset District a total 93,583 (66%) of the population in all town kebeles and 30 rural kebeles have potable water supplies. In the district there are 19 deep well that serve 19 kebeles, 11 kebeles have spring water. The total water coverage was 71% by kebeles in 2012/13, this includes that, all of health facilities have water supply.

Energy Supply

Biomass, Electric Power, and Solar Energy are the main sources in the district. In Boset District 8 town kebeles and 23 rural kebeles have 24 hours electric power supply with this 110,681(63.5%) of the population. Among rural 83,957(57%) and urban population were 26, 724 (100%). The rest 10 rural kebeles (23%) were using solar energy.

District Health System

Organization of Boset District Health Office (Organogram)

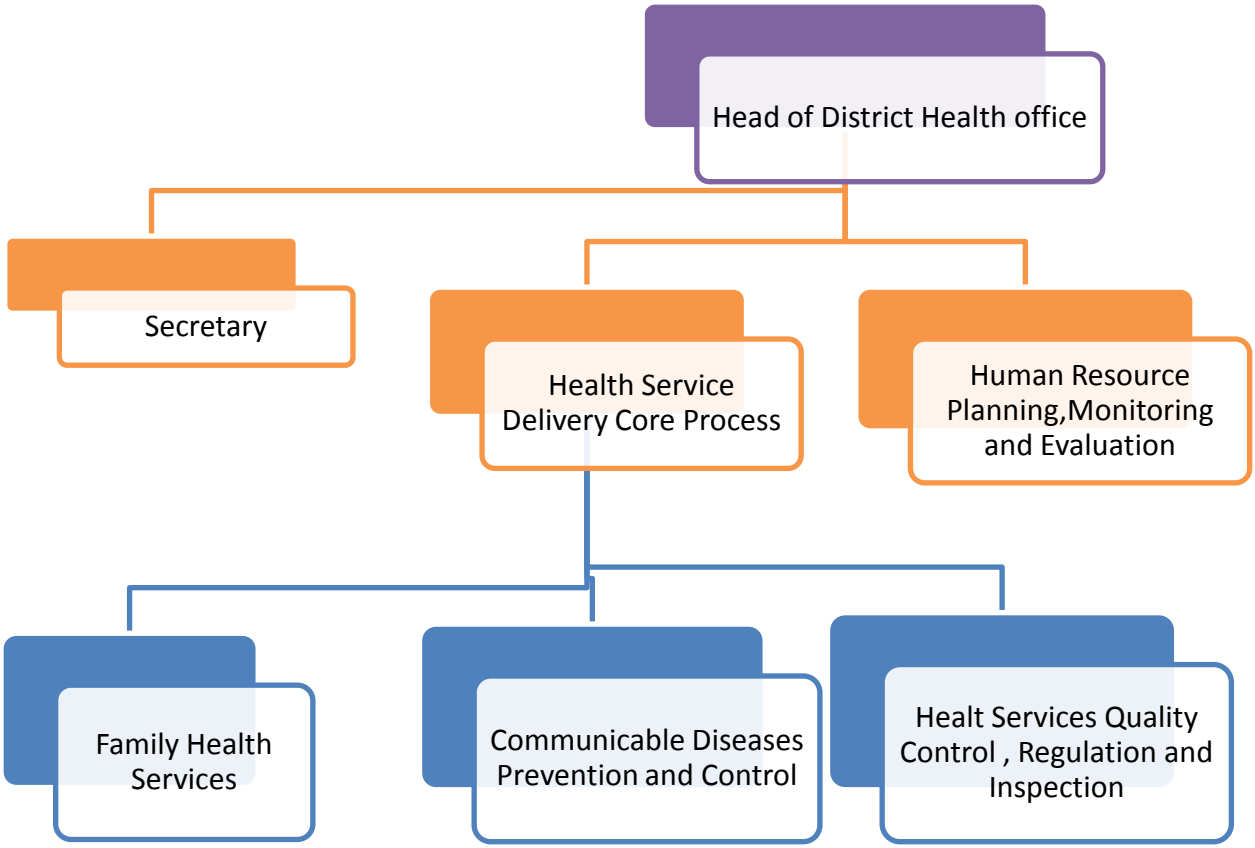


Figure 22: Organo-gram of Boset District, Ethiopia, 2012/13

The District Health Office was well structured and member of the district administrative cabine. The potential health coverage of the district was 100%; estimated from seven functional health centers and 33 health posts. One health center provides VCT, PMTCT, PIHTC, and ART follow up services. **(Table-14)**

Table 13: Available health facilities by type, Boset District, Ethiopia, 2012/13

S/N	Type	Number	Health Facility: Population Ratio	Remark
1.	Hospitals	1	-	Under construction
2.	Health center	7	1:24,922	
3.	Private HF small clinics	19	-	
4.	Private HF medium clinics	1	-	
5.	Drug store	3	-	
6.	Drug vendor	6	-	
7.	Health posts	33	1:5286	
	Total	**70**		

Health Indicators and Vital Statistics

Health indicators and vital statistics are important for estimation of the district's or country's development.

Table 14: Distribution of vital statistics in Boset District, Ethiopia, 2012/13

S/N	Indicators	Number	Percent
1.	Total population	169,467	100
2.	Male	85,242	50.3
3.	Female	84,225	49.7
4.	Under 1 years old	5,762	3.4
5.	Under 5 years old	27,793	16.4
6.	Women 15- 49 years old	6,270	3.7
7.	Pregnancy women	6,779	4.0
8.	Urban	25,928	15.3
9.	Rural	143,539	84.7
10.	Total live births	5,762	3.4
11.	IMR	59/1000 live birth[1]	-
12.	Under 5 MR	88/1000 live birth [1]	-

[1] EDHS-2011

Mothers and Child Health Services

Immunization Status

Both static and outreach immunization services was conducted in 2012/13. Of 5,711 targeted population, immunization coverage for children under one years of age was 102% for BCG, 112% for Penta 1, 104% for Penta 3,110% for PCV1, 102% for PCV3, 96%, and 95% for measles and fully vaccinated respectively. **(Table- 15 and Figure-23)**

Table 15: Immunization status of Boset District, Ethiopia, 2012/13

S/N	Activities	Target	Achievements (%)
1	BCG	5711	5852 (102)
2	Penta 1	5372	6030 (112)
3	Penta 3	5372	5606 (104)
4	Measles	5372	5152 (96)
5	Fully Vaccinated	5372	5120 (95)
6	PCV 1	5372	5888 (110)
7	PCV 3	5372	5493 (102)

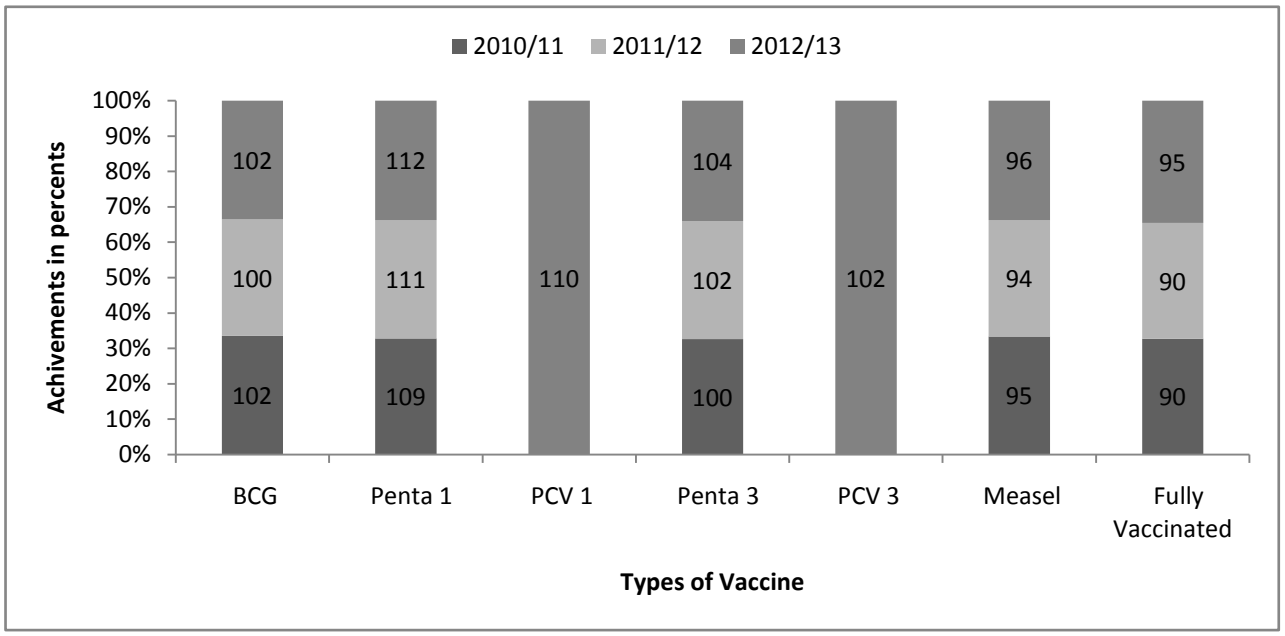


Figure 23: Trends of immunization status of Boset District, Ethiopia, 2010/11-2012/13

Mothers Health Services

Antenatal care (ANC) performances was over achieved 117% (7316/6270) pregnant women were received the services. 28 %(976/3457) of deliveries were attended by skilled health personnel in the district. **(Table-17and Figure-25)**

Table 16: Distribution of mothers' health services in Boset District, Ethiopia-2012/13.

Activities	Target	Achievement (%)
Family Planning(FP)	31181	22322(72)
Antenatal Care (ANC)	6270	7316(117)
Delivery	3457	976(28)
Post Natal Care (PNC)	5711	4739(83)

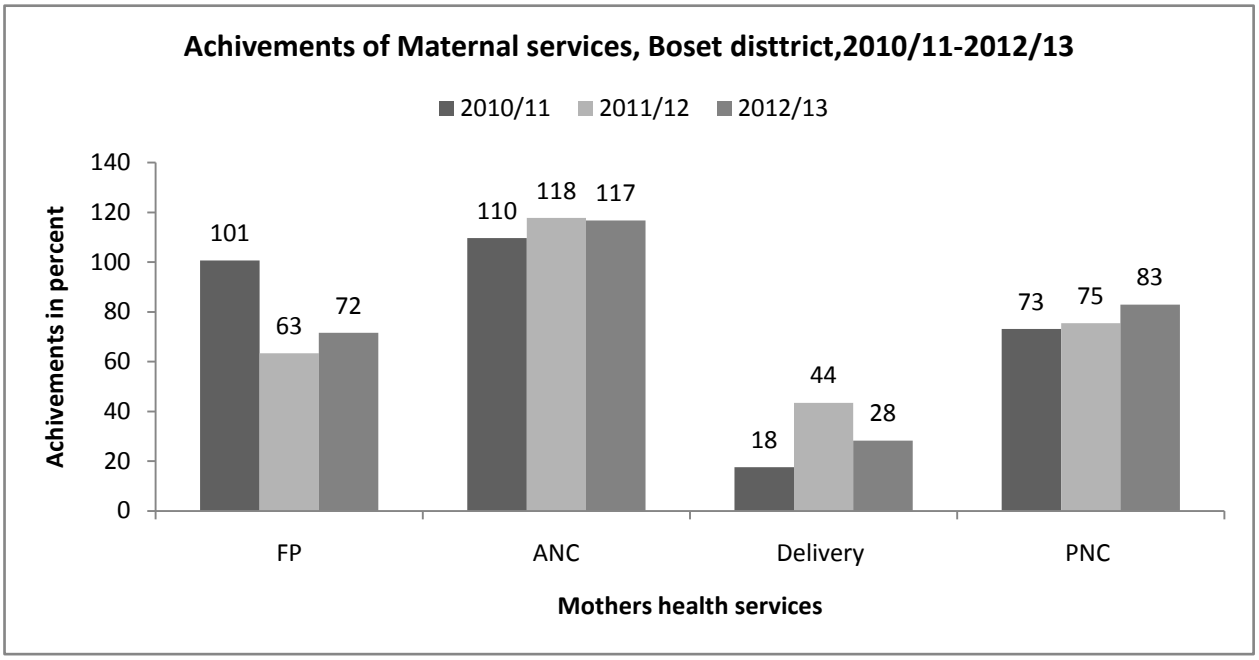


Figure 24: Status of mothers' health services in Boset District, Ethiopia, 2010/11-2012/13

Sanitation and Hygiene

Boset District latrines coverage increased from 4416/5289 (83%) in 2011/12 to 30146/35306(94%) in 2012/13 and there was no document on latrine utilization rate in the district.

Health Education

Health education was provided for a total of 125,000 people or 26041 households on different health issues like environmental sanitation, PMTCT, FP, ITNs utilization, and others public health concerns in 2012/13.

Morbidity (Out-Patient and In-Patient)

Acute febrile illness (AFI) 12067 (21%) followed by malaria (all types) 8875(15%), and acute upper respiratory tract infection (AURTI) 7370(13%) were the top three causes morbidity in adults outpatient department visit in Boset District 2012/13**. (Table-17)**

Table 17: Top ten causes of morbidity in adult OPD in Boset District, Ethiopia, 2012/13

S/N	Types of Diseases	Number of Cases	Percent
1	Acute febrile illness (AFI)	12,067	21
2	Malaria(all types)	8,875	15
3	Acute upper respiratory tract infection	7,370	13
4	Urinary tract infection (UTI)	6,304	11
5	Helminthiasis	4715	8
6	Diarrhea (non bloody)	4,616	8
7	Typhoid fever	4,004	7
8	Pneumonia	3,896	7
9	Acute bronchitis	3,563	6
10	Infections of the skin and subcutaneous	3,330	6
	Total	**59,351**	**100**

Regarding under five outpatient visit pneumonia 3649(21%) followed by upper respiratory tract infection 3266(19%), and acute febrile infection were the top three causes of morbidity in under five children outpatient visit in Boset District in 2012/13. **(Table-18)**

Table 18: Top ten causes of morbidity in <5 OPD in Boset District, Ethiopia, 2012/13

S/N	Types of diseases	Number of cases	Percent
1.	Pneumonia	3,649	21
2.	Acute upper respiratory infection (URTI)	3,266	19
3.	Acute febrile infection (AFI)	3,213	19
4.	Diarrhea (non-bloody)	2,942	17
5.	Malaria(all types)	1,290	8
6.	Helminthiasis	1,058	6
7.	Otitis	633	4
8.	Infections of the skin and subcutaneous tissue	493	3
9.	Other or unspecified diseases of the eye and adnexa	345	2
10.	Other or unspecified infectious and parasitic diseases	251	1
	Total	17,140	100

Relapsing fever was the leading causes of admission that accounts for 92% of overall admitted cases followed by malaria 3%, typhoid fever 2%, and the others constitute 1% each. (Table 19)

Table 19: Top 6 leading causes of admission in In-Patient, Boset District, Ethiopia, 2012/13

S/N	Types of diseases	Number of cases	Percent
1.	Relapsing fever	88	92
2.	Malaria	3	3
3.	Typhoid fever	2	2
4.	Dental and gum diseases	1	1
5.	Other or unspecified diseases of digestive system	1	1
6.	Poisoning	1	1
	Total	**96**	**100**

Endemic Diseases

Malaria

Malaria is endemic in the district throughout the year. About 100% of kebeles of the district are malarious in which the total population is at risk of being infected by malaria. In the last nine years the highest number of malaria cases (8611) was reported in 2011/12. **(figure-25).**

The District Health Office has applied indoor residual spray (IRS) in all kebeles and insecticide treated bed nets (ITNs) distribution was conducted and the ITNs coverage is 100% in Boset District in 2012/13. Incidence per 100,000 population at risk was (4,203/100,000 population) and/or annual prevalence of 4% 2012/13.

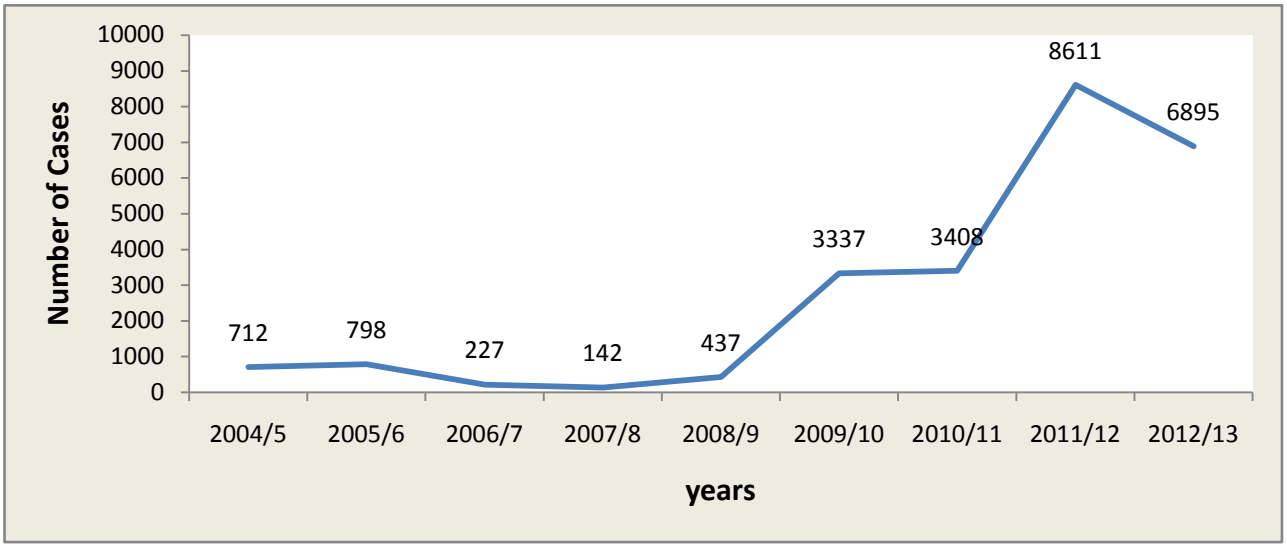
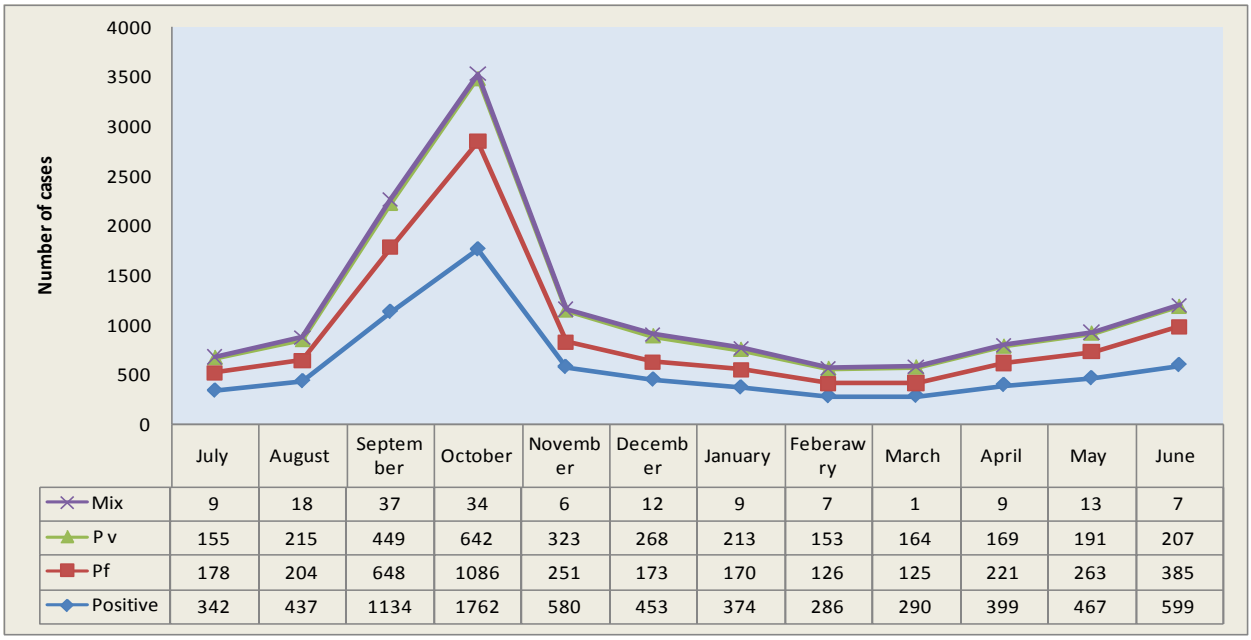


Figure 25: Trends of confirmed Malaria cases over time (nine years) in Boset District, Ethiopia, 2004/5-2012/13

The dominant species of malaria parasites was *P.falciparum* (54%), *P.vivax* (44%), and 2% were mixed species of plasmodium and the peak month was October, and with highest incidence rate=1%. There was no shortage of anti-malaria drugs to treat malaria cases. **(Figure 26)**



	July	August	September	October	November	December	January	Feberawry	March	April	May	June
Mix	9	18	37	34	6	12	9	7	1	9	13	7
P v	155	215	449	642	323	268	213	153	164	169	191	207
Pf	178	204	648	1086	251	173	170	126	125	221	263	385
Positive	342	437	1134	1762	580	453	374	286	290	399	467	599

Figure 26: Monthly trends of malaria cases by species, Boset District, Ethiopia, 2012/13

Tuberculosis (TB), and Leprosy

A total of three hundred ninety two (392) tuberculosis (all forms) cases were reported to the district in 2012/13. From the total all forms of TB cases, 117 pulmonary tuberculosis (PTB) negative, 135 PTB positive, and 140 were extra PTB. The district TB detection rate was 53% with 91% and 98% for TB cure rate and treatment success rate respectively. The annual TB (all forms) case notification rate was 231 per 100,000. There was one defaulter, three transferout, and one death from TB treatment in 2012/13. Out of 341 all forms of TB cases screened for HIV 43(12.6%) have TB-HIV co-infection. A total of 8 leprosy cases with grade II disability (MB and PB) newly diagnosed leprosy cases, of these 4 of them completed treatment, and one treatment defaulter leprosy cases.

Human Immuno-Deficiency Virus (HIV)/ Acquired Immune Deficiency Syndrome (AIDS)

A total of 23,930 clients were screened for HIV antibody tests in VCT,PIHTC and PMTCT testing point in different health facilities in the district ,of these 10,528(44%) were male while the rest 13,402(56%) were female**. (Figure-27).** From all HIV rapid test screened clients

244/23,930(1%) were positive for HIV antibody tests from these 127(52%) were male, and 117(48%) were female subjects. Majority of the screened cases were with age greater than 25 years old. HIV prevalence and incidence was 0.99% and 0.14% respectively in the district's general population. **(Figure-28)**

Of total 3,923 pregnant women attending antenatal care(ANC) screened for HIV in PMTCT site 22(0.56%) were positive for HIV antibody and all of them linked to ART as well all of them received full course of HIV prophylaxis and attended skilled delivery in the health facilities. **(Figure-29)**

A total of 1,441 people living with HIV/AIDS (PLWHA) where all of them are received ART services.

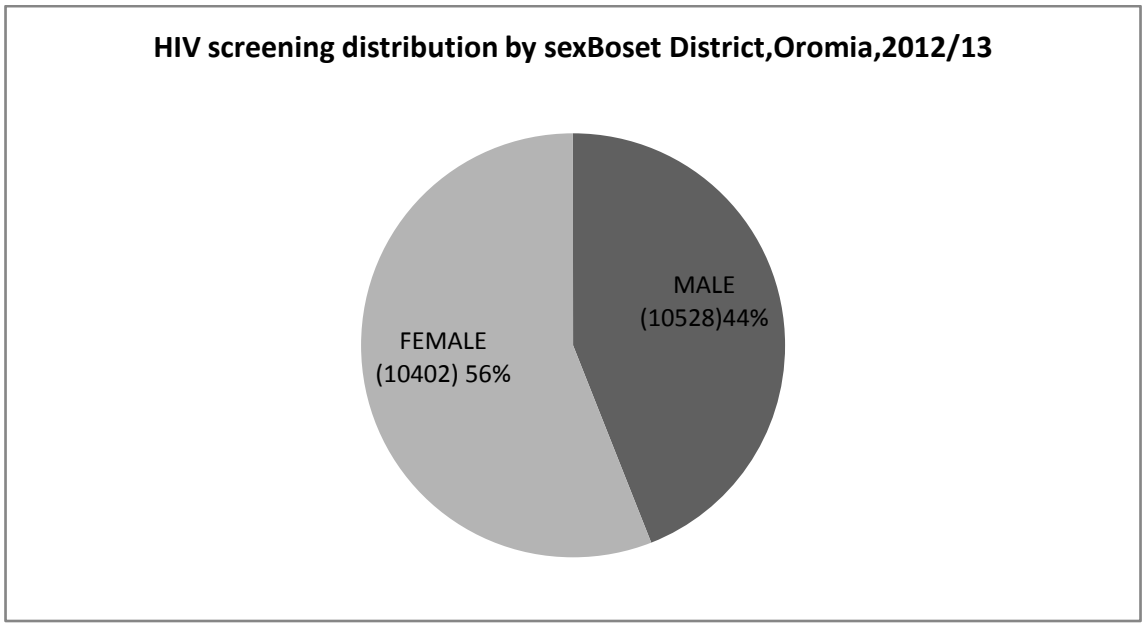


Figure 27: Distribution of total clients screened for HIV test by sex in Boset District, Ethiopia, 2012/13

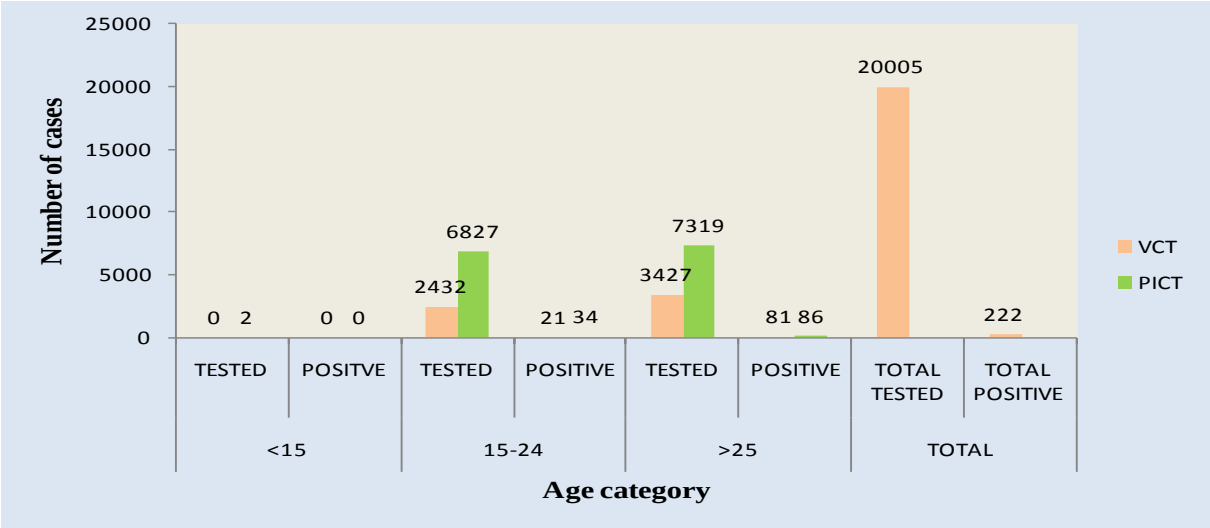


Figure 28: Distribution of HIV screened clients by age category in Boset District, Ethiopia, 2012/13

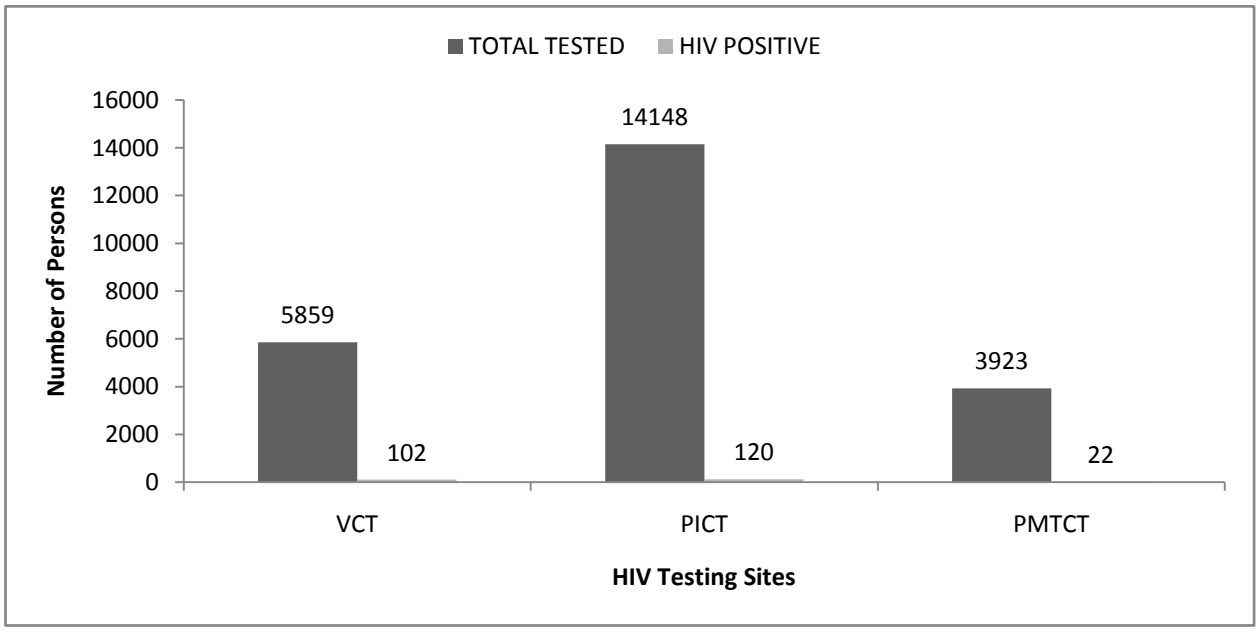


Figure 29: Distributions of all screened clients and HIV positive in different sites in Boset District, Ethiopia, 2012/13

Nutritional Status of the District

There was 41 outpatient treatment program (OPT) sites, and 3 stabilization center (SC) in the district in 2012/13. A total of 1,164 children (age between 6-59 months) were admitted in OPT sites within the district and there was no devastating malnutrition problems occurred in the district.

Disaster Situation in the District

There was no devastating disaster in the district in the last three years but, in 2013 there was 3 times (on 31-July-2013, 11-Augest-2013, and 28-Augest-2913) flood hit a total of 9 Kebeles: 2 kebeles of (01, 02) Welenchiti Town (capital of Boset District) and 7 rural kebeles surrounding Welenchiti, with an estimated 20,694 people (3,001 households) was displaced. An estimated 90 Hectors of land has been flooded and ruined residents' property with an estimated amount of 1,034,572 ETB. The District Disaster Preparedness Prevention and Relief (DPPR) Office in collaboration with the regional DPPR Office and other stakeholders was playing role in resettlement of the affected population. They have tried to handle the situation, and there was no loss of human life by these occurrences. (Source: Boset District Disaster Preparedness and Prevention Office, March, 2014).

Budget Allocation for Health Sectors

In 2012/13 the budget allocated for health activities (all kinds of activities) from Government Finance was 5,172,167 Ethiopian birr (ETB), and 1,243,474.49 ETB from Funding Agencies (WHO, UNICEF, Global Fund, and other funding agencies). Currently in 2013/14 the Government Budget alone has increased by, 31% as compared to the previous year.

Human Resources for Health Facilities

There are a total of 252 staffs working in government health sector in which all health facilities were staffed with all types of professionals and each facility has their own communication system with the district health office, **(Table 20).**

Table 20: Human resources working in Boset District health system, Ethiopia, 2012/13

S/N	Type		Number	Total /type	HW: Pop Ratio	Remark
1.	Physicians		0	-	-	No physicians
2.	Health Officers		15			
3.	Nurses	Clinical Nurses BSC	5	43	1:4,057	
		Clinical Nurses Diploma	37			
		Public Health Nurses(Diploma)	1			
4.	Midwifery nurses	Midwifery Nurses (BSC)	1	16	1:10,903	
		Midwifery Nurses (Diploma)	15			
5.	Laboratory	Lab. Technologists	1	11	1:15,859	
		Lab. Technicians	10			
6.	Pharmacy	Pharmacist	3	8	1:21,807	
		Druggists	5			
7.	Biologists		2	2		
8.	Environmental Health	Environmental Health (BSC)	2	4	1:43,614	
		Environmental Health (Diploma)	2			
9.	HEWS	Health Extension Workers (Rural)	71	71	1:2080	
		Health Extension Workers (Urban)	7	7	1:3817	
10.	HMIS		7	7	1:24,922	
11.	Others Supportive staff (TBA...)		68	-	-	
	Total		**252**	**252**		

Discussion

Acute febrile illnesses (AFI) were the leading cause of morbidity which accounts for 21% of top ten adult OPD visits and ranking 3rd (19%) in children (under 5 year) OPD.

Malaria was ranking second (15%) among adults in the outpatient department and still within top 10 causes of morbidity in children less than five years but, there was no death due to malaria this might be explained as; improvement in health services as well 100% ITNs distribution in the district plays great role in minimizing the risk of suffering from malaria, but still needs to encourage utilization of ITNs for its better reduction of morbidity.

Relapsing fever was the leading causes of admission (91%) in the district this might be due to that people might come to the district for job searching as daily laborer during the harvesting

time and face and residing in crowding environment. Consistent with study conducted on LBRF outbreak occurred in Boset District June, 2012-November, 2012 (9).

The district TB-cure and treatment success rates are on track toward targets, but Tuberculosis detection rate remains behind plans (75%). The current district TB detection rate was 53% which is higher than the regional case detection rate 39% in 2011 and national TB detection rate 34% but, still below 70% which is recommended by World Health Organization (WHO) (7). In 2012/13 a total of 392 all forms of TB cases diagnosed and reported to the Boset District health office with an estimated TB prevalence of 231/100,000 population. This is less than national prevalence 258/100,000 population for all forms of TB (6, 7). The TB cure rate (91%) less than the target (95%) set for the year 2012/13 and treatment success rate (98%) which was higher than the national target (95%) set for the year 2012/13(2005 EFY) (8).

Total HIV prevalence among 15-49years of age was HIV 0.14% in 2012/13 which is much lower than regional prevalence that was 1.9% in 2011(5). Incidence was particularly 0.8% at PIHTC site. The explanation for this was low initiation of health workers at OPD site than those working at VCT and/or PMTCT. An estimated Prevalence of HIV in pregnant women attending ANC was 0.32% which is relatively less than 4% of the national prevalence of 2007 ANC HIV sentinal surveillance (5).

There was sustainable immunization coverage even higher than 100% in some immunization programs in the year targeted to children less than one year old to prevent suffering from vaccine preventable diseases. This might be due to increased visits of the health facilities from the neighboring districts where children are coming to the district to get these health services.

Even though, latrine coverage was showing improvement to 94% in 2012/13; Diarrhea and Helminthiais are still in the lists of top 10 leading causes of morbidity in both adults and under 5 children OPD this suggests that, there were no proper utilizations and low awareness of sanitation and Hygiene practices in the district.

Contraceptive prevalence rate (CPR) in the district was 72% in women age 15-49 years, which is higher than the regional coverage 61.7% in 2011(2). The overall provision of safe water supply

was improved to 71% in the district this is because broken deep well water was repaired in addition to newly constructed water supply.

Antenatal care coverage for at least one visit was 82% which was higher than the regional coverage (79%) in 2011. Although the deliveries attended by skilled health personnel were improved to 28% it is much lower than the HSDP-IV target (62%) by district was improved (1, 7). Severe malnutrition was among the leading causes of admission in the district with the prevalence of 4.6%, which is greater than the regional prevalence that was 3%.

Limitations

- Lack of some data such as: Mortality, Admission…etc.
- Incompleteness of data
- Lack of enough literature about district health profile description

Conclusions

Acute febrile illnesses (AFI) were the leading cause of morbidity in adult OPD visits and ranking 3rd in children under 5 year followed by malaria and upper respiratory tract infection. Highest ITNs distribution and IRS was conducted in the district in the prevention and control strategy for malaria transmission. Relapsing fever was the leading causes of admission in the district. Tuberculosis detection rate of the district was higher than the regional case detection rate in 2011. An estimated Prevalence of HIV in pregnant women attending ANC was 0.32%. There was sustainable immunization coverage. Latrine coverage was showing improvement, Contraceptive prevalence rate (CPR) in the district was 72% in women age 15-49 years. Antenatal care coverage for at least one visit was increased. Severe malnutrition was among the leading causes of admission in the district. The overall provision of safe water supply was improved.

Recommendations

1. TB detection rate should be encouraged to achieve a level recommended by national level which is 70% and above.

2. ITNs coverage was 100% in the district but malaria remains the main public health problem as it was indicated in top 10 causes of morbidity, therefore, HEWs and other health workers should emphasizes on proper utilization of it.
3. Although, Latrine coverage was showing improvement 94% in 2012/13; Diarrhea and Helminthiasis are still causes of morbidity in both adults and under 5 children OPD this due to improper utilizations and low awareness of sanitation and Hygiene practices in the district.
4. Health professionals should be sensitized on the low performances of HIV testing particularly PIHTC sites.
5. Deliveries attended by skilled manpower were low so health extension workers and health workers should work on the advocacy of convincing mothers to delivery in the health institutions.
6. Flooding is the prone to Welenchiti town; the District and Zonal administration should find way to prevent future attack by flood.

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CHAPTER-V

Scientific Manuscript for Peer Reviewed Journals

5.1. Measles Outbreak Investigation in Abuna Gindeberet District, West Shewa Zone, Oromia Region, Ethiopia-May, 2014

Abstract

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Background: Measles is a highly contagious, vaccine preventable viral disease. In April, 2014 a measles outbreak was reported from Abuna Gindeberet District and we investigated the outbreak to characterize it, identify risk factors, and implement public health control measures.

Methods: We conducted a descriptive followed by case-control study with 60 cases and 120 age and sex matched community controls from Jan.5, 2014 to May.13, 2014. Line lists, observations of cold chain, interviews using standard at different levels were used to collect data. We defined suspected cases of Measles as any person presenting with fever and maculo papular rash and cough, coryza or conjunctivitis, while a confirmed case was IgM positive for Measles antibody. P-value and 95% confidence interval for odds ratiowere used in deciding the significance of the associations.

Results: We identified a total of 202 measles cases. The outbreak was confirmed by measles IgM antibody.The overall attack rate of this outbreak was 300 per 100,000 populations. Age specific attack rate was high in age less than 5 years (407per 100,000). In bivariate analysis: having contact with measles case/s at home [Odds Ratio (OR)=40; 95% CI (14,112)], contact with known measles cases [OR=7.69; 95% CI (3.82, 15.49)], health facility distance greater than one hour walk [OR=13.22; 95% CI (1.55,112.5)], living in unventilated house were significant risk factors associated with contracting measles.

Conclusions: Contact with measles case, health facility distance more than one hour walk and living in unventilated house were the possible risk factors and increased susceptibility. We

recommend strong ongoing active case surveillance of febrile rash illness; health education on treatment and prevention of Measles to be enhanced and continued in the community by health workers.

Key words: Measles, Outbreak, Risk factors, Ethiopia

Introduction

Measles is a leading vaccine preventable contagious infectious disease caused by a paramyxovirus of the genus *Morbillivirus*. Regardless of the availability of a safe, effective and inexpensive vaccine for over the last four decades, measles remain leading cause of illness and death among children worldwide [**1-3].**

Measles is characterized by a prodrome 2-4 days of fever and malaise, cough, coryza and conjunctivitis, followed by an erythematous macula papular rash. The rash begins at the hairline, and then involves the face and upper neck. Over the next days the rash gradually proceeds down wards and outward reaching the hand and feet [**4-5]**.

The incubation period of measles is, from exposure to prodrome averages 10-12 days, and from exposure to rash averages 14 days ranging 7-18 days. Transmission is primarily person-to-person via large respiratory droplets; airborne transmission via aerosolized droplet nuclei has been documented in close areas for two hours after a person with measles occupied the area [**6, 7].** Measles mortality in Ethiopia is believed to have decreased by 78% since initiation of the catch-up measles campaigns using modeling techniques [**1**].

This reduction in mortality is higher than the global estimate which was 60% reduction, and that of the African Region with 75% reduction **[8].**

Although remarkable health service expansion and accessibility to the entire community has been achieved during the last years and vaccination coverage of the region is progressively improving, unexpected occurrence of measles outbreak has been recently reported.

For countries that have completed catch-up measles immunization campaigns, WHO-AFRO defines a suspected measles outbreak as the occurrence of five or more reported suspected measles cases in a health facility or district in a 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 assumed to be confirmed when there are 3 or more IgM positive measles cases in a health facility or district in one month.

In 2001, countries in the World Health Organization (WHO) African Region began accelerated measles control activities to reduce measles deaths by half by 2005 compared to the estimated number of measles deaths in 1999. Implementation of the recommended strategies led to a 75% reduction in estimated measles mortality in the African Region by 2005. Following this progress, in 2006 the African Region adopted a goal to achieve 90% measles mortality reduction by 2010 compared with the estimate for 2000. By 2008 in the African Region, reported measles cases decreased by 93% and estimated measles mortality decreased 91% compared with 2000 **[10].**

The importance of raising measles vaccination coverage, dramatically reducing measles deaths and indeed eliminating measles from most of the world is recognized in several global and regional documents.

Despite the introduction of the Reaching-Every-District approach to strengthen immunization coverage, services have not expanded adequately to ensure enough coverage of the hard-to-reach populations in all districts in the African Region **[11].**

Measles outbreaks appear in communities with low measles vaccination coverage as the measles virus is one of the most infectious human diseases, and the disease is easily recognizable. Measles outbreaks are an early warning signal of low immunization coverage. Countries may use the measles outbreaks to learn the causes of the outbreaks determine problems in the immunization and health system and address these through policy change or improvements in program implementation **[12].**

Recently, countries of the Region have seen a substantial improvement in the detection, investigation and case management of measles outbreaks **[13],** surveillance and improvement in surveillance of vaccine preventable diseases. Information from outbreak investigations have helped to identify susceptible groups and targeted supplemental immunization campaigns. Improved measles surveillance has also helped to uncover the previously unrecognized Measles disease burden in Bangladesh, Bhutan, Maldives and Nepal **[14].**

To interrupt endemic transmission of measles, mathematical models indicate that

93%–95% population immunity is needed **[15].**

On April 23, 2014, West Shewa Zone Health Department (ZHD) Office reported to Oromia Regional Health Bureau suspected measles outbreak in one of the district, Abuna Gindeberet. The regional health bureau sent the Ethiopian Field Epidemiology Training Program (EFETP) residents to investigate and respond to the problem in collaboration with the zonal health department (ZHD), and District Health Office on May, 8, 2014.

Objectives

General objective

To assess the magnitude, contributing factors of measles outbreak reported, and undertake appropriate public health control measures, in West Shewa Zone, Abuna Gindeberet District of Oromia Region in May, 2014.

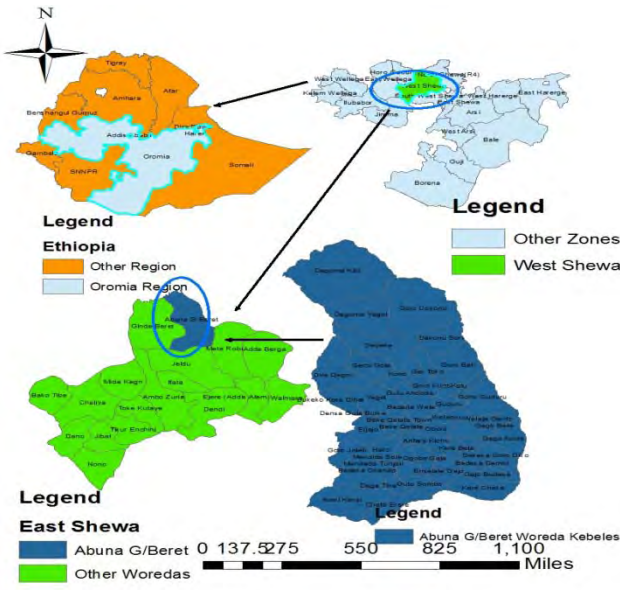
Specific objectives

- To characterize outbreak in terms of person, place and time in the zone.
- To identify factors contributed to the occurrence of an outbreak.
- To assess the control and prevention interventions.
- To strengthen the surveillance system and prevent further spread of outbreak.

Methods

Study area

The outbreak investigation was conducted in Abuna Gindeberet District of West Shewa Zone started on 05-Jan-2014 up to 13-May-2014. The projected population of the Abuna Gindeberet District has 44 Kebeles with an estimated total population was 131,761 in 2014. The district's agro-climatically divided into Dega (20%), waina daga (10%) and Kola (60%). The altitude varies from 800-2800 meters above sea level. Abuna District is shared boundaries with four districts on North, Were Jarso District (North Shewa Zone) on East, Jeldu District, on West Gindeberet District and on South Amahara Regional State.



Map 6: Map of Abuna Gindeberet District, West Shewa Zone, Oromia, May, 2014

Study design and period

We conducted descriptive study followed by matched case-control study design to identify risk factors that contributed the measles outbreak in the zone 8-20 May, 2014.

Source and study population

Target population of the investigation was all patients with measles cases /death come to health facilities and fulfills the case definition/confirmed cases of measles in affected kebeles of Abuna Gindeberet District.

Data collection

Data was collected with line list, observation of cold chain management and case management; and purposively selected key informant; Surveillance focal person and community leader interview at all levels from Zone to Kebele and discussion on health seeking behavior with community. Cases were defined using WHO standard measles case definition, for analytic analysis 60 measles cases and 120 controls (case to control ratio of 1:2) were interviewed using standard questionnaire that includes; socio-demographic, Knowledge to disease, exposure, and risk factors were included. Active case search was conducted, cold chain management of the district health office was assessed and vaccination status of the district was obtained.

Discussion were conducted with the Zonal Health Office, District Health Office, district health personnel, teachers, community members, and the district administrative cabinet both prior and exit of the investigation.

Case Definitions

Suspected measles cases at community level: Any community member should report when he/she come with a person with fever and rash, to the health workers and should advice to visit health facility.

Suspected measles case:

Any person with generalized maculo-papular rash and fever plus one of the

following: cough or coryza (runny nose) or conjunctivitis (red eyes)**.**

Laboratory confirmed measles 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 e.g. A trauma or chronic disease.

Data processing and analysis

The data were entered and analyzed using Epi Info Version7.1.3.0 and Microsoft Excel 2007. Results were presented using descriptive table, chart and spot map. Attack rate and case fatality rate were also calculated. P-value and 95% confidence interval (CI) for odds ratio (OR) were used in deciding the significance of the associations.

Data quality control

We used case based and line listing for describing measles cases interms of time, place and person. How ever, all data were checked for compeletnes before entery and cleaned before analysis.

Inclusion criteria

Cases: Any resident of Abuna Gindeberet district who tested positive for measles IgM and/or Epidemiologically linked to Laboratory confirmed cases and had symptoms of measles from 05th Jan to 13th May 2014 and who agreed to participate in the study was included

Control: A control was any resident of Abuna Gindeberet during the study who was a neighbor to a case and who did not develop signs and symptoms of measles and agreed to participate was included.

Exclusion criteria

Cases: hose cases that refused to participate or were not conscious and family members in the same house hold were excluded

Controls: Those who refused to participate were excluded as well as family members from same house hold.

Ethical issues

A support letter was obtained from Oromia Regional Health Bureau and supportive letter were obtained from the Zonal Health Department to respective District Health Office. Oral informed consent was obtained from participants or from their parents to

participate in the study. Confidentiality was assured and no personal details was recorded or produced on this documentation.

Results

Laboratory result

Five blood samples were collected from patients in districts in 27/01/2014 and sent to the EPHI for confirmation. All five (100%) specimens were tested positive for measles IgM during the specified outbreak period hence, based on the laboratory result typical measles clinical manifestation and epidemiologically linked with laboratory confirmed cases, and the outbreak was confirmed and cases were treated as measles.

Descriptive Epidemiology

We identified a total of 202 measles cases from 05th -January up to 13th-May-2014. Mean age of 7- year and median 6-year [ranging: 5 month and 57-year]. Of total cases 114(56%) female and 88 (44%) were male.

Description of measles cases by person

Most cases 88(44%) were age 0-4 year followed by age 5-9 year of age 49(24%) and 10-14 year of age 43(21%), and greater than 25 year was with the least frequency of cases that is only two case.

The highest Attack Rate was in children less 5 years of age (407 per 100,000 Population) followed by 10-14 years was (235 per 100,000 population) and the least were in age older than or equal 25 years (12/10,000 population).

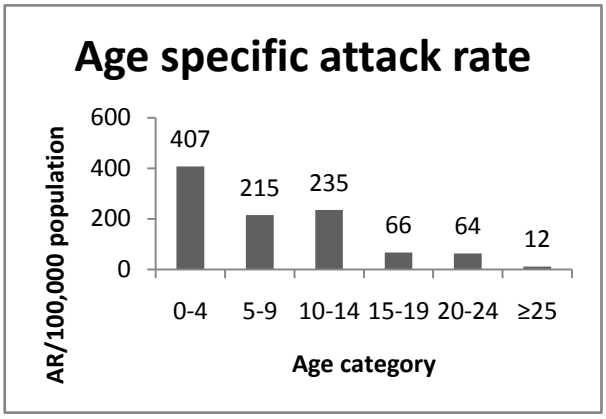


Figure 30: Age specific Attack rate in Abuna Gindeberet District, West Shewa, Oromia, May-2014

Description of measles cases by place

Most cases were reported from Goro Furto with an Attack Rate of 20 cases per 1000 population followed by Goro Jalate 8 cases per 1,000 populations **Figure-4.** An overall AR=3/1000 Population.

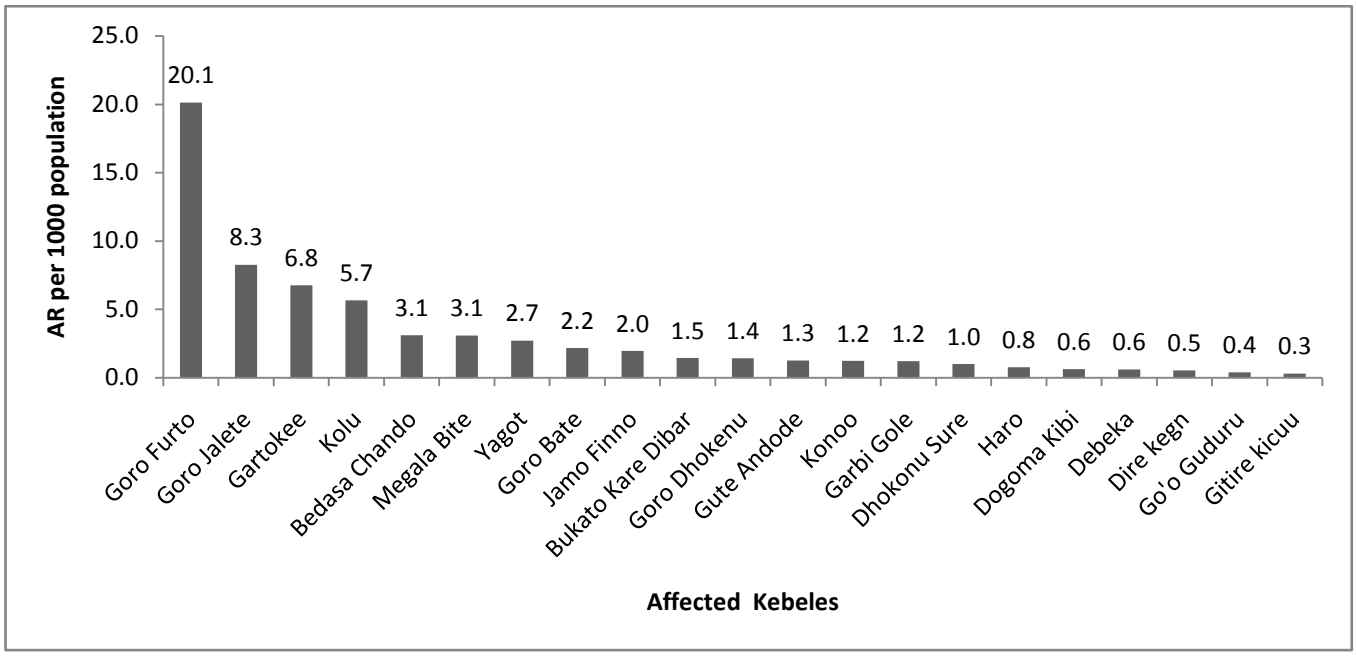


Figure 31: Cumulative Attack Rate of measles by Kebele in Abuna Gindeberet District, West Shewa, Oromia May-2014

Descriptions of measles cases by time

Index case:

The index case was seen in Goro Furto Kebele on 05-Jan- 2014. The case was a 17-year old unvaccinated female (whose 5 other members of her family get sick at different time and 2 of confirmed cases were in this group) who have a travel history out of her home village to the School where she is living there in the Kelate Town and she was attending Grade 9th in Kelate Secondary School. She later admitted to Gindeberet Hospital and later come back to her home where there was a ceremony sometime in her convalescent period in which many people were invited to attend the ceremony that was held in her family home. **Figure-32**

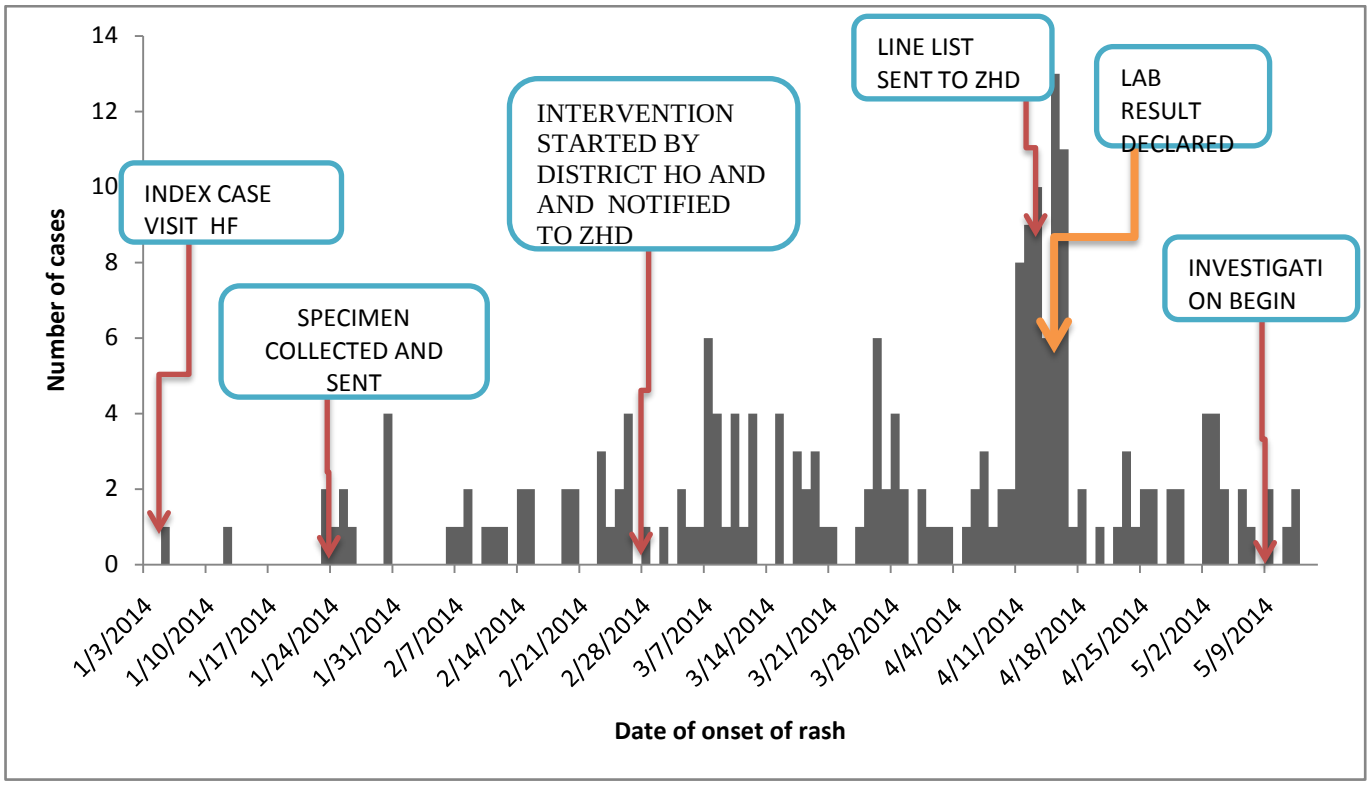


Figure 32: Epi-curve based on date of onset of rash Abuna Gindeberet District, West Shewa, Oromia, May-2014

The outbreak occurred between January 05, 2014 and May 13, 2014 with several peaks and stayed for about 20 weeks. The index case was seen so early at health facility but the district health office had started intervention lately after three weeks delay. Additionally, late notification of the outbreak to the zonal level which in turn delayed early intervention which results a prolonged type of outbreak.

Vaccination status of the cases

Out of total cases 44% (88/202) were vaccinated with 2 or more doses of measles vaccination in routine and campaign EPI activities followed by 24%(49/202) of cases had vaccinated with a single dose, 24% (48/202) of cases were not having vaccination history, and 8% (17/202) of all reported cases have an unknown or missing their vaccination status.

Cold chain management

The cold chain management of zonal health department and district health offices for drug and vaccine storage was good during our visit. The temperature monitoring chart for cold chain was done on a regular

manner. However, there was no precise temperature measurement that there is shortage of temperature monitoring devices; refrigerators temperature was read by only built in digital reading; this may not ensure the correct temperature. Vaccine storage was in questionable situation in a one of visited health center where there was an expired measles vaccine accumulated in the refrigerator.

Analytic Epidemiology

A total of 60 measles cases and 120 apparently healthy controls were included into this study. Participants were matched by; age and sex as shown in Table 1. The mean age of cases and controls were 7.6 and 8.3 year respectively. The median age of both cases and controls were 8 years (ranging from three months up to 25 years). Among sixty cases interviewed thirty three (55%) were female and twenty seven (45%) were male. The most reported symptoms were macula-papular rash, fever, red eyes, cough in 60(100%), sore mouth 55(92%) and the least was coryza 50(83%). The major complications reported were diarrhea 44 (73%), pneumonia 33(55%), change of vision 25(42%), Convulsion 25(42%) ear infection 14 (23%), and none of them developed blindness. Out of the total 60 cases interviewed thirty one (52%) visited health facility for medical treatment; of these only 19/31 (91%) sought medical treatment within 3 days of onset of illness.

In bi-variate analysis, having contact/staying with known active measles case within the house hold[Odds Ratio(OR)=40; 95% CI (14,112), P=0.000], contact with known measles cases [OR=7.69; 95% CI (3.82,15.49), P=0.000], access to health facility; distance more than one hour walk [OR=13.22; 95% CI (1.55,112.5), P=0.002], housing condition that is lacking ventilation were significant risk factors for contracting measles [(OR)=2.24; 95% CI (1.18,4.24), P=0.012], being vaccinated for measles containing antigen (MCV) was found to be associate but lack statistical significance [OR= 0.64; 95% CI [0.32,1.28, P=0.21] ,and there is no significant knowledge difference between the cases and control groups this might be due to the intervention given during the active surveillance and investigation process. as shown in Table 2 bellow

Table 21: Socio-demographic characteristics of cases and controls: Abuna Gindeberet District, West Shewa Zone, Oromia, Ethiopia-May, 2014

Variables		CASES (%) n=60	CONTROLS (%) n=120
Age in years	Mean	7.6	8.3
	Median age	8	8
	Ranges	0.26-25	0.0-25
	<5	21(35)	35(29)
	≥5	39(65)	85(81)
Sex	Male	27(45)	58(48)
	Female	33(55)	62(52)
Marital status	Single	1(2)	3(3)
	Married	3(5)	2(2)
	Note Applicable	56(93)	115(96)
Ethnicity	Oromo	60(100)	120(100)
Religion	Protestant	40(67)	86(72)
	Orthodox	20(33)	32(27)
	Others	0(0)	2(2)
Occupation	Farmer	1(2)	3(3)
	House wife	1(2)	1(1)
	Merchant	1(2)	1(1)
	Student	29(48)	66(55)
	Pre-School children	28(47)	49(41)
Respondent's education	Pre-School	30(50)	50(42)
	KG	3(5)	9(8)
	Primary	26(43)	55(46)
	Secondary	1(2)	6(5)
Number of persons per/HH	<5/HH	9(15)	29(24)
	≥5/HH	51(85)	91(76)
Mother's education	Illiterate	40(67)	82(68)
	Literate	20(33)	37(31)
Father's education	Illiterate	32(53)	59(49)
	Literate	28(47)	61(51)

Table 22: Identified Socio-demographic factors and risk factors for measles outbreak in Abuna Gindeberet District, West Shewa Zone, Oromia, Ethiopia-May, 2014

Variables		CASES (%) (n=60)	CONTROLS (%) (n=120)	OR(95%CI)	P-value
Sex	Male	27(45)	58(48)	0.87[0.46,1.62]	0.76
	Female	33(55)	62(52)		
Age	<5	21(35)	35(29)	1.30[0.67,2.53]	0.42
	≥5	39(65)	85(81)		
Respondent's education	Yes	30(50)	70(58)	0.7[0.38,1.33]	0.28
	No	30(50)	50(42)		
Marital status	Married	3(5)	2(2)	3.1[0.5,1.9]	0.19
	Single	57(95)	118(98)		
House head occupation	Farmer	49(82)	95(79)	1.17[0.53,2.57]	0.69
	Others	11(12)	25(21)		
Mother's education	Illiterate	40(67)	82(68)	0.9[0.46,1.75]	0.76
	Literate	20(33)	37(31)		
Knowledge to measles transmission	Yes	26(43)	39(47)	1.18[0.63,2.22]	0.59
	No	34(57)	61(73)		
House hold contact	Yes	38(63)	5(4)	**40[14,112]**	**0.000****
	No	22(37)	115(96)		
Contact with known measles case	Yes	38(63)	22(18)	**7.69[3.82,15.49]**	**0.000****
	No	22(67)	98(82)		
Health facility distance >1hrs Walk	Yes	6(10)	1(1)	**13.22[1.55,112.5]**	**0.002****
	No	54(90)	119(99)		
Having vaccinated against measles	Yes	15(25)	41(34)	0.64[0.32,1.28]	0.21
	No	45(75)	79(66)		
Housing condition (lack of ventilation)	Yes	30(50)	37(31)	**2.24[1.18,4.24]**	**0.012****
	No	30(50)	83(69)		
History of travel 2-3 weeks prior to onset of illness	Yes	5(8)	8(7)	1.27[0.39,4.07]	0.68
	No	55(92)	112(93)		

** Variables significantly associated with contracting measles infection.

Public health Intervention

The investigation team identified and characterized the measles outbreak along with the provision of health education, around 200 households were visited home to home with an estimated 1,500 people were given health education. Technical assistance was given for health workers on case management, recording and reporting system.

Active cases were treated to prevent further spread, and to reduce morbidity and mortality attributed to measles pathogenesis. Routine surveillance system was enhanced and closely followed at each level on a daily bases. Health education was given for the

community members and students in school to prevent the transmission of the disease, to maximize the health seeking behavior and treat if there is sign and symptoms of measles.

Discussion

Prolonged measles outbreaks occurred in Abuna Gindeberet District which lasted for five months starting from Jan.05, 2014-May 13, 2014 and resulted 202 cases. This could be explained that delayed in notification of the outbreak indicates that there was poor active surveillance system at the district level and late response to the outbreak had contributed for the chance of widened expansion of the outbreak to the nearby kebeles. An overall attack rate of the outbreak was 300 cases per 100,000 populations. A similar study conducted in Abaya District, Oromia Region has documented an overall AR=390 cases per 100,000 population [17] which is comparable to our finding but much more higher than the finding documented at national level outbreak that was 4.1 per 100,000 in 2008[1]. This might be due to low vaccine potency despite the highest vaccination coverage reported at the district level that was 91% [Abuna Gindeberet district, administrative report 2013]. The most affected age group was <5 years of age (attack rate 407 cases per 100,000) this might additionally be explained as there may be vaccine failure or less vaccination coverage in the study area. Measles outbreak could frequently occurred in area with low measles immunization coverage and poor cold chain management even with high vaccination coverage [1]

In case-control part of our study, factors such as: education, marital status and education between cases and control were not different this might be due to awareness created through health education given by health workers during active case searching and field investigation. During the time of investigation we have tried to identify the communities' awareness towards measles, modes of transmission, prevention and control measures were equally low. The health seeking behavior is also minimal as it was indicated that only 52% of case visited health facility within three days of onset of illness. This is lesser than the observations in Zaka District, Zimbuwabe where 91.8% of cases sought medical treatment within 3 days of onset of illness [19]. This difference could be lack of awareness on the need of visiting health facility whenever there is an illness with in the household.

The most powerful relationship was observed for "contact history" this was consistent with study conducted in Zaka district, Zimbuwabe, 2010 [19]. This reveals that contact with measles cases was contributing much in measles transmission. Health facility distance greater than one hour walk was the other likely contributing factor a study in India support this[18]. Measles transmission was strongly associated with ventilation of the house this means living in unventilated room has 2.24 fold at risk of developing measles infection than persons living in ventilated room. This is consistent with the study conducted in Abaya district, Borena Zone, Oromia, Ethiopia [17].

It has also been suggested that large inoculums can increase the risk of vaccine failure. Furthermore, total protection against measles might not attainable, even among revaccinees when children are confronted with intense exposure to the virus [20, 21, 22].

Limitations

Absence of child immunization card at household level poses difficult to get exact date of vaccination and other relevant information. Measles line-List was not properly filled by the district health workers until the correction was made by the deployed team from regional health bureau. Lack of immunization coverage data by Kebeles. Cases subjects/guardians might forget the exact evidence about their own or their Children health condition (Recall bias). This study might be subjected to misclassification bias as a result of similarity between rubella and measles as well as classification is only with clinical presentations.

Conclusions

The outbreak was confirmed based on laboratory diagnosis. Contacts with measles case, health facility distance more than an hour walk and living in unventilated house were the possible risk factors and increased susceptibility. We recommend strong ongoing active case surveillance of febrile rash illness; health education on treatment and prevention of Measles to be enhanced and continued in the community by health workers.

Recommendations

Ongoing active febrile-rash illness surveillance should be enhanced and continued in community by health extension workers. Improving health seeking behavior

of the community through awareness creation towards modern treatment and the important of vaccine for vaccine preventable diseases in collaboration with community leaders should be mandatory. Strengthen routine immunization through awareness creation on the importance and benefits of routine immunization services. Improve measles active surveillance by training the health workers on active surveillance system. Non selective immunization campaign should be planned targeting age group of 6 months up to 14years.

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CHAPTER-VI

Abstracts for Scientific Presentations

6.1. Measles Outbreak Investigation in Abuna Gindeberet District, West Shewa Zone, Oromia Region, Ethiopia-May, 2014

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Abstract

Title: Measles Outbreak Investigation in Abuna Gindeberet District, West Shewa Zone, Oromia Region, Ethiopia-May, 2014

Background: Measles is a highly contagious, vaccine preventable viral disease. In April, 2014 a measles outbreak was reported from Abuna Gindeberet District and we investigated the outbreak to characterize it, identify risk factors, and implement public health control measures.

Methods: We defined suspected cases of Measles as any person presenting with fever and maculo papular rash and cough, coryza or conjunctivitis, while a confirmed case was IgM positive for Measles antibody. We conducted descriptive followed by a matched case-control study with 60 cases and 120 community controls from Jan.5, 2014 to May.13, 2014. Line lists, observations of cold chain, interview using standard questionnaire at different levels were used to collect data. P-value and 95% confidence interval for odds ratiowere used in deciding the significance of the associations.

Results: We identified a total of 202 measles cases and no deaths (CFR=0.0%). The outbreak was confirmed by measles IgM antibody.The overall attack rate of this outbreak was 300 per 100,000 populations. Age specific attack rate was high in age less than 5 years (407 per 100,000). In bivariate analysis: having contact with measles case/s at home [Odds Ratio (OR)=40; 95% CI (14,112)], contact with known measles cases [OR=7.69; 95% CI (3.82, 15.49)], health facility distance greater than one hour walk [OR=13.22; 95% CI (1.55,112.5)], living in unventilated house were significant risk factors associated with contracting measles.

Conclusions: Contact with measles case, health facility distance more than one hour walk and living in unventilated house were the possible risk factors and increased susceptibility. We recommend strong ongoing active case surveillance of febrile rash illness; health education on treatment and prevention of Measles to be enhanced and continued in the community by health workers.

Key words: Measles, Outbreak, Risk factors, Ethiopia.

6.2. Assessment of Hospitals Preparedness towards Ebola Virus Diseases in Addis Ababa, Ethiopia-January, 2015

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Title: Assessment of Hospitals Preparedness towards Ebola Virus Diseases (EVD) in Addis Ababa-Ethiopia, January, 2015.

Background: The 2014 Ebola epidemic in West Africa has ignited increasing global concern. Health facilities including hospitals are at the front line to detect, diagnose and manage EVD suspects. Addis Ababa is home of the African Union and hub of the biggest airline network in Africa. We assessed hospitals in Addis Ababa to identify their preparedness towards EVD in order to improve the capacity of early EVD detecting and reporting.

Methods: We conducted a cross-sectional health facility based survey from January 1-3, 2015, in all the 33 (public and private) hospitals in Addis Ababa City. A structured questionnaire was used to interview key informants in each hospital. Data analysis was made using Epi Info 7.

Results: Out of the 33 Hospitals, 13(39.4%) were public and 17(60.6%) were private, out of which 84.6% of the public and 75% of the private hospitals have done staff awareness on EVD. From all hospitals assessed, most had functional incinerator (94%) and triage units (78.5%) in place; 72.7% had EVD case definition; 27.3% had national Ebola interim guideline available; 48.5% had Ebola cases screening procedures in place. In terms of facilities 51.5% had isolation rooms. In 39.4% of hospitals isolation rooms were separated from other wards while in only 9.1% they were properly labeled with safety signs. In further assessment 45.5% had dedicated bed rooms, 18.2% had built-in toilets, and 33.3% had a separate hand-washing facility. In 57.6% of hospitals there was a functional referral systems in place, 66.7% had focal-person for referring EVD cases while 24.2% had EVD preparedness and response committee.

Conclusion: More than half of the hospitals in Addis had good preparedness for EVD, based in their emergency triage units and isolation room. However, we observed poor infection prevention and control practice, coordination and referral system in most hospital. We recommend improved hospital coordination, referral system to the hospital, infection prevention and Control to EVD should be improved through continues training and supportive supervision.

Key Words: Ebola Virus Diseases (EVD), Hospital, Preparedness, Addis Ababa, Ethiopia.

CHAPTER-VII

Narrative Summary of Disaster Situation

7.1. Narrative Summary Report on Meher Assessment in Borena, Guji and West Arsi zones, Oromia, Ethiopia-November, 2014

Executive Summary

Emergency needs Assessments are simply systematic processes to collect information and making justifiable decisions. Experience has shown that coordinating needs assessments is an important element in saving lives and restoring people's livelihoods. We conducted this assessment in Gujii, Borena and West Arsi Zone. These zones are among 18 zones of Oromia region and found in western part of the country. This assessment is intended to investigate the extent, types, magnitude, severity and likelihood of different risks in the most "vulnerable" Districts and develop response plan based on identified findings.

Visited districts were selected by discussing with zonal Epidemic Preparedness Task Force and considering districts those were selected at Regional level. The same procedures were done at district level to select visited kebeles, health facilities and villages. Following this, two districts (Goro Dola and Liban) from Gujii, five districts (Miyo, Dire, Dillo, and Gelana) from Borena and two districts (Arsi Negele and Shalla) from West Arsi were assessed from November,28 to December,19,2014. At each level interview and discussion were conducted with concerned bodies including community members by using prepared checklists. Additionally, review of documents was done at zonal and district level.

Even though they did not have regular meeting there are functional multi-sectorial coordination forum at both zonal and district level. In Guji zone, there were measles cases in three districts with a total of 144 cases from July to October, 2014. Additionally, there was Malaria outbreak with a total of 691 cases and 2 deaths in last three months from July to October, 2014. However, there was no outbreak in Borena zone during the past three months. There were a shortage of emergency drugs and supplies at all visited districts of visited zones. Mortality of major communicable diseases was significantly decreased in all zones. There was poor latrine coverage and utilization at all visited districts. Similarly, there was poor coverage of drinking water in all visited districts of zones. Due to lack of drinking water in the coming six months, AWD is anticipated to increase in some districts of the visited zones. Poor cold chain management and low vaccination coverage were contributed for measles outbreak in Guji zone.

Multi-sectorial coordination forum should be strengthened at all levels in Borena, Guji and West Arsi zones. Medical supplies for emergency management should be adequately maintained at zonal, district and health facility level.

Introduction

Need is not a precisely definable or measurable quantity. Needs Assessments are simply systematic processes for collect information and making justifiable decisions. Experience has shown that coordinating needs assessments is an important element in saving lives and restoring people's livelihoods. Along with emergency preparedness, the timeliness and quality of assessments help determine an effective humanitarian response.

A coordinated assessment is an assessment planned and carried out in partnership by humanitarian actors, in order to document the impact of a particular crisis and to identify the needs of affected populations.

This Meher assessment was conducted from November 28, 2014 to December 19, 2014 by formulated team from Ministry of Water and Energy, Regional DPPC and Pastorals, NGOs and UN agencies (FAO, WFP and UNICEF). This assessment is aimed to identify health and health related events/hazards, to determine actual capacity of zonal problem solving and propose recommendations on identified problems.

General objectives

To assess the extent, types, magnitude, severity and likelihood of different risks and the outcome of 2014 meher crop and potential risk factors for the anticipation of occurrence of health problems, food insecurity for ensuring appropriate and effective humanitarian planning and responses for reducing morbidity and mortality in the zones.

Specific Objectives

- To assess the existing capacity of the health system to address those risks
- To determine gaps in the capacity of the health system to address anticipated health risks and existing threats

Methods

Visited districts were selected based on regional need and discussion with zonal task force, Checklists were used during data collection at zonal and District level, Discussion was done with Districts task force, Observation was conducted during interviewing for confirmation

1. Communities were interviewed on some issues such as health service delivery, feeding behaviour and availability of drinking water
2. Debriefing was given for Zonal and district task forces on assessment findings

Results

Coordination

There is functional multi-sectorial coordination forum at both zonal and district level of all assessed sites. In this forum all relevant government, NGOs and UN agencies were represented. However, they did not meet regularly. Similarly, there is functional multi-sectorial PHEM coordination forum in all visited districts of both zones. However, there is a shortage of funds for PHE preparedness and response activities in these districts.

Top five Morbidity

Pneumonia is a leading cause of morbidity in below five years of age in 5/9(55%) of all visited districts. Similarly, pneumonia is coupled AURTI and act as leading cause of morbidity for above five years in 6/9 (67%) of all visited districts. See Table 23 and 24.

Table 23: Top five causes of morbidity in less than five years children in visited districts of Guji zone, Borena and West Arsi Zone from July,2013-June,2014.

Zone	Districts	**Top Five causes of morbidity in under five years children**				
		1	**2**	**3**	**4**	**5**
Guji	Goro Dola	None-bloody diarrhoea	Pneumonia	Acute upper respiratory tract infection	Helmenthiasis	Acute febrile illnesses
	Liben	Pneumonia	Diarrheal Disease	Acute febrile illnesses	Dyspepsia	Disease of musculoskeletal
Borena	Moyale	AURTI	Pneumonia	Helmethiasis	UTI	AFI
	Dire	Diarrhoea	Pneumonia	AURTI	AFI	Malaria (P.vivax)
	Miyo	Pneumonia	Diarrhoeal disease	AFI	Ear problem	Intestinal parasites
	Dillo	Pneumonia	Diarrhoeal disease	Helmethiasis	AURTI	Infection of the skin and subcutaneous

						tissue
	Gelana	Pneumonia	Non-bloody diarrhoea	Malaria (P.falciparum)	Diarrhoea with dehydration	Malaria (P.vivax)
W/Arsi	A/Negele	Non -bloody diarrhoea	Pneumonia	AURTI	AFI	Infections of the skin and subcutaneous tissue
	Shalla	Pneumonia	Non-bloody diarrhoea	AURTI	AFI	Not legible

Table 24: Top five causes of morbidity in above five years in visited districts of Guji zone, Borena and West Arsi Zone from July, 2013-June, 2014.

Zone	**Districts**	**Top Five causes of morbidity in adults (>5years of age)**				
		1	**2**	**3**	**4**	**5**
Guji	Goro Dola	None-bloody diarrhoea	Pneumonia	Acute upper respiratory tract infection	Helmenthiasis	Acute febrile illnesses
	Liben	Pneumonia	Diarrheal Disease	Acute febrile illnesses	Dyspepsia	Disease of musculoskeletal
Borena	Moyale	AURTI	Pneumonia	Diseases of musculoskeletal system	Helmenthiasis	UTI
	Dire	AURTI	Pneumonia	Diseases of musculoskeletal system	AFI	Dyspepsia
	Miyo	Pneumonia	Malaria	Intestinal parasite	Trauma	UTI
	Dillo	Pneumonia	AURTI	Diseases of musculoskeletal system	Helmenthiasis	UTI
	Gelana	Malaria	AFI	Pneumonia	Malaria	UTI

		confirmed with p.falciparum			confirmed with p.vivax	
W/Arsi	A/Negele	AURTI	AFI	Pneumonia	Non- bloody diarrhea	Helmenthiasis
	Shalla	AFI	Pneumonia	Typhoid fever	Malaria confirmed with p.falciparum	AURTI

Guji zone assessment findings

Health

Guji is one of the zones found in Oromia region with a total population of 1,787,760.The zone is divided into 16 woredas (districts) including three towns. There are 2 hospitals and 69 health centres as well as 328 health posts providing service to the public. The health facilities are capable of providing promotive, preventive and curative services to the community.

Based on the outbreak and surveillance reports, Malaria and suspected measles outbreaks were occurred in the zone. A total of 691 malaria cases out of which 2 deaths were reported and 144 suspected measles cases where there's no death encountered. The appropriate treatment was provided to the cases and timely actions were taken to make the diseases under control. The zonal health department has listed out anticipated epidemics in order to facilitate adequate preparedness and prevention capacities. Hence, Malaria, Measles and Diarrheal diseases are predicted among the prone woredas of the zone**.(Table 25)**

Table 25: Districts and population at risk Guji Zone, Oromia, 2014.

Zone	Woredas at risk	Type of risk	At risk population
Borena	Seba boru, G/dola, Girja	Diarrheal diseases	242,927
	S/boru, Shakiso, G/dola, Wadera, Liben	Malaria	364, 540
	Liben, G/dola, Shakiso, S/boru	Measles	197,109

Pneumonia and Diarrheal diseases have found out to be the leading causes of morbidity among under 5 years of age children followed by acute febrile illnesses. The poor safe water coverage has made its own contributions for the occurrence of diarrheal diseases. 9 cases of rabies was also reported in Liben woreda in which they were treated appropriately and 566 street dogs were killed.

Taking a look at the level of preparedness among the two woredas visited; Liben and Gorodhola there is a shortage of anti-malarial drugs as well as supplies for testing. Moreover, No budget is allocated for emergency rapid response by the woredas. However, the timeliness and completeness of the weekly surveillance report is good as it's above 85% & 90% consecutively.

Unlike the other zones in the region there is no functional mulitsectoral coordination forum where relevant government and Non-government organizations are represented. However, there are trained staff on Public health and emergency management and the zone has developed an emergency preparedness and response plan which isn't financially funded and the stock status of emergency drugs and supplies at zone level seems to be very poor. The following table shows the stock status and the gaps. **(Table 26)**

Table 26: Availability of Emergency drugs and supplies in Guji Zone, Oromia-Decmber 2014.

Drugs and medical supplies		**Total requirement**		**Available**	**Gap**
		Unit	Plan		
Meningitis vaccine		-	-	-	-
	Coartem (all type)	Dose	14,580	0	14,580
	Oily CAF	Vials	-	-	-
Drugs	Doxycycline	Pack(20x10)	77	0	70
	Ringer Lactate	Bags	15,304	0	15,304
	ORS	Sachets	33,159	0	33,159
	Amox. Suspension	Bottle	3826	0	3826
	Cotri. Suspension	Bottle	-	-	-
	TTC ointment	Tubes	1971	0	1971
	Vitamin A	Tin	60	0	60

Lab.	RDT	Box	364	0	364
supplies	Pastorex (meningitis)	-	60	0	60
	LP set	-	60	0	60
	TI bottle	Bottle	30	0	30
	CTC kits for AWD	Kit	5	0	5
Medical	Gloves	Box	60	0	60
supplies	Syringe	Box	100	0	100
	PPE	Set	50	0	50

Nutrition

A slight increment of malnutrition cases was seen since July to October, 2014 due to the poor rainfall and the local area conflicts in some woredas of the zone as well as the community health day conducted in October has also contributed through enhanced identification of cases. Adequate amount of supplies are put in place to manage the SAM cases at OTP/SCs as well as for the MAM cases with a technical and logistics support by NGOs. **(Table 27)**

Table 27: Results of CHD, Guji Zone, Oromia-December, 2014

Months	**Under 5 children**			**Pregnant & Lactating**	
	Screened	MAM	SAM	Screened	MAM
August, 2014	237,650	5181	1055	60,414	3340
November, 2014	255,059	5932	1471	59,844	3882

WASH assessment

Status of water supply schemes, water, sanitation & hygiene situation

The zone water coverage is 74.83% and Districts water supply coverage ranges between inclusively 36.9%-95.5%. The water supply coverage of the two visited Districts (Liban& Goro dola) 52.5%and 62.74% respectively. The average distance to collect water is 6.5km in the zone. Guji zone has a total of 1,514 water schemes. Out of these water schemes 1452(95.9%) are functional and 62(4.1%) are non functional. The number and types of water schemes include 50

deep well, 190 shallow well, 621 springs on spot, 647 Hand dug well, and 6 ponds. Even though currently, water supply was better in all the lowland areas of the Guji Zone due to the improvement of water availability in meher rain season siltation of the ponds spare parts to maintain/replace the non-functional water supply schemes was the major challenge.

Generally in Guji zone better WASH condition observed in meher assessment and was confirmed that in regular condition there is no need of emergency case in the next few month related to WASH situations. **(Table 28)**

Table 28: Status of water supply schemes, water and sanitation situation in Guji zone, Oromia, 2014

Districts	Status of water schemes										Water supply coverage %	Latrine coverage %
	DW		HDW		SW		SP		POND			
	F	NF	F	NF	F	NF	F	NF	F	NF		
O/shakiso	2	3	102	-	33	2	115	2	-		94.66	101.1
Bore	-	-	16	-	28	-	88	6	-		94.57	93.9
M/shakiso	4	-	60	5	18	6	1	-	-			97.8
S/boru	1	-	-	2	-	-	-	-			36.78	63.7
Wadara	5	3	98	7	16	8	158	7			95.45	71.2
Uraga	3	1	50	6	11	5	107	3	-		90.49	83.8
H/wamanna	1	2	20	5	-	-	-	-	2		38.44	88.6
Negelle city	3	-	15	2	-	5	-	-	-			75.9
A/redde	2	-	-	-	-	-	12	4	1		55.19	72
Damma	3	2	158	3	4	1	2	-	-		93.42	79.4
A/wayu	-	-	12	-	19	22	-	3	-			84.1
Girja	1	-	20	-	-	-	88	11	-		90.91	71.3
Liban	2	-	7	1	-	-	-	-	1		80.56	54.7
Anna sora	5	3	5	1	10	12	2	1	-		88.64	94.9
G/dola	-	-	2	-	-	-	-	-	-		62.74	64.3
Qarcha	2	2	15	37	-	-	8	-	-		70.70	78.6

ZONAL	74.83	80.3

NB; F=Functional, NF=Nonfunctional, DW=Deep Well, SW= Shallow Well, SP= spring, HDW=Hand dug Well.

Institutional WASH situation

Although there was a chronic problem of water in both schools and Health institutions in the assessed Districts of the Guji zone, the current existing condition is normal. In the zone 836 schools are there 786 primary schools, 36 secondary schools and 14 preparatory. From these 663(84.4%) primary schools, 9(25%) secondary schools and 7(50%) preparatory have water. This means a total of 679(81%) schools get from different sources. Regarding health institution there are a total of 328 health posts, of these none of them has water (100%)and 31 (44.3%)Health Centers have a water supply facility where as 39(55.7%) Health center in the zone have no water supply facility.

Hygiene and Sanitation

In all assessed Districts of Guji zone the hygiene and sanitation condition is active. The relevant assessed Districts sectoral officers and communities have awareness on importance of hygiene and sanitation promotion. The factors can be cited for this better sanitation condition is accessibility to health extension workers as information obtained from the interviewed community. On the other hand the major challenging was shortage of water treatment chemicals. The other problem observed from both the interviewed communities and sectoral officers from the Guji zone include lack of separated latrine for men and women, no facilities for solid waste disposal and communal latrines.

Borena Zone

Health

Borena is among the zones found in Oromia region known to have a total population of 1,328,403. The zone is divided into 13 woredas and 2 towns. A huge amount of efforts have been exerted in terms of enhancing the access to health services and so far a total of 241 health posts,

66 health centres and 3 hospitals are providing both preventive and curative services to the community.

Based on the findings of the meher assessment, it was found out that there was no outbreak occurred in the zone for the last three months. However, suspected measles was seen in Miyo and Melka soda woredas. Appropriate treatment was provided to the cases and samples were collected and sent for laboratory confirmation. Even though it has not reached the threshold level, occurrence of malaria diseases has showed a slight increment. Likewise, due to the critical shortage of safe water supply the number of diarrheal cases has increased. In response to this water treatment chemicals (purifiers and water guards) were provided to the woredas. The zonal health office has made the required preparations in collaboration with partners and made anticipations for woredas which are at risk of suspected measles. **(Table 29)**

Table 29: Districts and population at risk, Borena Zone, Oromia, 2014

Zone	Woredas at risk	Type of risk	At risk population
Borena	Dire	Measles	63,427
	Bule hora	Measles	282,912
	Dhas	Measles	30,733
	Miyo	Measles	159,459

There is a functional multi sectoral coordination forum for the health sector which is composed of several NGOs and CBOs working in the zone. The forum is led by the zonal health office ensuring all relevant organizations are represented and regularity of forum meetings which is basically done in a monthly basis. Similarly, the zone has developed a public health emergency preparedness and response plan however, it isn't financially funded. For the major emergency drugs and supplies the following table shows the availability and gaps. **(Table 30)**

Table 30: Availability of Emergency drugs and supplies in Borena zone, Oromia, 2014

Drugs and medical supplies	Total requirement		Available	Gap
	Unit	Plan		
Meningitis vaccine	-	-	-	-

	Coartem (all type)	Dose	16,500	6840	9660
	Artesunate (rectal)	Pkt	150	0	150
Drugs	Artesunate (Inj)	Vial	3000	0	3000
	Artemether IM	Pkt	100	0	100
	Quinine (PO)	Tin	100	25	75
	Quinine (IV)	-	-	-	-
	Chloroquine	Tin	122	10	112
	Ceftriaxione	Vials	200	20	180
	Oily CAF	Vials	100	0	100
	Doxycycline	Pack(20x10)	300	12	108
	Ringer Lactate	Bags	120	0	2000
	ORS	Sachets	1000	15000	0
	Vitamin A	Tin	108	0	108
Lab.	RDT	Box	354	354	0
supplies	Pastorex (meningitis)	-	50	0	50
	LP set	-	100	0	100
	TI bottle	Bottle	10	0	10
	CTC kits for AWD	Kit	5	0	5
Medical	Gloves	Box	100	30	70
supplies	Syringe	Box	50	20	30
	PPE	Sts	100	0	100
Emergency RH	Individual clean delivery kits		5	0	5

A total of 5 woredas were visited with an objective of assessing the health and nutrition situations. This comprise Moyale, Dire, Dilo, Miyo and Gelana woredas. In both above and under 5 age groups Pneumonia and diarrheal diseases are the leading causes of morbidity. Regarding availability of emergency drugs and supplies for one month, shortage of anti-malarial drugs was seen in most of the woredas. The major risk factors for an AWD epidemics to occur

seemed to be higher as the latrine coverage and utilization for many of the woredas is below 40% as well as the safe water supply coverage is also poor. Whereas the level of risk factors for the other epidemics is low in which the LLINs coverage is above 80% and the measles vaccination coverage is above 85%. Health workers are trend on Meningitis outbreak management and the weekly surveillance timeliness and completeness is also good in most of the woredas.

Nutrition

Based on the results of recently conducted CHD, the malnutrition trend is in a decreasing pattern. The results were compared with the CHD conducted in the 4th quarter of 2006EFY. and same months of last year. The fact that there were several interventions that enhanced the food security status at household level (TSFP & OTP) as well as the presence of preventive programs like community based nutrition and others have mentioned the reasons for the current decrement. It's anticipated that there will be case increment in the upcoming dry season and adequate preparedness is made in terms of ensuring availability of Nutrition supplies and routine drugs. Similarly, OTP admissions has also showed decrement for the past three months in the visited woredas. **(Table 31 and Figure 33)**

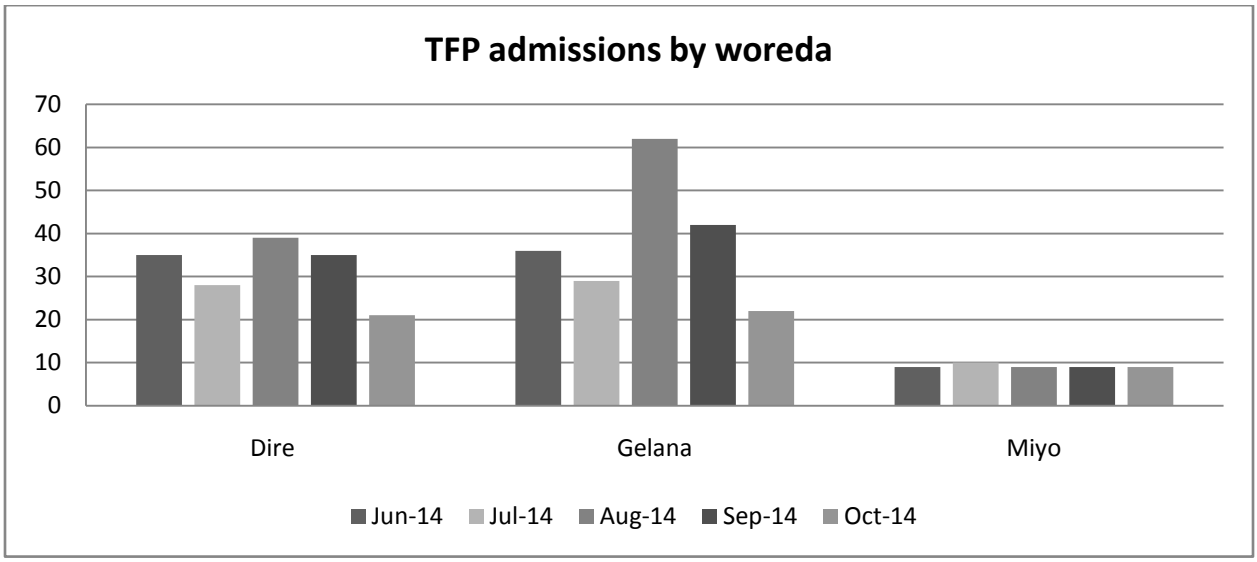


Figure 33: TFP admission trend by district, Borena Zone, Oromia, 2014

Table 31: Results of CHD, Borena zone, Oromia, 2014

Months	Under 5 children			Pregnant & Lactating	
	Screened	MAM	SAM	Screened	MAM
August, 2014	178,849	10,746	809	60,943	15,680
November, 2014	197,087	7474	435	57,513	11,771

WASH assessment

The livelihood of Borena zone population affected by drought, flooding and Acute Watery Diarrhea (AWD) for the last six months. In most lowland areas of the zones water rationing was undergoing for three months before the last hagaya rain due to drought. The current hagaya rain also affected ten kebeles of Galena Districts by flooding and most of the lowland area of population in the zone now a day at the risk of drought and AWD.

The zone water coverage is 54%. The main water sources include ponds, traditional Ellas, **BH** (hand pumps, motorized schemes, solar pumps),**spring (**Fitted with motor, Gravity, on spot), **Hand dug well** (Fitted with hand pump, open pump) etc.There are 1003 total water schemes, of which 957(95.4%) water schemes are functional and 46(4.6%) schemes are non-functional. These include 149 functional and 8 non-functional mtorized, 350 functional and 18 non-functional hand pumps, 2 functional and 3 non-functional solar pumps, 3 functional and 1 non-functional fitted with motor, 17 functional and 2 non-functional gravity, 119 functional and 1 on spot,118 functional and 3 non-functional fitted with hand pumps and 208 functional and 9 non-functional open pump.Due to shortage and erratic rain fall of the Hagaya most ponds did not harvest water during the season especially in Dire, Miyo, Moyale and Dilo this is common. It is obvious that in kola area of Borena zone there will be the risk of drought. Because of many factors like short rainy seasons ponds didn't harvested much water, lowering of ground water tables, damage of existing water supply schemes and non-participation of NGOs in some areas.The harvested water in these lowland Districts not serves more than one and half months. But, in Yabello, Arero, Dhas, Teltele, D/Dawa and M/soda ponds and ellas harvest good water as compared to other lowland Districts.

In all assessed District among the zone, the communities are facing at the risk of recurrent drought except Gelana District. Dire, Dillo, Miyo and Moyale are at the risk of shortage of water sources within the next six months. **(Table 32)**

Table 32: Status of water supply schemes, water and sanitation situation in Borena zone, Oromia, 2014

District	Water sources																Water supply coverage (%)	Household latrine coverage (%)
	BH(DW/SWL)						Spring						Hand dugwell					
	Motorized pump		Hand pump		Solar pump		Fitted with motor		Gravity		On spot		Fitted with hand pump		Open pump			
	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF	F	NF		
Teltele	19	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	77	76
Dilo	8	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	59	204
Yabello	20	2	17	2	-	-	-	-	2	-	3	-	-	-	-	-	87.1	34
Dire	15	-	12	-	-	1	-	-	5	-	-	-	-	-	8	3		54
Miyo	9	1	68	-	1	-	-	-	-	-	-	-	4	-	19	-		49
Moyale	8	-	8	-	-	1	-	-	-	-	-	-	7	-	16	-	26.4	61
Dhas	8	1	16	-	-	1	-	-	-	-	-	-	-	-	-	-	100	46
Arero	5	-	15	2	1	-	-	-	-	-	1	-	3	-	-	-	58.3	44
D/Dawa	7	1	55	3	-	-	-	-	2	2	2	-	13	-	-	-	82.33	11
B/Hora	20	1	55	-	-	-	2	1	1	-	51	-	53	-	46	-	71.8	77
M/Soda	4	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	76.9	61
Gelana	8	-	20	4	-	-	1	-	1	-	9	-	18	-	53	-	53	72
Abaya	11	2	61	4	-	-	-	-	2	-	53	1	34	1	66	6	82.5	39
Total	**F=957 , NF=46**															**1003**		**60**

Institutional WASH situation

All schools in assessed District of Borena zone are facing at the risk of recurrent drought. In Dire, Dillo, Miyo and Moyale schools from Primary to High schools are at risk of critical water shortage. Relative to schools, Health centers have better water availability. Of these 33/65(51%) Health centers and 3/214(100%) Hospitals have water even though all of them do not get directly

from schemes others get from tanker, Rotto and ponds by treating. But, 214 health posts have shortage of water.

Hygiene and sanitation condition

Hygiene promotions in all assessed Districts of Borena zone are not active. As data obtained from the zonal health bereau and communities interviewed shows that latrine coverage and utilization is low. According to the sectoral officers this is difficult for pastorals communities because the community move from place to place in different time, to find pasture and water for their cattle. So that, this is challenging to make awareness for the community about hygiene and sanitation. In some agro pastoralist Districts hygiene and sanitation awareness is applicable, but all communities are not practically applied.In all the assessed Districtsno communal latrine and waste disposal system is identified. Thus, these situation exposes the community to the communicable and water borne diseases like trachoma, typhoid, AWD, etc.

West-Arsi zone

Health

West Arsi is among the zones known by high crop production in Oromia region. It has a total population of 2,345,910 and divided into 15 woredas including 3 towns. The zone has a tremendous achievement towards enhancing the public access to health services. There are a total of 5 hospitals in which 3 are on construction and 75 health centres as well as 354 health posts providing both preventive and curative services.

Due to the reason that there's a strengthened routine EPI and the regular monitoring and follow ups to the program resulted in an effective outbreak prevention. No outbreak was occurred except for malaria mentioned as an anticipated epidemics as there are 4 endemic woredas. The surveillance system is put in place and weekly reports are being received with a special focus to the four woredas; Shalla, Siraro, Arsi Negele and Shashemene. Based on this, the zone has made its anticipations on districts and at risk population for ease preparedness and prevention. **(Table 33)**

Table 33: Districts and population at risk, 2014

Zone	Woredas at risk	Type of risk	At risk population
West Arsi	Shalla	Malaria & Malnutrition	7289
	Arsinegele	Malaria & Malnutrition	11,541
	Siraro	Malaria & Malnutrition	7956
	Shashemene	Malaria & Malnutrition	5006
	Wondo	Malaria & Malnutrition	3762
	Nansebo	Malaria & Malnutrition	194

Among the top five causes of morbidity pneumonia and diarrheal diseases are the leading ones in both under and above 5 years of age population. Acute febrile illnesses and AURI were also reported in the woredas visited; Shala and Arsi Negele. No death occurred according to the routine surveillance and outbreak reports. Regarding availability of emergency drugs and supplies at woreda level; shortage of ant-malarial drugs and vitamin A was encountered.

The level of risk factors for epidemics to occur is low in most of the diseases. However, there is a high risk for malaria in which the LLINs coverage is <80% and there are unprotected irrigations as well as malaria breeding sites. The fact that Meningitis vaccination was provided and presence of health workers trained on meningitis outbreak management made the probability of meningitis to occur in the zone very low. The latrine and utilization coverage is also good which is nearly 93% indicating the low level of risk for occurrence of AWD.

There is also a functional multi-sectoral coordination forum for the health sector in which relevant government and non-governmental organizations are represented. Key zonal program updates, successes as well as gaps are shared through the regular meetings held in a monthly basis. The zonal health office has developed a public health emergency preparedness and response plan by trained health professionals and experts on PHEM. Though the EPRP isn't financially budgeted, the emergency drugs and medical supplies are planned to be in stock. **(Table 34)**

Table 34: Availability of Emergency drugs and supplies in West Arsi zone, Oromia, 2014

Drugs and medical supplies		Total requirement		Available	Gap
		Unit	Plan		
Meningitis vaccine		-	-	-	-
	Coartem (all type)	Dose	3120	0	3120
	Oily CAF	Vials	-	-	-
Drugs	Doxycycline	Pack(20x10)	200	0	200
	Ringer Lactate	Bags	240	0	240
	ORS	Sachets	3000	3000	0
	Amox. Suspension	bottle	1000	400	600
	Cotri. Suspension	bottle	1500	0	1500
	TTC ointment	Tubes	1000	0	1000
	Vitamin A	Tin	80	6	74
Lab.	RDT	Box	435	0	435
Supplies	Pastorex (meningitis)	-	100	0	100
	LP set	-	100	0	100
	TI bottle	bottle	200	0	200
	CTC kits for AWD	Kit	5	0	5
Medical	Gloves	Box	50	0	50
supplies	Syringe	Box	100	10	90
	PPE	set	50	0	50

As it's clearly seen in the table there's a shortage of emergency drugs and medical supplies which implies that there is high requirement of budget to be allocated for emergency management where NGOs working in the zone should intervene and ensure the availability of the supplies.

Nutrition

The current trend of malnutrition has a decreasing pattern as compared to the onset encountered in the previous quarter. Basically the prevalence of malnutrition is known to be high in the lowland woredas of the zone. **(Table 35)**

Table 35: Results of CHD, West Arsi zone, Oromia, 2014

Months	Under 5 children			Pregnant & Lactating	
	Screened	MAM	SAM	Screened	MAM
August, 2014	342,880	9882	1876	78,978	8422
November, 2014	385,276	6647	1414	86,432	6248

The current decrement is explained by the efforts exerted in changing the community's knowledge and practice towards proper feeding and care to children and mothers through the ongoing programs like CBN as well as programs that helped in the early identification and treatment of cases; CMAM and ICCM. The supports provided by several NGOs in the Nutrition sector has also contributed.

WASH assessment West-Arsi zone

The zonal water coverage is 80%, 78% in rural and 95% urban. The water coverage of the Districts range from 54%-98%.The critical water shortage is observed in the kolla area of the zone. There are 1,559 total water schemes 1,489(95.5%) functional and 70(4.5%) are non-functional. Accordingly, assessed Districts water coverage; 65.5% in shalla and 98% in Arsi Negele. In six Districts of west arsi zone there is chronicshortage of water problems. This Districts include Siraro, Shalla, Gedabasasa, Adeba, wondo and Dodola.Of these Districts Siraro in 8 kebeles 39,089total population 18,731 male and 20,358 female are currently at the risk WASH related emergency. Similarly, shalla in 7 kebeles 35,003 population 19,784 male and 15,219 female are also at the risk of current drought. The main factors for this (risk emergency/hazard) lowering of ground water tables damaging of some water schemes and Delaying of the proposed projects to finish within time. **(Table 36)**

Table 36: The schemes and water coverage of West Arsi zone Districts, Oromia,2014.

	Types of water schemes												
District	**BGF**		**BG**		**BTW**		**BIG**		**BHPW**		**Treat PL**	**Total**	
	F	NF	F	NF	F	NF	F	NF	F	NF		F	NF
Adabba	3	-	16	-	8	1	42	5	72	2	-	148	8
Ar/negelle	19	4	13	-	2	-	17	-	52	-	-	102	4
Dodola	12	3	14	5	1	-	31	2	66	2	-	121	11
Gadab	6	-	10	-	8	-	4	-	78	-	-	106	-
Kofale	10	1	7	1	-	-	39	2	255	26	-	311	30
Kokosa	2	-	-	-	-	-	103	4	106	2	-	211	8
Qore	1	-	1	-	6	-	58	1	131	2	-	197	3
Nansab.	-	-	-	-	8	0	71	5	7	2	-	87	7
Sha/ne	8	1	10	-	3	1	33	-	79	-	-	133	2
Sha/ne city	2	-	-	-	-	-	-	-	-	-	1	3	-
Shalla	18	-	-	-	-	-	-	-	-	-	-	18	-
Siraro	18	3	-	-	-	-	-	-	-	-	-	18	-
Wondo	-	-	-	-	2	-	15	1	17	4	-	33	5
Total	75	6	71	6	33	2	415	20	863	34	1	1489	70
	81		**77**		**35**		**435**		**897**		**1**	**1,559**	

Institutional WASH situation

There are a total of 767schools in west arsi zone,714 primary schools and 53 secondary schools, of these 463(64.8%) primary schools and 30(56.6%) secondary schools have shortage of water. Similarly, there are 412 totals of health institution, 80 health centers, 330 health post and 2 hospitals. Regarding WASH for health institution, 32(40%) health centers and 302(91.5%) of health post have not water.

Hygiene and sanitation situation

Regarding hygiene and sanitation the awareness in all districts of the zones are there, but practical application is not active. Some institutions have promotion committee, in schools, health post, health centers and hospitals. In all assessed District among the zone, hygiene and sanitation situation is ongoing practice.

Recommendations

- The emergency preparedness and prevention plans at zonal level should be financed by responsible sector offices and Non-governmental organizations.
- The Emergency supply management system should be strengthened so as to ensure adequate preparedness at all levels.
- Emergency drugs and supplies, mainly for malaria and AWD should be maintained adequately.
- There should be a multisectoral coordination forum in Guji zone and should be strengthened in the zones where it's operational.
- NGOs working on development interventions has to be invited to work in Guji zone.
- The cold chain management system must be enhanced as occurrence of measles in most of the zones could serve as an indicator of this requirement.
- Water treatment chemicals and purifiers should be supplied to areas where there is a low coverage of safe water supply and a regular monitoring in order to ensure the timely delivery of the supplies to the community as there are woredas with sufficient stock of the supplies while the community isn't receiving them. Moreover, there should be a strong coordination between water and health sectors in this regard.
- Refresher training on Public health emergency and management should be planned and provided to relevant health professionals and experts.
- Preventive programs should be enhanced in order to inhibit the recurrent onset of malnutrition as well as multi-sectoral coordination among relevant sectors based on the revised National Nutrition Program.

References

1. Office for coordination of humanitarian affairs, weekly humanitarian highlights in Ethiopia, May 21, 2012

2. UNDP, Emergency Unit for Ethiopia, Field assessment report, August, 2000

CHAPTER-VIII

Protocol/Proposal for Epidemiologic Research Project

8.1. Assessment of magnitude of vaccination status and factors related among Children Age 12-23 Months of age in Abuna Gindeberet District, Oromia, Ethiopia-2015

Executive Summary

Introduction: Worldwide about 29,000 children under the age of five die every day, mainly from preventable causes. Every year around 8 million children in developing countries die before they reach their fifth birthday; many during the first year of life. An Ethiopian child is 30 times more likely to die by his or her fifth birthday than a child in Western Europe. In 1980, the Ministry of Health of Ethiopia initiated the Expanded Program on Immunization (EPI). The objective of EPI in Ethiopia was to fully vaccinate 90% under-one children by the year 1990. To increase the immunization coverage in Ethiopia, predictors of defaulting has to be identified through community based studies. Such community based studies are not much available in Ethiopia.

Objectives: To assess magnitude and factors affecting childhood vaccination status in Abuna Gindeberet District West Shewa Zone, Oromia region, Ethiopia.

Methods and Materials: Community based cross-sectional study with Multi-stage cluster sampling method will be used to collect the data. A total of 444 children age 12-23 months and the mothers/caretakers will be study participants. Structured questionnaire will be used and the questionnaire included sections on: socio-demographic characteristics of mothers and child, utilization of ANC, TT immunization and health institution delivery by mothers, child characteristics, and knowledge of mother on vaccination and vaccine preventable diseases, and immunization history of the child. Data will be entered and analyzed using Epi Info version 7.1.3.0. Logistic regression will be undertaken to determine the odds ratio for both multivariate and bivariate analysis.

Work Plan: The study will be conducted from Julu-August-2015

Budget: The required cost for the study is estimated ETB=62,358.

Introduction

Worldwide about 29,000 children under the age of five die every day, mainly from preventable causes. Every year around 8 million children in developing countries die before they reach their fifth birthday; many during the first year of life. An Ethiopian child is 30 times more likely to die by his or her fifth birthday than a child in Western Europe [1, 2]. Some of the deaths occur from illnesses like measles, malaria or tetanus. According to the demographic health survey (DHS, 2005) of Ethiopia, child mortality rate of the country was 132 per 1000 live births, which is one of the highest in the world. The child mortality rate in Oromia was 142 per 1000 live births [2, 3]. Immunization offered the greatest benefits for health, well being and survival of children than any other interventions [4]. From 1960–2002, a fifty percent reduction in under-five mortality was observed in Africa. Immunization programmes has saved the lives of nearly 4 million children [1-3]. Study showed that the cost to treat a vaccine preventable disease is 30 times more than the cost of the vaccine [5].

Epidemiological investigations of recent outbreaks of vaccine preventable diseases indicated that incomplete immunization was the major reason for the outbreaks. Moreover, a low immunization rate was the major reasons for many of the outbreaks of infectious diseases in the past two decades [6].

In 1980, the Ministry of Health of Ethiopia initiated the Expanded Program on Immunization (EPI). The objective of EPI in Ethiopia was to fully vaccinate 90% under-one children by the year 1990. The vaccination schedule of Ethiopia is based on the recommendation of World Health Organization (WHO) for developing countries [7, 8]. However, different literatures revealed that EPI schedule in Ethiopia is not completed as planned and full immunization rate is low (49.9%). As a result many children in Ethiopia do not get the benefits of immunization [9,10]. To increase the immunization coverage in Ethiopia, predictors of defaulting has to be identified through community based studies. Such community based studies are not much available in Ethiopia.

Ethiopia EPI Schedule

AGE	Vaccine	Disease it prevents	Vitamin
At Birth	BCG,OPV-0	Tuberculosis	
6weeks	DPT-HepB-Hib1,OPV1,PCV1	Polio Diphtheria, Pertussis, Tetanus, Haemophilus Influenza type B, Hepatitis B, Pneumonia, Rotavirus, Diarrhoea.	
10weeks	DPT-HepB-Hib1,OPV2,PCV2,Rota1		
14weeks	DPT-HepB-Hib3,OPV3,Rota2		
9months	Measles	Measles	1st dose Vitamin A

Source: Comprehensive multiyear plan on EPI in Ethiopia, 2011-2015, FMoH

Statements of the problem

Poor intake of child vaccine is a main attributed factor for magnitude of vaccine-preventable communicable diseases. Published and unpublished researches in Ethiopia documented that occurrence of measles outbreak in many areas of the country is significantly associated with low measles vaccination coverage and improper management of cold chain system. With the recent scenario, there was a plenty of measles outbreak in Oromia region, Ethiopia. Measles vaccination coverage of the Oromia region was 46% in 2011 at any time before the survey (EDHS 2011). Similarly, unpublished study by the same auther on measles outbreak investigation and response in Abuna Gindeberet District in May, 2014 showed that poor vaccine utilization was contributed for the outbreak. Although the Abuna Gindeberet District health office report shows that the average measles administrative vaccination coverage for the last consecutive five years was 89% which is still under recommended level (95%) for herd immunity. However, only few studies have assessed factors associated with complete immunization coverage. Therefore, the aim of this study was to assess factors affecting the immunization status among children 12–23 months of age in Abuna Gindeberet District and to generate data that could be used for better planning and strengthening of immunization services.

Lirature Review

Study in Mozambique, India and Bangladesh also showed utilization of maternal health care service like Antenatal Care (ANC), tetanus toxoid vaccination and institutional delivery is associated with complete immunization status of children [11-13].

Certain research faindigs revealed that place of delivery is identified as determinant factor for childhood immunization. Same way study conducted in Rural Mozambique shows home delivered children have nearly 3 times higher risk of not completing their vaccination program than delivered at health institutions [14]. Similarly, study conducted in Uganda on factors influencing childhood immunization documented that maternal education and access to media have been highlighted as an important predictor of full childhood immunization and receiving individual vaccines [15]

Study done in south and north Ethiopia identified that, mothers' educational status, urban residence and perceived health care support are significantly associated with complete immunization coverage [16,17].

In addition, low access to services, inadequate awareness of caregivers, missed opportunities, and high dropout rate are major factors contributing to low immunization coverage [19].

A research conducted in South-Western rural of Ethiopia on childhood vaccination with demographic factors and women's autonomy exhibited that women's participation in household decision making, maternal education and use of antenatal care during pregnancy were significantly associated with full vaccination status [20].

Objective

General Objective

To assess magnitude and factors affecting childhood vaccination status in Abuna Gindeberet District West Shewa zone, Oromia region, Ethiopia.

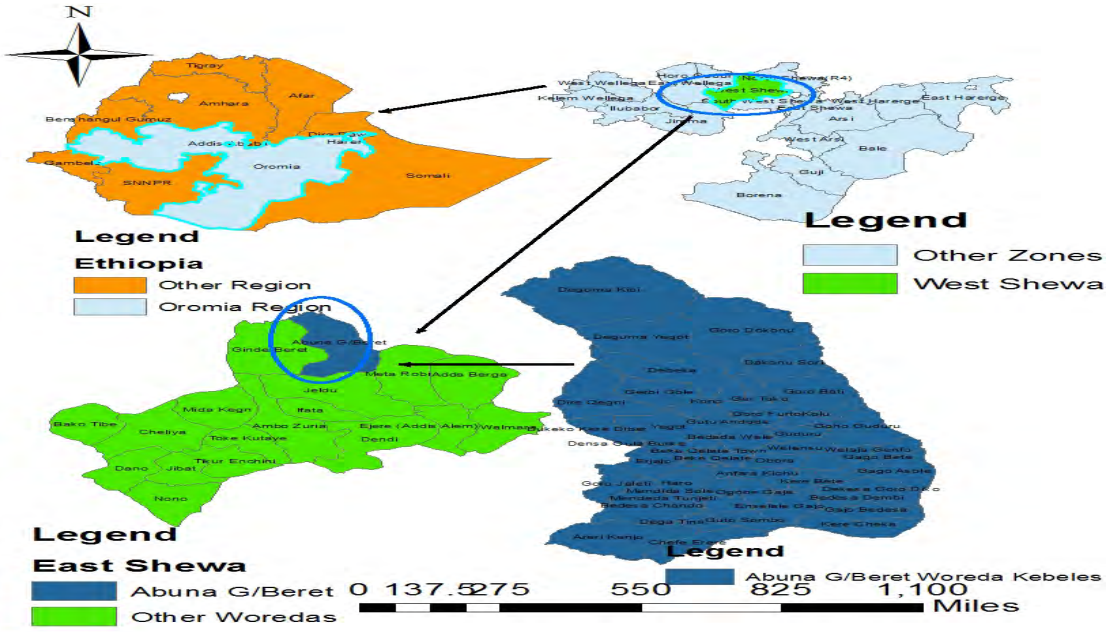
Specific Objectives

- To describe magnitude of children vaccination status in Abuna Gindeberet District
- To identify demographic and socio economic factors affecting immunization status among children 12–23 months
- To assess the knowledge of mothers/caretakers on immunization service and vaccine-preventable diseases.
- To identify health service related factors that may influence childhood vaccine intake in the district.

Methods and Materials

Study area

The study will be conducted in Abuna Gindeberet District which is 210 KM away from Addis Ababa. Abuna Gindeberet is one of 19 districts in West Shewa Zone, The projected population (CSA-2007) of the Abuna Gindeberet District estimated to be a total population of as 131,761 in 2014 has 44 Kebeles (one urban and forty three rural). The district's agro-climatically divided into High Land (20%), Mid-Land (10%) and Low land (60%). The altitude varies from 1800-3500 meters above sea level. Abuna District is shared boundaries with four districts on North, Were Jarso District (North Shewa Zone) on East, Jeldu District, on West Gindeberet District and on South Amahra Regional State. The primary health service coverage of district was 100% in 2013 by the available 6 Health Centers alone. The health delivery system is given to the community by using 6 health centers, 44 health posts. In the last three years routine measles addminstrative average vaccination coverage of district was above 89%.



Map 7: Map of Abuna Gindeberet District, West Shewa, Zone, Oromia

Study Design and period

Community based cross-sectional study will be used on 12-23 months children July-August, 2015

Source Population

All households with 12-23 months children in Abuna Gindeberet District will be the source population

Study Population

All mothers/caretakers with 12-23 months age children in randomly selected 11 kebeles of the woreda will be study population.

Sample Size Determination

The sample size will be calculated using Ethiopian Demographic Health Survey (EDHS) 2011 estimation for fully vaccinated children [17]. Following this, the proportion of fully immunized children of 12-23 months for Oromia region in 2011 was 15.6% with 95% confidence interval 5% margin of error and 10% non-response rate and design effect will be 2 as common for immunization cluster survey.

Number of Sample Size = $\frac{(1.96)^2 \text{ X P (1-P) X}}{d^2}$ Design Effect = **404**

Where: - d = Absolute precision = 5%

P = Estimated prevalence = 15.6%

A total of 449 children age 12-23 months and the mothers/caretakers will be study participants.

Sampling Procedure

The total (44 rural and 1 urban) kebeles in the District initially be stratified into rural and urban areas. Then, 10 rural and 1 urban kebeles will be selected by lottery from the total kebeles in the district. The modified 2005 WHO EPI cluster sampling method [21] will be used to select study households. Each kebele will be considered as one cluster. The lists and number of households

could not be found for all selected rural kebeles. So, equal number of household with at least one child between 12–23 months of age will be selected from each of rural kebeles. In each kebele the first household will be selected by randomly chosen from the central location of kebele, then counting the households along the directional line to the edge of kebele area and selecting randomly one. The subsequent households will be selected, according to the inclusion criteria, based on the principle of the next nearest household. Households in the kebele will be visited until the allocated sample size for the kebele becomes fulfilled.

Data Collection Procedure

Structured questionnaire initially developed in English and will be later translated into Afan Oromo for data collection. Some of the questions adopted from demographic and health survey of Ethiopia [18]. The questionnaire included sections on: socio-demographic characteristics of mothers and child, utilization of ANC, TT immunization and health institution delivery by mothers, child characteristics, and knowledge of mother on vaccination and vaccine preventable diseases, and immunization history of the child. Respondents will be interviewed in the households by nurses. The acceptability of the questions and logical structure will be checked in the field during pretesting. Data on immunization history will be collected either from vaccination cards or mothers verbal report. A household will be eligible if a child between 12-23 months of age available in the house. After a child aged between 12-23 months was identified from the household through house-to-house visits, mothers of the child were asked for the presence of child's immunization card. In case where there are two or more child aged between 12–23 months the youngest child will be selected. For the child with immunization card, the information on the doses and types of vaccines will be copied from the card. In the absence of vaccination card, mothers will be asked for immunization history of the child. The number of doses the child took and its route of administration will be the way of collecting immunization history of the child. Information on other variables will be asked directly from the child's mother/care giver. Mothers of children will also be interviewed about their knowledge on vaccination and vaccine preventable disease.

Operational Definitions

Accessibility of Immunization Services: Opportunity to get immunization services with in short radius (less than 5 kilometres for health center).

Vaccination: The administration of a vaccine to stimulate a protective immune response that will prevent disease in the vaccinated person if contact with the corresponding infectious agent occurs subsequently.

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.

Immunization: If vaccination is successful, it results in immunization: the vaccinated person has been immunized.

Fully Vaccinated: A child between 12-23 months old who received one BCG, at least three doses of Pentavalent, three doses of OPV, three doses of PCV, two doses of Rota Virus and a measles vaccine**.**

Partially Vaccinated: A child who misses at least one doses of the ten vaccines.

Unvaccinated: A child who does not receive any dose of the ten vaccines.

Immunization Coverage: Proportion of children took vaccination.

Immunization Status: Being fully/partially vaccinated or unvaccinated

Immunization Service: Activities delivered to mothers and children that contain full package of vaccination at health facilities or outreach sites.

Inclusion Criteria

All households with at least one 12-23 months child will be included in the study.

Exclusion Criteria

This study will not include households with no child with age ranges 12-23 months.

Variables of the Study

Dependent Variables

- Childhood vaccination status.(not, partially or fully vaccinated)

Independent Variables

- ANC follow up of mothers/caretakers
- Autonomy of mothers/caretakers
- Birth order of the children
- Family income
- Family size
- Knowledge of mothers/caretakers
- Number of 12-23 months children in the home
- Place of delivery
- Sex of children
- Socio demographic characteristics of mothers/caretakers
- Tetanus toxoid vaccination status of mothers/caretakers
- Time of travel to reach the nearest health facility
- Vaccination history of the children

Data Entry and Analysis Procedures

Data will be entered and analyzed by Microsoft Excel and Epi Info version 7.1.3.0. Magnitude of childhood vaccination status will be described by percentage and number for different independent variables. logistic regression will be undertaken to determine the odds ratio for both multivariate and bivariate analysis. Bivariate analysis will be done to determine factors associated with childhood vaccination status. The findings of the study will be presented by tables and charts.

Data Quality Management

The questionnaire that will be used for the study is adopted from Ethiopian Demographic and Health Survey (EDHS) and other studies conducted in different countries on assessment of factors associated with childhood vaccination status. During data collection every questionnaire filled by data collectors will be checked by field supervisors for their completeness and if responses filled correctly in daily basis. Unfilled questions on the questionnaire will be

completed by revisiting those households. Data collectors will be supposed to fill information on child vaccination history based on vaccination card (if available) and give a time for mothers/caretakers to bring this card. Additionally, the principal investigator will check filled questionnaire and give feedback for field supervisors every day prior to data entry.

Ethical Clearance

Ethical clearance will be obtained from Addis Ababa University School of Public Health Institutional Review Board. A formal letter will also be submitted to all the concerned bodies (West Shewa Zone Health Department and Abuna Gindeberet Health office) to obtain their co-operation. For the study subjects who will agree to participate, written consent will be secured from parents or guardians. Confidentiality and anonymity will be maintained for the study participants and findings. All the participants right to self-determination and autonomy will be respected. Confidentiality will be assured and no personal details will be recorded or produced on any documentation related to the study.

Dissemination of the results

After the research paper is approved by the advisors and other responsible bodies of the EFETP of School of Public Health at Addis Ababa University, written report (both in hard and soft copies) will be prepared and shared to the respective bodies. There will be presentation or meeting to debrief the finding of the research to the Oromia Regional Health Bureau, West Shewa Zone Health Department, Abuna Gindeberet District Health Office, EFETP program coordinators.

Expected Outcomes

This study will be able to document childhood vaccination coverage of Abuba Gindeberet District and identify factors affecting childhood vaccination status that could contribute towards improvement of immunization service in the area and through the region as well.

Timeline

Major activities and estimated time for the accomplishment for the project on factors associated with complete immunization coverage in children aged 12–23 months in Abuna Gindeberet, Oromia, Ethiopia

Phases of Project	Major Activities	Done	15-April – May-15 2015	July 2015	July 2015	Augrst 2015	Augst 2015
Phase- I. Writing Proposal	Selection of research title						
	• Writing the draft of research proposal, amending the proposal as per the comments of the advisor • Submitting the finalized proposal to the graduate coordinator • Review proposal • Approval of the project						
Phase- II. Conducting Research	Collecting letter of clearance & other supportive letters from research and publication committee						
	Training of the data collector Pretesting of the and questionnaire						
	Data collection, entry, clearance and analysis						
	Write-up of the research draft Amending of the research paper as per the comments of the advisor						
	Compile final report						
	Submission of Final Version of report						
Phase- III. Defending	Defense and dissemination of findings						

Budget break down

SN	Budget/Item/Activities	Qualification	Unit	Total	Unit Price USD	Duration of work	Total USD
1	Personal cost						
1.1	Training & Pre- test	Data collectors	each	7	15	2	**210.00**
1.2	Refreshment						**50.00**
1.3	Data collector	Nurse	each	4	15	10	**700.00**
1.4	Supervisor	HO	each	2	20	10	**400.00**
1.5	Investigator	EFETP resident	each	1	25	20	**500.00**
				Sub Total			**1,860.00**
2	Communication /Internet		card	1	20	1	**20.00**
3	Stationery materials						**490.00**
				Sub Total			**510.00**
4	Transport						
4.1	Fuel cost	300km/day with5km/liter 20 lit/day => for total trip 515lt x 1.22USD	liter	515lier	1.22/liter	20	**628.30**
				Sub Total			**628.30**
				Ground Total			**2,998.30**

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CHAPTER-IX

Other Additional Outputs

9.1. Assessment of Hospitals Preparedness towards Ebola Virus Diseases in Addis Ababa, Ethiopia-January, 2015

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Title: Assessment of Hospitals Preparedness towards Ebola Virus Diseases (EVD) in Addis Ababa-Ethiopia, January, 2015.

Background: The 2014 Ebola epidemic in West Africa has ignited increasing global concern. Health facilities including hospitals are at the front line to detect, diagnose and manage EVD suspects. Addis Ababa is home of the African Union and hub of the biggest airline network in Africa. We assessed hospitals in Addis Ababa to identify their preparedness towards EVD in order to improve the capacity of early EVD detecting and reporting.

Methods: We conducted a cross-sectional health facility based survey from January 1-3, 2015, in all the 33 public and private hospitals in Addis Ababa City. A structured questionnaire was used to interview key informants in each hospital. Data analysis was made using Epi Info 7.

Results: Out of the 33 Hospitals, 13(39.4%) were public and 17(60.6%) were private, out of which 84.6% of the public and 75% of the private hospitals have done staff awareness on EVD. From all hospitals assessed, most had functional incinerator (94%) and triage units (78.5%) in place; 72.7% had EVD case definition; 27.3% had national Ebola interim guideline available; 48.5% had Ebola cases screening procedures in place. In terms of facilities 51.5% had isolation rooms. In 39.4% of hospitals isolation rooms were separated from other wards while in only 9.1% they were properly labeled with safety signs. In further assessment 45.5% had dedicated bed rooms, 18.2% had built-in toilets, and 33.3% had a separate hand-washing facility. In 57.6% of hospitals there was a functional referral systems in place, 66.7% had focal-person for referring EVD cases while 24.2% had EVD preparedness and response committee.

Conclusion: More than half of the hospitals in Addis had good preparedness for EVD, based in their emergency triage units and isolation room. However, we observed poor infection prevention and control practice, coordination and referral system in most hospital. We recommend improved hospital coordination, referral system to the hospital, infection prevention and Control to EVD should be improved through continues training and supportive supervision.

Key Words: Ebola Virus Diseases (EVD), Hospital, Preparedness, Addis Ababa, Ethiopia.

Introduction

The devastating epidemic of Ebola virus disease (EVD) in West Africa, with over 18,603 reported cases and nearly 6,915 deaths as of 17 December 2014 [1], has ignited increasing global concerns about the potential introduction and further spread of the disease by international travel and repatriation [2–4].

For this reason, the World Health Organization (WHO) has advised all nations, including those not directly neighboring currently EVD affected countries, to prepare for the detection, investigation and management of confirmed and suspected EVD cases [4]. In view of the non-specific nature of initial symptoms, suspected patients essentially include all travelers with unexplained febrile illness recently arrived from areas with ongoing EVD transmission, particularly when accompanied by gastrointestinal symptoms. The current assessment will be related to travel-associated cases that may be remained rare across Ethiopia, but that the occurrence of EVD in returning healthcare workers in Europe is a realistic scenario [5,6]. The recent experiences with both types of EVD cases in the United States and Europe, with local transmission to healthcare workers, illustrate the importance of being prepared [7,8]. To gain insights into the preparedness of Ethiopian hospitals and identify potential gaps in preparedness at hospital level, we conducted a survey in 33 hospitals in Addis Ababa, focusing on the early/rapid detection, isolation and capacity to communicate patients' referral/transfer with suspected EVD and on specific preparedness activities of hospitals in response to the current Ebola crisis. It should be emphasized that the survey didn't address preparedness for EVD at national levels but was solely intended to explore the preparedness at the hospital level.

Interventions in the three most-affected countries continue to progress in line with the UN Mission for Ebola Emergency Response aim to isolate and treat 100% of EVD cases and bury safely and with dignity 100% of EVD related fatal cases by 1 January, 2015.

Rationale of the study:

As it is well known that currently EVD has become global issue which has been continuing to affect the West African countries especially those three (Serra Leone, Guinea and Liberia) are remained affected on the daily basis. Ethiopia has an airline connection as well a seat for African Union there has to be strong readiness to defend the existence of EVD. A significant number of travelers (transits, AU staff, UN staff, Diplomatic, residents and other business travelers) from EVD affected countries have been come to Ethiopia every day. Probably, health facilities are the front line to detect Ebola patients. Building their capacity will enable them to timely detect, safely isolate and properly refer to designated Ebola treatment unit. This assessment was identifed strengthens and weaknesses of both public and private hospitals towards Ebola Virus disease preparedness. Finally, based on the results of the assessment plan of action will be developed to fulfill the gaps.

Objectives

General objective

To assess the level of hospitals preparedness towards the deadly Ebola virus diseases (EVD) in Addis Ababa, Ethiopia-Jan, 2015

Specific objectives

- To identify the capacity of hospitals to timely detect Ebola patients properly
- To identify hospitals ability to isolate and manage Ebola patient in the hospital
- To assess the capacity of Hospitals to properly refer Ebola patient to treatment unit properly
- To evaluate the awareness among hospitals staff
- To assess hospitals waste management system and infection prevention practice
- Finally, to draw possible recommendations and develop plan of action based on the assessment findings

Methods

Study area

The study was conducted in Addis Ababa. Addis Ababa is the capital city of Ethiopia. It is the largest city in the country, with a population of 3,233,544 according to the 2007 population census projection with annual growth rate of 2.1%. It is where the African Union is based. It also hosts the headquarters of the United Nations Economic Commission for Africa (UNECA) and numerous other continental and international organizations. As the city of the country, it is the bases for diplomatic.

Bole International airport is serve as African flight hub which connects Ethiopia mainly Addis Ababa with countries of Africa, Europe, U.S.A, Canada, Asia and the Middle East.From its hub

at Addis Ababa, Ethiopian serves 83 international and 20 domestic destinations. The Bole International airport serves for 52,800 Passengers Per day and 19, 219,200 passengers per year.

Study design and Period

Cross-sectional health facility based survey was conducted from January 1-3, 2015.

Sample size

The assessment was conducted in public, army, police and private Hospitals in Addis Ababa. Totally, 33 hospitals (11 public, 2 army, 1 police and 20 private hospitals) were assessed.

Data collection

Structured questionnaire was used. Orientation was given to data collection team prior to data collection period. Interview was conducted with the heads of the hospitals, triage unit experts, Infection prevention focal person and surveillance focal person using the questionnaire. Discussion was also made with the Ebola isolation room delegated person if any. Observation was made to ensure the existence of relevant documents, protocols, case definitions, infection prevention materials, waste disposal system. Camera was also use to take pictures.

Data analysis

Data was entered and analyzed by using Excel and Epi info 7

Results

A total of 33 hospitals participated in this survey of which 13(39.39%) were Public/Government owned Hospitals and 20(60.6%) were Private owned Hospitals; all of them are located in Capital City Addis Ababa.

Range of awareness, waste management system, water and power supply

Initiatives to raise the awareness and reduces panic of staff regarding the current situation of Ebola virus diseases were done in 11 of 13 public hospitals (84.6%) where as in 15 of 20 private hospitals (75%), overall, 31 of 33 hospitals (94%) indicated that they have functional incinerator, one (3%) have no functional incinerator and another one (3%) hospital has incinerator which was under maintenance (Table 1). Liquid waste disposal system were available in 32 of 33 hospitals (96.9%), color coded waste disposal bins (yellow, red and black) in 23 of 33 hospitals (69.7%) sharp waste disposal containers were available in all hospitals.

Local hospital infection prevention and control guidelines were available in 32 hospitals (97%), IP committee were established and functioning in 24 (72.7%) hospitals, of which 12 (36.4%) hospitals were having regular meeting (Table 1).

Regarding water source all 33 (100% hospitals were having pipe water supply, 9 of 33 hospitals (27.3%) were having 5,000 – 15,000 Liter capacity water container, and 24 (72.7%) hospitals were having greater than 15,000 Liter capacity water reservoir. Standby backup generator was available in all assessed hospitals (Table 36).

Table 37: Level of preparedness with regard to waste management system, Infection prevention and control practice, water supply, and power supply in public and private hospitals-Addis Ababa, Ethiopia-Jan-2015 (n=33)

Description	Responses (yes/No…)	Total (n=33)(%)	Public Hospitals (n=13) (%)	Private Hospitals (n=20) (%)
General information				
Initiatives to raise the awareness and reduces panic of staff	Yes	26(78.7)	11(84.6)	15(75.0)
	No	7(21.2)	2(15.4)	5(25.0)
Waste management system				
Functional incinerator	Yes	31(94.0)	11(84.6)	20(100)
	No	1(3.0)	1(7.70)	0
	maint.	1(3.0)	1(7.70)	0
Liquid waste disposal pit	Yes	32(96.9)	12(92.3)	20(100)
	No	1(3.0)	1(7.7)	0
color coded waste disposal bins(yellow, red and black)	Yes	23(69.7)	13(100)	20(100)
	No	10(30.3)	0	0
sharp waste container(safety box)	Yes	33(100)	13(100)	20(100)
	No	0	0	0
Infection prevention and control (IP) guidelines	Yes	32(97.0)	13(100)	19(95.0)
	No	1(3.0)	0	1(5.0)
presence of IP committee	Yes	24(72.7)	12(92.3)	12(60.0)
	No	9(27.3)	1(7.7)	8(40.0)
IP committee regular scheduled meeting	Yes	12(36.4)	7(53.9)	5(25.0)
	No	21(63.6)	6(46.2)	15(75)
water source				
clean pipe water	Yes	33(100)	13(100)	20(100)
	No	0	0	0
Hospitals having water reservoir	Yes	33(100.0)	13(100)	20(100)
	No	0	0	0
Capacity of water reservoir	5,000-15,000L	9(27.3)	6(46.2)	3(15.0)
	>15,000L	24(72.7)	7(53.9)	17(85.0)
power supply				
24 hours electric services	Yes	33(100)	13(100)	20(100)
	No	0	0	0
functional standby generator	Yes	33(100)	13(100)	20(100)
	No	0	0	0

Case detection, triage management and sanitation facilities

Triage unit were available in 25 of 33 hospitals (78.5%), Ebola case definition were available and posted in 24 of 33 hospitals (72.7%), national Ebola interim guideline were available in 9 of 33 hospitals (27.3%), Ebola cases screening procedure were available in 16 of 33 hospitals (48.5%), patient and clinician seat arranged in 90^0 and 1meter apart in 7 hospitals (22%), notification system were indicated in 25 of 33 (75.8%) hospitals, knowledge to hotline number were in 24 of 33 hospitals (72.2%), functional hand washing facility were available in 23 of 33 hospitals (69.7%), hand washing procedure were available in 25 of 33 hospitals (75.8%), soap/0.05% bleach solution were available in 25 of 33 hospitals (75.8%), house hold bleach(5%) were available in 21 of 33 hospitals (63.6%), chlorine preparation procedure in 17 of 33 hospitals (51.5%) (Table 37).

Table 38: Existence of emergency triage unit, capabilities of Ebola cases screening procedures in line with standard precautions and establishment of notification system in public and private hospitals-Addis Ababa, Ethiopia-Jan-2015 (n=33)

Description	Responses (yes/No…)	Total (n=33)(%)	Public Hospitals (n=13) (%)	Private Hospitals (n=20) (%)
Case detection				
Having emergency triage unit	Yes	25(75.8)	13(100)	12(60.0)
	No	8(24.2)	0	8(40.0)
Presence of Ebola virus disease case definition and posted at the appropriate sites.	Yes	24(72.7)	9(69.2)	15(75.0)
	No	9(27.3)	4(30.8)	5(25.0)
presence of national Ebola interim guidelines	Yes	9(27.3)	4(30.8)	15(75.0)
	No	24(72.7)	9(69.2)	5(25.0)
EVD screening procedure	Yes	16(48.5)	5(38.5)	11(55.0)
	No	17(51.5)	8(61.5)	9(45.0)
practice of patient and clinician seat at 90 degree and 1meter distance apart	Yes	7(22.2)	1(7.7)	6(30.0)
	No	26(78.8)	12(92.3)	14(70.0)
Notification system to next higher public health authority established	Yes	25(75.8)	9(69.3.0)	16(80.0)
	No	8(24.2)	4(30.8)	4(20.0)
Responsible focal person for reporting and	Yes	22(66.7)	8(61.5)	14(70.0)

coordinating isolation, transfer of EVD suspected patients	No	11(33.3)	5(38.5)	6(30.0)
Hotline number known by all health worker	Yes	24(72.7)	2(15.4)	7(35.0)
	No	9(27.3)	11(84.6)	13(65.0)
Hand washing facility				
Functional Hand washing facility	Yes	23(69.7)	9(69.2)	14(70.0)
	No	9(27.3)	4(30.8)	5(25.0)
	maint.	1(3.03)	0	1(5.0)
Hand washing procedure	Yes	17(51.5)	6(46.2)	11(55.0)
	No	16(48.5)	7(53.9)	9(45.0)
Availability of Soap	Yes	25(75.8)	10(77.0)	15(75.0)
	No	8(24.2)	3(23.1)	5(25.0)
Availability of alcohol based hand rub	Yes	28(84.9)	13(100)	15(75.0)
	No	5(15.2)	0	5(25.0)
Alcohol based hand rubbing procedure	Yes	17(51.5)	7(53.9)	10(50.0)
	No	16(48.5)	6(48.2)	10(50.0)
Disinfection materials at triage unit in case there is body fluid				
Availability of 5% household bleach	Yes	21(63.6)	8(61.5)	13(65.0)
	No	12(36.4)	5(38.5)	7(35.0)
Chlorine preparation procedure	Yes	17(51.5)	5(38.5)	12(60.0)
	No	16(48.5)	8(61.5)	8(40.0)
Chlorine solution preparation materials	Yes	26(78.8)	8(61.5)	18(90.0)
	No	21(21.2)	5(38.5)	2(10.0)
Mechanism to take suspected EVD patients to designated isolation room	Yes	16(48.5)	4(30.8)	12(60.0)
	No	17(51.5)	9(69.3)	8(40.0)

Figure 34: Readiness of PPE in both Triage unit and Isolation unit in the assessed hospitals – Addis Ababa, Ethiopia, Jan-2015

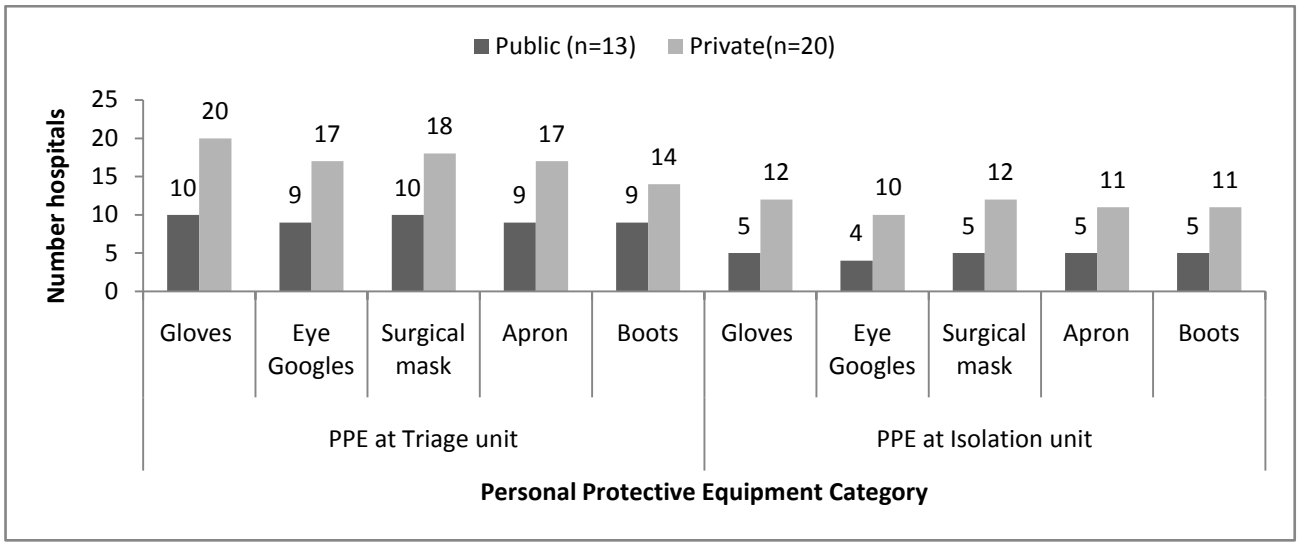

Figure-32. Indicated the distribution of primary Personal protective equipment at both triage and isolation unit)

Isolation room and management of Ebola patients

Isolation room were available in 17 of 33 hospitals (51.5%), isolation rooms separated from other wards in 13 of 33 hospitals (39.4%), the room labeled with safety signage and fenced in 3 of 33 hospitals (9.1%), isolation rooms have bed in 15 of 33 hospitals (45.5%), dedicated/ isolation room specific toilet were available in 6 of 33 hospitals (18.2%), separated hand washing facility were available in 11 of 33 hospitals (33.3%) **(Table 38).**

Table 39: Existence of well equipped temporary isolation room and precautions undertaken until Ebola virus disease suspected cases transferred to treatment unit , in public and private hospitals-Addis Ababa, Ethiopia-Jan-2015 (n=33)

Description	Responses (yes/No…)	Total (n=33)(%)	Public Hospitals (n=13) (%)	Private Hospitals (n=20) (%)
Isolation and management of Ebola patients				
Availability of isolation room	Yes	17(51.5)	4(30.8)	13(65.0)
	No	16(48.5)	9(69.2)	7(35.0)
Isolation room separated from wards	Yes	13(39.4)	3(23.1)	10(50.0)
	No	5(15.2)	1(7.7)	4(20.0)
Isolation room labeled with safety sign and fenced	Yes	3(9.1)	1(7.7)	2(10.0)
	No	14(42.5)	3(23.0)	11(55.0)

Isolation room have bed	Yes	15(45.5)	4(30.8)	11(55.0)
	No	2(6.1)	0	2(10.0)
Mattress properly covered with rubber sheet	Yes	10(30.3)	2(15.4)	8(40.0)
	No	7(21.2)	2(15.4)	5(25.0)
Dedicated/separated toilet for isolation room	Yes	6(18.2)	0	6(30.0)
	No	11(33.3)	4(30.8)	7(35.0)
Separate hand washing facility for isolation room	Yes	11(33.3)	2(15.4)	9(45.0)
	No	6(18.2)	2(15.4)	4(20)
Puncture resistance safety box	Yes	14(42.4)	4(3.8)	10(50)
	No	3(9.1)	0	3(15)
Solid waste plastic bin or biohazard bag available	Yes	12(36.4)	4(30.8)	8(40)
	No	5(15.2)	0	5(25)
Chlorine solution (0.5%)	Yes	12(36.4)	3(23.1)	9(45)
	No	5(15.2)	1(7.7)	4(20)
Disinfection protocol	Yes	10(30.3)	3(23.1)	7(35)
	No	7(21.2)	1(7.7)	6(30)
spray or mopping materials	Yes	5(15.2)	1(7.7)	4(20)
	No	12(36.4)	3(23.1)	9(45)

Referral/transfer system of Ebola virus diseases suspected cases and overall coordination system

Presence of EVD treatment unit in Addis Ababa were indicated in 26 of 33 hospitals (78.8%) , 14 of 33 hospitals (42.4%) were responded that there was one treatment unit, 10 (30.3%) hospitals replied that there were two EVD treatment unit, and 4 of 33 hospitals (12.1%) were responded that there were no treatment unit in Addis Ababa (Table 40).

19 of 33 hospitals (57.6%) were having referrals system in place, 22 of 33 hospitals (66.7%) were having delegated focal person who can communicate in case of referral/transfer of EVD cases to the existing treatment unit. 26 of 33 hospitals (78.8%) were having documented telephone number, the national toll free hotline number were known by 12 of 33 hospitals (36.4%), EVD preparedness and response committee were established in 8 of 33 hospitals (24.2%) (Table 39).

Table 40: Referral system for Ebola virus disease suspected patients to treatment unit and existence of overall coordination system, in public and private hospitals-Addis Ababa, Ethiopia-Jan-2015 (n=33)

Description	Responses (yes/No…)	Total (n=33)(%)	Public Hospitals (n=13) (%)	Private Hospitals (n=20) (%)
Patient referral system to Ebola treatment unit				
Knowledge to Ebola treatment unit in Addis Ababa	Yes	26(78.8)	11(84.6)	15(75.0)
	No	6(18.2)	1(7.7)	5(25.0)
How many treatment unit	One	14(42.4)	7(53.9)	7(35.0)
	Two	10(30.3)	4(30.8)	6(30.0)
	No	4(12.1)	1(7.7)	3(15.0)
presence of referral system	Yes	19(57.6)	7(53.9)	12(60.0)
	No	13(39.4)	6(46.2)	7(35.0)
Delegated focal person	Yes	22(66.7)	8(61.5)	14(70)
	No	11(33.3)	5(38.5)	6(30.0)
Documented telephone number	Yes	26(78.8)	9(69.2)	17(85.0)
	No	6(18.2)	4(30.8)	2(10.0)
Knowledge to Ebola hotline number (8335)	Yes	12(36.4)	4(30.8)	8(40.0)
	No	20(60.6)	9(69.2)	11(55.0)
Coordination mechanism				
Ebola preparedness and response committee	Yes	8(24.2)	8(24.2)	3(15.0)
	No	25(75.8)	24(72.7)	17(85.0)
action plan produced by the committee and followed	Yes	4(12.1)	2(15.4)	2(10.0)
	No	12(36.4)	7(53.9)	5(25.0)
Trained rapid response team(RRT)	Yes	3(9.09)	2(15.4)	1(5.0)
	No	29(87.9)	11(84.6)	19(35.0)

Discussions

This assessment identified awareness creation in some private hospitals, lack of regular meetings and screening procedures were low. This can hinder hospital community in the involvement of EVD prevention due to lack of awareness, recent update on the disease and suspected cases can be missed during the screening.

Assessing the hospitals preparedness towards EVD case detection, isolation and referral capabilities will provide a good insight about their current status and hence gap-filling activities

will be planned. Ethiopia was one of the 13 high priority countries in Africa, on the basis of criteria including geographical proximity to affected countries, trade and migration patterns, and strength of health systems [1].

Majority (94%) and (96.9%) of hospitals; they had functional incinerator and Liquid waste disposal system respectively. This showed safe waste disposal system would play a great role in disease prevention and control. Color coded waste disposal bins (yellow, red and black) in hospitals sharp waste disposal containers were available in all hospitals having these materials will help to segregate wastes into categories such as: infectious and non infectious.

Regarding the infection prevention and control guide line; local hospital infection prevention and control guidelines were available in most hospitals (97%) but, IP committee were established and functioning in (72.7%) of hospitals, of which (36.4%) hospitals were having regular meeting. Having functional IP committee will provide the chance of monitoring mechanism in a regular basis.

Power interruption would be a serious problem in case of emergency to operate electrical medical materials and for lighting purpose and hence, there was standby backup generator was available in all assessed hospitals.

Our study findings revealed that triage unit were available in (78.5%) hospitals but, (24.2%) of hospitals were lacking triage facility. Ebola case definition was available and posted in (72.7%) of hospitals, availability of national Ebola interim guideline was demonstrated in (27.3%) of hospitals, this revealed that there are areas for improvement in this regards. Triage was defined to be a system of assessing and sorting patients according to the likelihood of a specific disease or the severity of their illness, to aid in referral to appropriate isolation options and treatment [9].

Ebola cases screening procedure were available in (48.5%) hospitals; patient and clinician seat arrangement at 90^0 and 1meter apart was demonstrated in (22%) hospitals this reveled that most hospitals emergency officers approaching not in standard manner rather they are at risk of getting the disease if it were happening in their facility. It is recommended by the national Ebola interim guide line, that Ebola screening procedure must be available in every health facility in case of emergency and the patient should face away from clinician at 90 degree [11].

Established notification system must be in place so as to early reporting and management of EVD suspected cases, our study finding indicated that notification system were in place in (75.8%) hospitals. Knowledge to hotline number was indicated by (72.2%) hospitals this implies that some of the respondents have no idea about the current working hotline number (8335).

In our finding (30%) hospitals lacking hand washing facility this revealed. Hand washing is one of the best recommendations as an element of IP protocol before and after any procedures handled and hence, functional hand washing point was a must [9].

Isolation rooms are crucial in a waiting the EVD suspects until they are getting transferred to the EVD treatment center which will minimize the risk of spreading of the disease if it happens but, in our study, almost half of the assessed hospitals lacking isolation room, most isolation rooms were not found to be separated from other wards and did not be labeled with safety signage and most (90%) not fenced, there was also minimal effort exerted in making the isolation room to have dedicated/ isolation room specific toilet (18.2%) hospitals. In case there are EVD suspected cases there might be a chance of acquiring the disease because there is no clear border indicated in the area.

Knowing to the presence of EVD treatment unit in Addis Ababa were indicated in (78.8%) hospitals while (42.4%) hospitals were responded that there was one treatment unit, (30.3%) hospitals replied that there are two EVD treatment unit, and hospitals (12.1%) were responded that there were no treatment unit in Addis Ababa. This is possibly reveled that if they know the presence and location of treatment center they can notify as early as possible.

Our study identified that, there was referral system in 57.6% hospitals, and 66.7% hospitals were having delegated focal person who can communicate in case of referral of EVD cases to the existing treatment unit.

Existence of referral system and delegation of focal person would help to address proper and timely handling of cases.

Currently there is 24 hours serving toll free hotline number but presences of this number were known only by 36.4% of hospitals. The aim at which this toll free number established was to provide a media of communication to all, in case there are rumors and notification demands.

EVD preparedness and response committee is crucial in planning and following up of the progress towards strict adherence of the whole system, in contrary less has been done in the assessed hospitals, only 24.2% of hospitals had established the committee.

There are possible scenarios that may result in patients infected with Ebola virus to prevent in health care workers or support staff coming into contact with them. Person travelling to Ethiopia from an affected country while incubating the virus and developing symptoms only after arrival, as the case experienced recently in Dallas, United States [10]. One of the possible limitations could be Lack of enough literature in a local context as this the first study in Ethiopia since the outbreak of EVD started in West Africa.

Conclusion

More than half of the hospitals in Addis had good preparedness for EVD, based in their emergency triage units and isolation room. However, we observed poor infection prevention and control practice, coordination and referral system in most hospital.

Recommendations

To all concerned: Ministry of Health, Regional Health Bureau, Sub city health offices and Hospitals

- Infection prevention and control guide line have to be in place and there has to be designated IP committee in both public and private hospitals.
- Safe waste management system has to be practiced in health facilities.
- Emergency Triage unit should be established in all hospitals so as to trap the existence of EVD in case of visiting the health facility.
- Ward case searching (surveillance) should be practiced in case there might be revealed EVD cases among admitted ward cases.

- Especially designed training should be given in alerting the health care professional such as in triage management, isolation mechanism and referral of EVD suspected case in case of emergency situation.
- Isolation rooms have to be established in each of the hospitals and should be dedicated for EVD suspected cases.
- Awareness about EVD should be crated to all technical and supportive staffs of all health facilities.
- Action plan should be designed and need to be follow up for proper implementation of it.

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9.2. Weekly Bulltetin –ORHB-PHEM-2014

Weekly Bulletin of PHEM Report for WHO Epidemiologic Week-9/2014, Oromiya Regional Health Bureau.

HIGH LIGHTS OF THE WEEK

- *Suspected measles cases report were kept increasing.*
- *Confirmed malaria cases have been decreasing.*

Introduction

In our Region malaria and measles have been still the main public health concern as compared with others. This bulletin was prepared for week 9, 2014. The bulletin consists of completeness of weekly report, trend of malaria and measles cases, surveillance and responses.

Weekly surveillance Report

In this week report completeness of our Region was 88% and increased by 3% from the last week. The government and private health facilities report completeness was 89% and 73% respectively. It is the week at which the highest percentage has been reported in WHO Epid.week 01-09/2014. All Zones and towns sent the weekly report. Except the 3 Zones,(Borena , Bale and East Wollega), the reporting completeness of all zones and towns were 80% and above for this week. The report completeness of zones and towns is indicated below (fig.1).

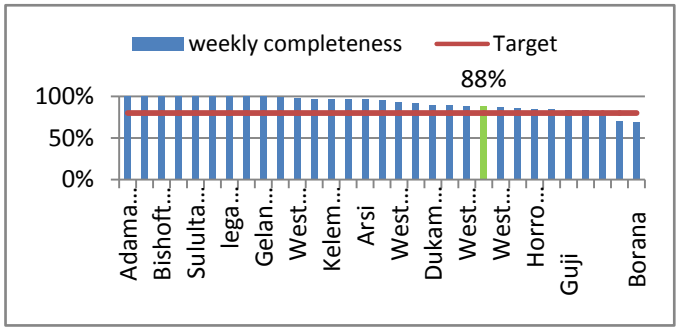

Figure1: Completeness of weekly report by zones and towns, week 9, 2014,Oromia.

From nine consecutive weeks (01/2014_09/2014), the lowest(78%) completeness report was in WHO week 01/2014 and the highest (88%) it is this week 9 /2014 (fig. 2).

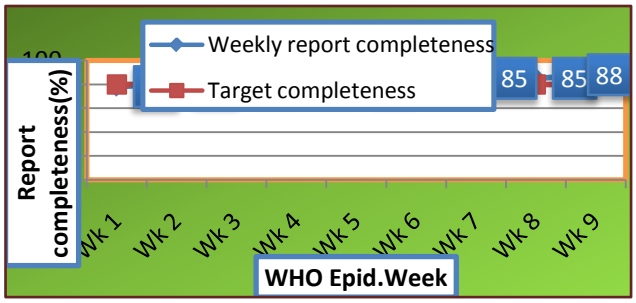

Figure 2: Regional surveillnace report completeness by week

WHO week , from week 1-9, 2014, Oromia.

III. Diseases

Malaria

In week 9/2014, totally 4,300 confirmed malaria cases were reported. Among confirmed and clinical cases, 45 (0.8%) cases were admitted. From total confirmed cases, 2199(51.1%) were P.falciparum and P.vivax 2101(48.9%). In this week confirmed malaria cases were decreased by 301(6.5%) as compared to week 8/2014 and the slide positivity rate were 21.8%. The weekly magnitude of confirmed malaria cases is indicated in figure 3, which consists the last eight consecutive WHO weeks report.

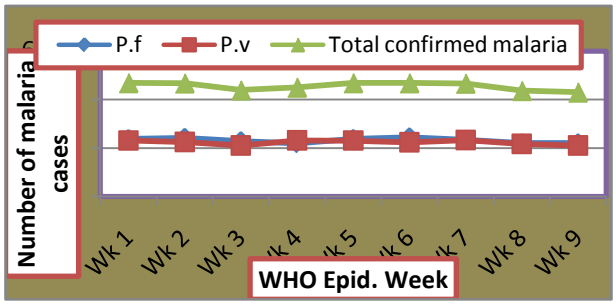

Figure 3: Regional confirmed malaria trends including P.f and P.v species from week 01-9/2014,Oromia.

Among total confirmed cases, the highest number of cases were reported from East Shewa zone, 670(16%) and followed by Jimma zone, 574(13%). The other zones with high number of confirmed malaria cases were West Shewa, South West Shewa, West Wollega and East Wollega with the magnitude of 545(13%), 416(10%) 292(7%) and, 270(6%) cases respectively. Three consecutive WHO weeks (7_9/2014) confirmed malaria cases of some zones were shown below (figure4).

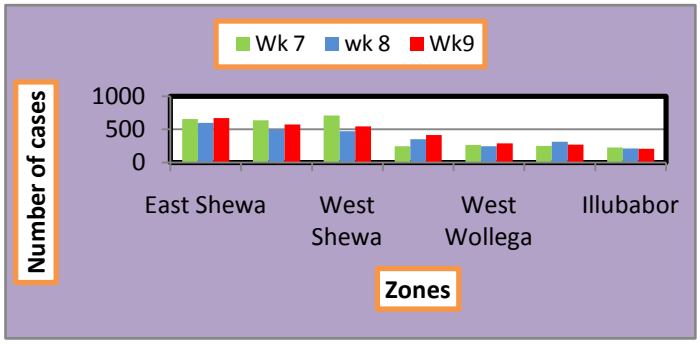

Figure 4: Trends of confirmed malaria cases by WHO weeks, 7-9, 2014,Oromia.

2. Dysentery (Diarrhea with Blood)

A total of 1,787 dysentery cases were reported out which 8(0.4%) of Dysentery cases were admitted. From the report of nine consecutive WHO weeks (01_09/2014). The highest number of cases (1787) were reported in this week 9/2014 and the lowest cases (1060) were reported in the first week 01/2014 (Fig.5). The reported cases were increased by 125(7.5%), compared with week 8/2014.

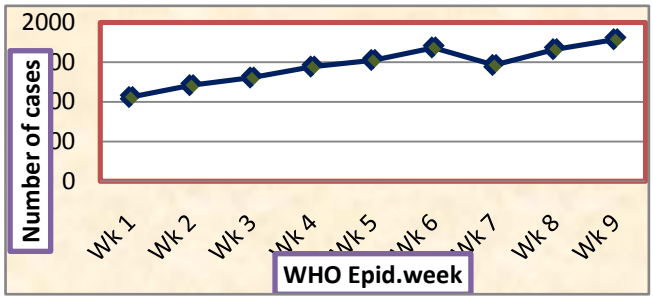

Figure 5: Dysentery cases by WHO week from 01-9/2014, Oromia.

3. Measles

In week 9/2014, a total of 181 suspected measles cases were reported. The cases were increased by 106(>100%) as compared to week 8. Among the total 181 cases reported in week 9, 99(55%),12 (7%),and 11(6%) were reported from Illubaor and Oromia special Zone surrounding Finfine and East Shewa zone respectively.

Nine consecutive WHO weeks (01-09/2014) suspected measles cases trend is indicated below.

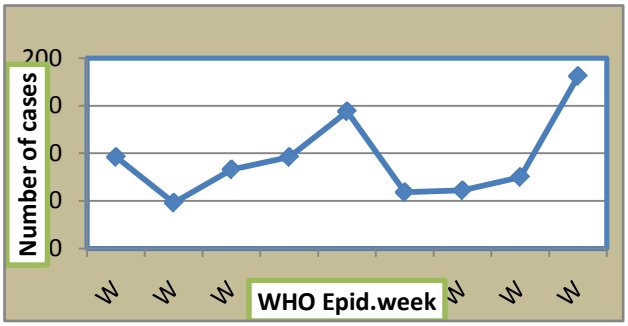

Figure 6: Trends of Regional suspected measles cases by WHO week(01-09/2014), 2014,Oromia.

4. Polio

In this week (9/2014), there were no suspected AFP cases were reported.

5. Malnutrition

In week 9, 1421 severe acute malnutrition (SAM) cases were reported. The cases were decreased by 48(>100%) as compared with week 8/2014. Among total cases, 129 (10%) were treated in SC and 1(0.7%) death from admitted cases reported from Arsi Zone. The highest number of cases were reported from E/Hararge zone, 309(21.7%) followed by W/Hararge 177(12.5%), West Arsi 168(11.8%) and Bale Zone 117(8.2%).

6. Anthrax

In week 9/2014 a total of 27 suspected Anthrax cases were reported from Bale Zone, Laga Hida District and no deaths reported.

7. Meningitis

In week 9/2014 a total of 6 suspected cases were reported 5(83%) were admitted cases. From a total Meningitis cases reported 3(50%) were from West Arsi,and 2(33%) were from Horo Gudru Wollega.

Response activities

Strengthened active case management and routine EPI.

Strengthened active surveillance System.

Strengthened completeness of report through routine feedback.

Annex 1: Questionnaire for Measles outbreak investigation in Abuna Gindeberet Districts, 2014

Instructions: italics don't read out loud.

1. *Data collector information:* Name:_____ Phone number*:* _____
2. *Date of Data collection:*_____

   *Region*_____ *Zone*_____ *Woreda*_____

   Kebele _____ *Got* _____

   House: Longitude: _____ *Latitude:*_____
3. *Who is answering the questionnaire?:*

   ☐ Parent/ guardian of sick person ☐ Sick person ☐ Other (please specify)_____
4. *Respondent category*: ☐ case ☐ control Active case: Yes☐ No

II. **Socio-demographic information**

1. Patient Name_____
2. Patient phone number: _____ (whose phone#?) _____
3. How old are you? **:**_____months ____ years
4. Sex**:** ☐ Male ☐ Female
5. What is your occupation?**:**

   ☐ Farmer ☐ Merchant ☐ Housewife ☐ Unemployed ☐ Government ☐ Pastoralist ☐ Student ☐ Not applicable ☐ Other _____
6. What is your ethnicity?

   ☐ Oromo ☐ Tigre ☐ Amhara

   ☐ Gurage ☐ Other (specify) _____
7. What is your religion?**:** ☐ Orthodox ☐ Protestant ☐ Muslim ☐ Catholic ☐ other_____
8. What is your marital status ?: ☐ Single ☐ Married ☐Widowed ☐ Divorced ☐ Not applicable
9. Have you ever attended school?: ☐ yes (go to question 10) ☐ No (go to question 11)
10. What is the highest level of education you have completed? (read answers): ☐ KG ☐ Primary ☐ Secondary ☐ Tertiary ☐ Not applicable
11. Father's occupation : ☐ Farmer ☐ Merchant ☐ Unemployed

☐ Government ☐ Student ☐ Pastoralist ☐ Other _____

12. Parents' of case/control's education : Mother: ☐ Illiterate ☐ Primary ☐ Secondary ☐ Tertiary

    Father: ☐ Illiterate ☐ Primary ☐ Secondary ☐ Tertiary

13. *What is the main material of the roof. RECORD OBSERVATION*

    (Natural roofing)

    ☐ no roof ☐ thatch/leaf/mud

    (Rudimentary roofing)

    ☐ Rustic mat/plastic sheets ☐ reed/bamboo ☐ wood planks ☐ cardboard

    (FINISHED ROOFING)

    ☐ CORRUGATED IRON /METAL ☐ WOOD ☐ ASBESTOS/CEMENT FIBER

    ☐ CEMENT/CONCRETE ☐ ROOFING SHINGLES ☐ OTHER (SPECIFY) _____

14. Does your household have:

Electricity?	☐ Yes ☐ No
A watch/clock?	☐ Yes ☐ No
A radio?	☐ Yes ☐ No
A television?	☐ Yes ☐ No
A mobile telephone?	☐ Yes ☐ No
A non-mobile telephone?	☐ Yes ☐ No
A refrigerator?	☐ Yes ☐ No
A table?	☐ Yes ☐ No
A chair?	☐ Yes ☐ No

A bed with cotton/sponge/spring mattress? ☐ Yes ☐ No

I. Knowledge Questions

1. What is measles, or are you not sure? _____
2. How do you think measles is transmitted, or do you not know? You can pick more than one response:

   ☐ Through the air ☐ Fecal/oral ☐ Food ☐ Close contact with an ill person ☐ Other _____
3. How do you think measles can be prevented, or do you not know? :

☐ Vaccination, ☐ There is no prevention ☐ local healing ☐ Other _____

4. Who do you think can be affected by measles, or are you not sure?

   ☐ Children less than 5 years old

   ☐ Children between 5-18 years

   ☐ People over 18 years old

   ☐ Any age groups of both male and women

   ☐ Don't know

   ☐ Other (specify):_____

5. Why do some people vaccinate their children with measles vaccine?

   ☐ To prevent measles ☐ Other _____

6. What is the routine age for a child to be vaccinated with measles vaccine, or do you not know?

   ☐3 months ☐ 6 months ☐ 9 months ☐Other ☐ Don't know

7. Do you think vaccination can prevent measles? ☐ Yes ☐No ☐ Don't know

II. Clinical presentations *(for case ONLY)*

8. What were the symptoms?

a) rash: ☐ Yes ☐ No

b) fever: ☐ yes ☐ No

c) runny nose: ☐ yes ☐ No

d) red eyes: ☐ yes ☐ No

e) cough : ☐ yes ☐ No

f) Tiny white spots or sores inside the mouth ☐ yes ☐ No

9. What is the date when you first saw a rash on your body? : ____/_____/_____

10. Were you in your home village when you first noticed you were ill?

    ☐ Yes (skip to question 12) ☐ No (go to next question)

11. Where were you when the illness started?

    District;_____Kebele; _____

12. How long have you had a rash? _____days

13. Do you still have the rash? ☐ yes ☐ No

14. Did you visit health facility for this illness?

    ☐ Yes (date went to facility____/____/____) ☐ No (go to RISK FACTORS section)

15. How long were you sick before visiting the health facility? _____ in days/hours

16. Admitted: ☐ Yes ☐ No, If yes, date admitted:___/___ /_____

a. Treatment given? ☐ yes ☐ No, if yes

☐ ORS ☐ Antibiotics ☐ Vitamin A ☐ Supplementary food

☐ TTC ointment ☐ Anti pyretics ☐ Other _____

b. Outcome: ☐Alive ☐ death

17. Did you have any of the following complications when you were sick with measles?

g) Pneumonia:☐ yes ☐ No

h) Diarrhea: ☐ yes ☐ No

i) Ear infection: ☐ yes ☐ No

j) Convulsions ☐ yes ☐ No

k) Change in vision: ☐ yes ☐ No

l) Blindness : ☐ yes ☐ No

18. Did you travel four days prior to or four days after rash onset?

☐ Yes (go to question #19) ☐ No (go to question #20)

19. Where did you travel to? _____

III. Risk factors

VACCINATION STATUS

20. Can I see your immunization card? ☐ Yes (go to question 22) ☐ No (go to question 21)

21. Were you vaccinated again measles?: ☐ Yes (go to question 22) ☐ No (go to question 25) ☐ Don't know (go to question 25)

22. What is the number of measles vaccine doses received? ☐One ☐Two ☐ More than two

Age of first dose _____

Age of second dose _____

Age of third dose _____

23. Were these vaccinations given during routine programming (at the health center during vaccination days) or during a campaign, or both? : ☐ Routine program ☐ Campaign ☐ Both ☐ Don't know

24. Date last measles vaccine dose received? ___/____/_____ (GO TO QUESTION #22)

25. What is the main reason were you not vaccinated against measles?

☐ Clinic was too far ☐ You were absent during vaccination campaign ☐ You didn't know it was time for vaccination ☐ You think the vaccine will hurt the child ☐ Someone told you not to go ☐ You are scared of vaccines

☐ Other, (specify) _____

EXPOSURE

26. Did you have contact with a person with measles symptoms the 2-3 weeks before onset of illness?

☐ yes ☐ No ☐ Don't know

27. Have you travelled outside of your village the 2-3 weeks before onset of illness?

☐ Yes, ☐ No. If yes, District _____ Kebele_____

28. Is there other person with measles symptoms in your household?: ☐ Yes ☐ No

29. *Does the case have any symptoms of malnutrition? (Malnutrition being…)*: ☐yes, ☐ No.

a. If yes, on OTP:☐ Yes, ☐ No

30. How long does it take you to walk to the health center from your house?

☐ Less than 10 minutes ☐ 10-30 minutes ☐31 minutes – 1 hour

☐ More than 1 hour ☐ More than 2 hours

31. *How many windows does the house have*

☐ two or more windows or doors ☐less than two windows or doors Ilumunation ☐yes ☐No

32. How many sleeping rooms are there in your house? _____

33. How many people slept in your house last night? _____

Annex 2: Questionnaire for Measles outbreak investigation in Nedjo District-2015

Instructions: italics don't read out loud.

1. *Data collector information:* Name:_____ Phone number*:* _____
2. *Date of Data collection:*_____
3. *Region*_____ *Zone*_____ *Woreda*_____ *Kebele* _____ *Got* _____

   House: Longitude: _____ *Latitude:*_____
4. *Who is answering the questionnaire?:*

   ☐ Parent/ guardian of sick person ☐ Sick person ☐ Other (please specify) _____
5. *Respondent category*: ☐ case ☐ control Active case: Yes☐ No ☐

III. **Socio-demographic information**

15. Patient Name_____
16. Patient phone number: _____ (whose phone#?) _____
17. How old are you? **:**_____months ____ years
18. Sex**:** ☐ Male ☐ Female
19. What is your occupation?**:**

    ☐ Farmer ☐ Merchant ☐ Housewife ☐ Unemployed ☐ Government ☐ Pastoralist ☐ Student ☐ Not applicable ☐ Other _____
20. What is your ethnicity?

    ☐ Oromo ☐ Tigre ☐ Amhara ☐ Gurage ☐ Other (specify) _____
21. What is your religion?**:** ☐ Orthodox ☐ Protestant ☐ Muslim ☐ Catholic ☐ other_____
22. What is your marital status ?: ☐ Single ☐ Married ☐Widowed ☐ Divorced ☐ Not applicable
23. Have you ever attended school?: ☐ yes (go to question 10) ☐ No (go to question 11)
24. What is the highest level of education you have completed? (read answers): ☐ KG ☐ Primary ☐ Secondary ☐ Tertiary ☐ Not applicable
25. Father's occupation : ☐ Farmer ☐ Merchant ☐ Unemployed

☐ Government ☐ Student ☐ Pastoralist ☐ Other _____

26. Parents' of case/control's education : Mother: ☐ Illiterate ☐ Primary ☐ Secondary ☐ Tertiary

    Father: ☐ Illiterate ☐ Primary ☐ Secondary ☐ Tertiary

27. *What is the main material of the roof. RECORD OBSERVATION*

    (Natural roofing)

    ☐ no roof ☐ thatch/leaf/mud

    (Rudimentary roofing)

    ☐ Rustic mat/plastic sheets ☐ reed/bamboo ☐ wood planks ☐ cardboard

    (FINISHED ROOFING)

    ☐ CORRUGATED IRON /METAL ☐ WOOD ☐ ASBESTOS/CEMENT FIBER

    ☐ CEMENT/CONCRETE ☐ ROOFING SHINGLES ☐ OTHER (SPECIFY) _____

28. Does your household have:

Electricity?	☐ Yes ☐ No
A watch/clock?	☐ Yes ☐ No
A radio?	☐ Yes ☐ No
A television?	☐ Yes ☐ No
A mobile telephone?	☐ Yes ☐ No
A non-mobile telephone?	☐ Yes ☐ No
A refrigerator?	☐ Yes ☐ No
A table?	☐ Yes ☐ No
A chair?	☐ Yes ☐ No

A bed with cotton/sponge/spring mattress? ☐ Yes ☐ No

IV. Knowledge Questions

6. What is measles, or are you not sure? _____
7. How do you think measles is transmitted, or do you not know? You can pick more than one response:

   ☐ Through the air ☐ Fecal/oral ☐ Food ☐ Close contact with an ill person ☐ Other _____

8. How do you think measles can be prevented, or do you not know? :

☐ Vaccination, ☐ There is no prevention ☐ local healing ☐ Other _____

9. Who do you think can be affected by measles, or are you not sure?

☐ Children less than 5 years old

☐ Children between 5-18 years

☐ People over 18 years old

☐ Any age groups of both male and women

☐ Don't know

☐ Other (specify):_____

10. Why do some people vaccinate their children with measles vaccine?

☐ To prevent measles ☐ Other _____

11. What is the routine age for a child to be vaccinated with measles vaccine, or do you not know?

☐3 months ☐ 6 months ☐ 9 months ☐Other ☐ Don't know

12. Do you think vaccination can prevent measles? ☐ Yes ☐No ☐ Don't know

V. Clinical presentations *(for case ONLY)*

13. What were the symptoms?

m) rash: ☐ Yes ☐ No

n) fever: ☐ yes ☐ No

o) runny nose: ☐ yes ☐ No

p) red eyes: ☐ yes ☐ No

q) cough : ☐ yes ☐ No

r) Tiny white spots or sores inside the mouth ☐ yes ☐ No

14. What is the date when you first saw a rash on your body? : ____/_____/_____

15. Were you in your home village when you first noticed you were ill?

☐ Yes (skip to question 12) ☐ No (go to next question)

16. Where were you when the illness started?

District;_____Kebele; _____

17. How long have you had a rash? _____days

18. Do you still have the rash? ☐ yes ☐ No

19. Did you visit health facility for this illness?

☐ Yes (date went to facility____/____/____) ☐ No (go to RISK FACTORS section)

20. How long were you sick before visiting the health facility? _____ in days/hours

21. Admitted: ☐ Yes ☐ No, If yes, date admitted:___/___ /_____

a. Treatment given? ☐ yes ☐ No, if yes

☐ ORS ☐ Antibiotics ☐ Vitamin A ☐ Supplementary food

☐ TTC ointment ☐ Anti pyretics ☐ Other _____

b. Outcome: ☐Alive ☐ death

22. Did you have any of the following complications when you were sick with measles?

s) Pneumonia:☐ yes ☐ No

t) Diarrhea: ☐ yes ☐ No

u) Ear infection: ☐ yes ☐ No

v) Convulsions ☐ yes ☐ No

w) Change in vision: ☐ yes ☐ No

x) Blindness : ☐ yes ☐ No

23. Did you travel four days prior to or four days after rash onset?

☐ Yes (go to question #19) ☐ No (go to question #20)

24. Where did you travel to? _____

VI. Risk factors

VACCINATION STATUS

25. Can I see your immunization card? ☐ Yes (go to question 22) ☐ No (go to question 21)

26. Were you vaccinated again measles?: ☐ Yes (go to question 22) ☐ No (go to question 25) ☐ Don't know (go to question 25)

27. What is the number of measles vaccine doses received? ☐One ☐Two ☐ More than two

Age of first dose _____

Age of second dose _____

Age of third dose _____

28. Were these vaccinations given during routine programming (at the health center during vaccination days) or during a campaign, or both? : ☐ Routine program ☐ Campaign ☐ Both ☐ Don't know

29. Date last measles vaccine dose received? ___/____/_____ (GO TO QUESTION #22)

30. What is the main reason were you not vaccinated against measles?

☐ Clinic was too far ☐ You were absent during vaccination campaign ☐ You didn't know it was time for vaccination ☐ You think the vaccine will hurt the child ☐ Someone told you not to go ☐ You are scared of vaccines

☐ Other, (specify) _____

EXPOSURE

31. Did you have contact with a person with measles symptoms the 2-3 weeks before onset of illness?

☐ yes ☐ No ☐ Don't know

32. Have you travelled outside of your village the 2-3 weeks before onset of illness?

☐ Yes, ☐ No. If yes, District _____ Kebele_____

33. Is there other person with measles symptoms in your household?: ☐ Yes ☐ No

34. *Does the case have any symptoms of malnutrition? (Malnutrition being…)*: ☐yes, ☐ No.

a. If yes, on OTP:☐ Yes, ☐ No

35. How long does it take you to walk to the health center from your house?

☐ Less than 10 minutes ☐ 10-30 minutes ☐31 minutes – 1 hour

☐ More than 1 hour ☐ More than 2 hours

36. *How many windows does the house have*

☐ two or more windows or doors ☐less than two windows or doors Ilumunation ☐yes ☐No

37. How many sleeping rooms are there in your house? _____

38. How many people slept in your house last night? _____

Annex 3: Check list to evaluate the surveillance system of Jimma Zone-2014

Regional/Zonal Level Questionnaire

Respondent_____

Interviewer: _____

Date_____

General

1. Is there a national manual for surveillance? Yes/ No
2. *If yes*, describe (last update, diseases included, case definitions, surveillance and control, Integrated or different for each disease):_____.
3. Do you have standard case definitions for the Country's priority diseases like AWD, AFP polio), malaria, RF, typhoid fever, Epidemic fever and measles? Yes / No
4. If yes, Obs [1 to n priority diseases] is the standard case definition for each priority disease__
5. Is the central level responsible for providing surveillance forms to the health facilities Yes/ No
6. *If yes*, have you lacked appropriate surveillance forms at any time during the last 6 months? Yes / No
7. What are the reporting health facilities for the surveillance system?
   a. Public health facilities
   b. NGO health facilities
   c. Military health facilities
   d. Private health facilities
   e. Others_____
8. Number of reports in the last 3 months compared to expected number
   Weekly: ___/12 times the number of districts
   Immediately: -------/times the number of districts

9. Number of weekly reports received on time: ____/12 times the number of districts

10. Was there any report of the immediately reportable diseases in the past 1 month? Yes/ No

11. If yes, with in what time is the report received after detection of the Case/ diseases? a. Less than 1 hour b. 2-24 hour c. 1- 2 days d. 3- 7 days e. After 1 week

12. How do you report to the next high level? a. Mail b. Fax C. telephone d. Radio e.Other

13. Does the zone level describe data by person (case based, outbreaks, and sentinel) Yes/ No

If yes, (Obs) Observed description of data by age and sex

14. Describe data by place, time and person? Yes/No

15. Perform trend analysis? Yes/ No

If yes, Obs , line graph of cases by time and list disease(s) for which line graph is

16. Observed a._____ b._____ c._____ d._____ e._____

17. Do the zone have an action threshold defined for Measles, and malaria? Yes / No

18. Who is responsible for the analysis of the collected data? _____

19. How often do you analyze the collected data?

a. Daily b. Weekly c. Every 2 weeks d. Monthly e. Quarterly f. As needed……..

20. Do you have an appropriate denominators establish the threshold? Yes / No

21. If yes, Obs presence of demographic data (E.g. population by district and hard to reach groups)

Outbreak Investigation

22. Is there any outbreak in the zone in the last year? Yes/No

If yes, number of outbreaks investigated:_____

23. List of diseases:_____

24. Number of outbreaks investigated and in which risk factors were looked for:___.

25. Number of outbreaks in which findings were used for action:_____.

[Observe report]

26. Number of districts that looked for risk factors [observe in reports]

27. Number of districts that used the data for action [observe in final report] _____

Epidemic preparedness (relevant for epidemic prone diseases

28. Dose the zone established epidemic management committee? Yes/No

29. Do you have plan for epidemic preparedness and response? Yes/No

If yes, Obs, a written plan of epidemic preparedness and response

30. Has the zone had emergency stocks of drugs, vaccines, and supplies at all times in past 1 year? Yes/ No

31. Has the zone experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? Yes/ No

32. Doses the standard case management protocol for AWD, Malaria, AFP (polio), measles and others exists in all health facilities? Yes/No

33. Is there a budget line for epidemic response? Yes / No

If yes, Obs. minutes (or report) of meetings of epidemic management committee

34. Does the region have a rapid response team for epidemic? Yes/No

Response to epidemics

35. Dose the epidemic responded within 48 hours of notification from zone level? Yes/No

If yes, Obs (from written reports with trend and intervention)

Feedback

36. Dose a report is regularly produced to disseminate surveillance data from the zone? Yes/No

If, yes Obs: the presence of a report of surveillance data

37. How many feedback reports has the zone level produced in the last year?_____

Supervision

38. Did you conduct supervision last 6month? Yes/No

39. If yes, how many supervisory visits have you made in the last 6 months?____

40. If no , what is reasons for not making all required supervisory visits.

(Text)_____

Training

41. Have you received any post-basic training in epidemic management? Yes/No

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

42. How many of your staffs trained in surveillance? _____

Resources

43. For data management

a) Computer & Printer Yes/No

b) Photocopier Yes/No

c) Data manager Yes/No

d) Statistical package Yes/No

44. Communications availability

a) Telephone service Yes/No

b) Fax Yes/No

c) Radio call Yes/No

d) Internet Yes/No

Surveillance

45. Is there a budget line for surveillance in at zone? Yes/No

If yes, is it sufficient Yes/No

46. If No, what option did you use at zonal level?_____

How could surveillance be improved? _____

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

a._____

b._____

c. _____

Attributes and level of

a) Usefulness:

48. Total population under surveillance in the zone_____

49. How many cases and deaths reported in the zone last year?

Malaria cases _____Deaths _____

Measles cases _____Deaths _____

50. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early? Yes / No

b) To estimate the magnitude of morbidity, mortality and factors related to these diseases? Yes/ No

c) Permit assessment of the effect of prevention and control programs? Yes/ No

b) Simplicity:

51. Do you feel that additional data collected on a case are time consuming? Yes/No

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

c) Flexibility:

53. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

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

Ifyes, how?_____

d) Data Quality:

55. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

56. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, Obe: Review the last months report of these diseases

57. Average number of *unknown or blank responses* to variables in each of the reported forms __

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

e) **Acceptability**:

59. Do you think all the reporting agents accept and well engaged to the Surveillance activities? Yes/No; If yes, how many are active participants (of the expected to)? _____

60. If no, what is the reason for their poor participation in the surveillance activity?

a) Lack of understanding of the relevance of the data to be collected

b) No feedback / or recognition given by the higher bodies for their

Contribution; i.e. no dissemination of the analysis data back to reporting facilities

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

f) Representativeness:

61. What is the health service coverage of the district/ zone/ region? _____%

62. Do you think, the populations under surveillance have good health seeking behavior for these diseases? Yes/ No

63. Who do you think is well represented by the surveillance data? urban / rural

g) Timeliness:

64. What proportion of districts reports in acceptable time? ----------%

h) Stability

65. Was the new BPR restructuring affect the procedures and activities of the surveillance

of these diseases? Yes/No

66. Was there lack of resources that interrupt the surveillance system? Yes/No

District (Intermediate Level) Questionnaire

District_____Respondent_____Date _____

Interviewer _____

General Information

1. Is there a national PHEM /IDSR Guide line Or manual at this site? Yes/No

   If yes, Obs national PHEM /IDSR Guide line/manual:_____

2. Does the district have the capacity to transport specimens to a higher level lab? Yes/No

   If No, Reason _____

3. Does the district have guidelines Or SOP for specimen collection, handling and transportation to the next level? Yes / No

4. Have you lacked forms recommended for the country at any time during the last 6 months? Yes/ No

5. Number of reports received in the last 3 months compared to expected number

   Weekly: _____ /12 times the number of health facilities

   Immediately: _____/ times the number of health facilities

6. Number of weekly reports submitted on time: ____/12 times the number of health Facilities (On Monday)

7. Number of immediately reports submitted on time: _____/3 times the number of health facilities (within 30 minutes of events)

8. How do you report Weekly or immediately to the next level?

   a/ Mail b/Telephone c/ Fax d/Radio e/ Electronic f/ Other

9. How can reporting system be improved? _____

10. Did you analyze IDSR data? Yes/No

a) If yes, Is data describe by person for any case based, outbreaks or sentinel? Yes/No

If yes, Obs description of data by age and sex

i) Is description of data by place (locality, village, work site etc)? Yes / No

If yes, Obs. description of data by Place.

j) Is the description of data by time? Yes/ No

If yes, Obs observed description of data by time?

11. Is there a trend analysis for the following disease?

a) Malaria Yes/ No

b) Measles Yes/No

If yes, Obs. line graph of cases by time

12. Do you have an action threshold for any of the country priority diseases? Yes/ No

If yes, what is it? _____cases _____% increase _____rate

(Obs for 2 priority diseases)_____

13. Did you have appropriate denominators? Yes/ No

If yes, Obs. demographic data at site (E.g. total population by village, <5 yrs,---)

14. Who is responsible for IDSR data analysis? _____ ___

15. How often do you analyze the IDSR data?

a. Daily b. Weekly c. Every 2 weeks

d. Monthly e. Quarterly f. As needed……..

Outbreak investigation

16. Is there any Outbreak or suspected in the district in the past year6 months? Yes/No

If yes, number investigated_____ (Observe reports and take copies if possible)

Epidemic preparedness

17. Dose the district epidemic preparedness plan? Yes/No

If, yes,(Obs) a written plan of epidemic preparedness and response.

18. Has the district had emergency stocks of drugs and supplies at all times in past 1 year Yes/No

If yes, Obs, Observed the stocks of drugs and supplies at time of assessment

19. Has the district experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? Yes/ No

20. Is there a budget line or access of funds for epidemic response? Yes/ No

21. Does the district have a rapid response team for epidemics? Yes/No

If yes, Obs Observed minutes (or report) of meetings of epidemic management

22. Did epidemic response team evaluated their preparedness and response activities during the past year? Yes/ No

If yes, (observe written report to confirm)

Responses

23. Has the district implemented prevention and control measures based on local data

for at least one reportable disease or syndrome? Yes/No

24. Present of epidemic that responded by districts within 48 hours of notification of

most recently reported outbreak?_____

Feedback

25. How many feedback written reports has the district produced in the last year?_____

Obs Observed the presence of a written report that is regularly produced to disseminate .

Supervision

26. Did you supervise the health facilities in the last 6 month? Yes/No

If yes, how many times have you been supervised in the last 6 months?_____

(Obs supervision report)

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

(Text)

Reason 1_____

Reason 2_____

Reason 3_____

Training

28. Have you trained PHEM/IDSR disease surveillance? Yes/No

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

29. What percent of your staffs in the district trained on PHEM/IDSR surveillance?____%

Resources

30. Logistics Available

a) Bicycles Yes/No

b) Motor cycles Yes/No

c) Vehicles Yes/No

d) Stationery Yes/No

e) Computer & Printer Yes/No

31. Communication available

a) Telephone service Yes/No

b) Fax Yes/No

c) Radio Yes/No

d) Computers that have modems Yes/No

32. Information education and communication materials

a) Posters Yes/No

b) Megaphone Yes/No

c) TV Screen Yes/No

d) Projector (Movie) Yes/No

39. Availability of hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

Surveillance

40. Is there a IDSR focal person in the district epidemic management committee? Yes/ No

41. Are you satisfied with the current surveillance system? Yes /No *If no*, why? _____.

Attributes

a) Usefulness

42. Total population of the district under surveillance_____

43. How many cases and deaths reported in the district from the following disease past 6month ?.

a) Malaria cases _____Deaths _____

b) Measles cases _____Deaths _____

44. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early? Yes / No

b) To estimate the magnitude of morbidity , mortality and factors related to these diseases?Yes/ No

c) Permit assessment of the effect of prevention and control programs? Yes/ No

b) Simplicity:

45. Do you feel that data collections on a case report form are time consuming? Yes/No

46. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) Flexibility:

47. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

48. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes/ No If yes , how____

d) Data Quality:

49. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

50. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, Obe: Review the last months report of these diseases

51. Average number of *unknown or blank responses* to variables in each of the reported forms _.

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

e) Acceptability:

53. Do you think all the reporting agents accept and well engaged to the Surveillance activities? Yes/No If yes, how many are active participants (of the expected to)? _____

53. If no, what is the reason for their poor participation in the surveillance activity?

a) Lack of understanding of the relevance of the data to be collected

b) No feedback / or recognition given by the higher bodies.

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

f) Representativeness:

54. What is the health service coverage of the district? _____%

55. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes/ No

56. Who do you think is well represented by the surveillance data? urban / rural

g) Timeliness:

57. What proportion of health facilities reports in acceptable time? ----------%

h) Stability:

58. Was there lack of resources that interrupt the surveillance system? Yes/No

If yes, how did you manage it?_____

59. What do you suggest to overcome such problems?_____

Health facility Questionnaire (Hospital /Health center)

Identifiers

District_____

Name of health facility_____

Type of health facility _____

Respondent_____

Date _____

Interviewer: _____

General Information

1. Is there PHEM/IDSR national Guide line or manual at this site? Yes / No

If yes, Obs; for the existence PHEM/IDSR national guide line or manual

2. Is there a clinical register in health facilities? Yes/ No If yes, Obs the existence of a clinical register

3. Is there the health facilities correctly register cases during the previous 30 days? Yes/No If yes, Obs; the clinical register

4. Do you have a standard case definition for: (each priority disease)

a) Measles Yes/No

b) Malaria Yes/No

If yes, Obs the standard case definition for: (each priority disease)

5. Dose of health facilities use standardized case definitions for the country's priority diseases. Yes/ No If yes, Obs; the respondent correctly diagnosing one of the country's priority diseases using a standard case definition (Interview about of these)

6. Dose the health facilities have the capacity to collect the following specimens?

a) sputum Y N N/A

b) Stool Y N N/A

c) Blood Y N N/A

d) CSF Y N N/A

7. If yes, Obs the presence of materials required to collect

a) Stool Yes No N/A

b) blood/serum Yes No N/A

c) CSF Yes No N/A

8. Do you have the capacity to handle sputum, stool, blood/serum and CSF until shipment at this facility? Yes No N/A

If yes, Obs presence of status cold chain at health facility.

9. Dose the health facility that have the capacity to ship specimens to a higher level Lab? Yes No N/A

If yes, Obs presence of transport media for stool at health facility.

10. Have you lacked appropriate surveillance forms at any time during the last 6 months? Yes No N/A If yes, what the reason?_____

11. Observed that the last monthly report agreed with the register for 4 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])

a. Obs Measles Yes No N/A

b. Obs Malaria Yes No N/A

c. Obs AFP (polio) Yes No N/A

d. Obs AWD Yes No N/A

12. Number of reports in the last 3 months compared to expected number

Obs Weekly: _____ /12 times the number of health post sites

Obs immediately: _____/--- times the number of health post sites

13. On time (use national deadlines)

Obs Number of weekly reports submitted on time:-_____ /12 times the number of sites

Obs Number of immediately reports submitted on time: ___/-- times the number of sites

14. How do you report?

a/Telephone b/ Fax c/ Mail d/ Radio e/ Electronic f/ Other

15. How can reporting be improved? Your suggestion

_____

16. Describe data by person, place and time (outbreaks, sentinel) Yes No N/A

If yes, Obs data

17. Is there trend analysis Performed? Yes No N/A

If yes, Obs line graph of cases by time

18. Do you have an action threshold for any of the priority diseases? Yes No N/A

If yes, what is it (Ask for 2 priority diseases)?

Malaria cases ____ % increase

Measles cases____ % increase

19. Who is responsible for data analysis? _____

20. How often do you analyze the collected data?

a) Daily b) Weekly c) Every 2 weeks d) Monthly e) Quarterly f) As needed__

21. Presence of demographic data at site (E.g. population <5 yr., population by village, total Population) Yes / No

Epidemic preparedness

22. Is there standard case management protocol for epidemic prone diseases at health Facilities? Yes No N/A If yes, Obs the existence of a written case management protocol for 1 epidemic prone disease

Epidemic response

23. Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease? Yes No N/A

Feedback

24. Have you received feedback report in the last year from higher level? Yes/No

If yes, how many feedback reports has the health facility received in the last year? ___

Obs; at least 1 report received

25. Have you conduct meeting with community in the last 6 month? Yes No N/A

If yes, how often? a) Weekly b) every two weeks c) monthly d) quarterly e) as needed

Supervision

26. Did you supervise health posts in the last 6months? Yes No N/A

27. If yes, how many times have you been supervised in the last 6 months?_____

Obs; supervision report or any evidence of supervision in last 6 months

28. Did you get any supportive supervision from higher level in the last 6 months? Yes No N/A If yes, Obs; supervision report or any evidence for appropriate review of surveillance

Training

29. Have you trained in disease surveillance and epidemic management? Yes No N/A

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

30. Number of Staffs trained in disease surveillance and epidemic management_____.

Resources

31. Logistics

a) Electricity Yes/No
b) Bicycles Yes/No
c) Motor cycles Yes/No
d) Vehicles Yes/No

32. For data management

a) Stationery Yes/No
b) Calculator Yes/No
c) Computer Yes/No
d) Software Yes/No
e) Printer Yes/No

33. Communications available

a) Telephone service Yes/No
b) Fax Yes/No
c) Radio call Yes/No
d) Computers Yes/No

34. Information education and communication materials

a) Posters Yes/No
b) Megaphone Yes/No
c) TV Yes/No
d) Other: Yes/No

35. Hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

36. List Personal Protection materials (PPE) available in health facility

_____ _____ _____.

Attributes

a) **Usefulness**

49. Total population of the district under surveillance_____

50. How many cases and deaths reported in the district from the following disease past 6month?

c) Malaria cases _____Deaths _____

d) Measles cases _____Deaths _____

51. Does the surveillance system help?

d) To detect outbreaks of these selected priority diseases early? Yes / No

e) To estimate the magnitude of morbidity, mortality and factors related to these diseases? Yes/ No

f) Permit assessment of the effect of prevention and control programs? Yes/ No

b) **Simplicity**

52. Do you feel that data collections on a case report form are time consuming? Yes/No

53. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) **Flexibility**

54. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

55. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes/ No If yes , how_____.

d) **Data Quality**

49. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

51. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, Obs: Review the last months report of these diseases

51. Average number of *unknown or blank responses* to variables in each of the reported forms _

54. Percent of reports which are complete(that is with no blank or Unknown responses) from the total reports ____

e) **Acceptability**

53. Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes/No If yes, how many are active participants (of the expected to)? _____

55. If no, what is the reason for their poor participation in the surveillance activity?

f) Lack of understanding of the relevance of the data to be collected

g) No feedback / or recognition given by the higher bodies.

h) Reporting formats are difficult to understand

i) Report formats are time consuming

j) If Others: _____.

f) **Representativeness**

54. What is the health service coverage of the district? _____%

55. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes/ No

56. Who do you think is well represented by the surveillance data? urban / rural

g) **Timeliness**

58. What proportion of health facilities reports in acceptable time? ----------%

h) **Stability**

58. Was there lack of resources that interrupt the surveillance system? Yes/N

If yes, how did you manage it?_____

59. What do you suggest to overcome such problems?_____.

Health Post Level Questionnaire

Identifiers

District _____Name of health Post_____

Respondent_____Date _____Interviewer _____

General Information

1. Is there PHEM/IDSR national Guide line or manual at this site? Yes No

   If yes, Obs PHEM/IDSR national guide line or manual
2. Is the Health Post has a clinical register? Yes No N/A
3. Are cases correctly registered in the health post? Yes No N/A

   If No, state the reason; _____

   If yes, Obs; the correct filling of the clinical register during the previous 30 days.
4. Do you have a standard case definition for: (each priority disease)
   a) Measles, Yes No N/A
   b) Malaria? Yes No N/A

   If yes, Obs; the standard case definition for: (each priority disease)
5. Do you use standardized case definitions for the priority diseases? Yes/ No

   If yes, select one of the priority diseases in the facility's clinical register and ask how they diagnosed it — interviewer should have the standard case definition from MOH)
6. Have you lacked appropriate surveillance forms at any time during the last 6 months?

   Yes/ No
7. Dose the health post reported accurately cases from the registry into the summary report to go to higher level? Yes/No

   If yes, the last monthly report agreed with the register for 4 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])
   a) Obs Measles Y N N/A
   b) Obs Malaria Y N N/A
8. Number of reports in the last 3 months compared to expected number

   Obs Weekly: _____/12 times the number of sites

   Obs immediately: _____/-- times the number of sites

9. On time (use national deadlines)

Obs; Number of weekly reports submitted on time:-_ /12 times health post.

Obs ; Number of immediately reports submitted on time: ___/-- times from health post .

10. How do you report?

a) Mail b) Fax c) Telephone d) Radio e) Electronic f) Other

11. How can reporting be improved?

Suggest_____.

12. Describe data by person, place & time (outbreaks, sentinel) Yes/ No Not applicable

Epidemic response

13. Has the health post implemented prevention and control measures based on local data for at least one epidemic prone disease? Yes No N/A

Feedback

14. Have you received feedback in the last 6month? Yes No N/A

15. How many feedback reports has the health post received in the last year? ___

If yes Obs; Observed at least 1 report at the health post from a higher level during the past year on the data they have provided

16. Have you conduct meeting with community members in the 6month? Yes No N/A

17. If yes, how many meetings has this health post conducted with the community members in the past six months? _____

Observe the minutes or report of at least 1 meeting between the health post and the community members within the six months

18. If No, list the reason _____.

Supervision

19. Have you supervised by higher level in the last 6 months?

20. If yes, how many times have you been supervised in the last 6 months? _____

Obs; supervision report or any evidence of supervision in last 6 months

Training

21. Have you trained in disease surveillance and epidemic management? Yes No N/A

22. Number of staffs trained_____

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

Resources

23. Logistics

a) Electricity yes No N/A

b) Bicycles yes No N/A

c) Motor cycles yes No N/A

24. Data management

a) Stationery yes No N/A

b) Calculator yes No N/A

c) Computer Software &Printer Yes No N/A

25. Communications

a) Telephone service yes No N/A

b) Fax yes No N/A

c) Radio call yes No N/A

d) Computers that have modems Yes No N/A

26. Information education and communication materials

a) Posters yes No N/A

b) Megaphone yes No N/A

c) Flipcharts Image box yes No N/A

d) Other: yes No N/A

27. Hygiene and sanitation materials

a) Spray pump yes No N/A

b) Disinfectant Yes No N/A

28. List of Personal Protection Equipment (PPE)

Satisfaction with surveillance system

29. Are you satisfied with the surveillance system? Yes No N/A

If no, how can the surveillance systems will be improved? Suggest _____.

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

_____

Attributes

a) Usefulness

31. Total population of the district under surveillance_____

32. How many cases and deaths reported in the district from the following disease past 6month ?.

a) Malaria cases _____Deaths _____

b) Measles cases _____Deaths _____

33. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early? Yes No N/A

b) To estimate the magnitude of morbidity, mortality and factors related to these? Yes No N/A

c) Permit assessment of the effect of prevention and control programs?

Yes No N/A

b) Simplicity

34. Do you feel that data collections on a case report form are time consuming? Yes No N/A

35. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) **Flexibility**

36. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes No N/A

37. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes No N/A

If yes, how_____.

d) **Data Quality**

38. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes No N/A

39. Are the reporting site / data collectors trained/ supervised regularly? Yes No N/A

If, Obs: Review the last months report of these diseases

40. Average number of *unknown or blank responses* to variables in each of the reported form___

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

e) **Acceptability**

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

Yes No N/A

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

43. If no, what is the reason for their poor participation in the surveillance activity?

a) Lack of understanding of the relevance of the data to be collected

b) No feedback / or recognition given by the higher bodies.

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

f) **Representativeness**

44. What is the health service coverage of the district? _____%.

45. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes No N/A

46. Who do you think is well represented by the surveillance data? Urban / rural

g) **Timeliness**

47. What proportion of health facilities reports in acceptable time------?

h) **Stability**

48. Was there lack of resources that interrupt the surveillance system?

Yes No N/A

If yes, how did you manage it?_____

49. What do you suggest to overcome such problems?_____

Annex 4: Data collection tools for Boset District health profile description, 2014

1. Historical Aspects of the area (Culture & Truism office).

Woreda at a glance: where it is_____

The name (how& why) _____

How the woreda was formed_____

Any other historical aspect_____

2. Geography and Climate (including map, altitudes,

agro ecological zones etc…) Woreda map_____

Location (distance and direction) _____ _____

Altitude _____Annual rain fall (average)____ Max ____Min____ annual temp(average)_____High ___Low____

Climatic zones Highland_____% Midland _____% Lowland _____%

Accessibility (main roads)_____

3. Administrative setup

Total no. of kebeles: _____Rural _____Urban_____

Woreda boundaries North ___south ____East _____West_____

4. Demographic information

Population: Total_____ urban _____.rural_____

Male----------Female---------- sex ratio----------

Under1yrs_____. Under five yrs _____.

< 15 years_____>64 years _____Women 15_49 years of age_____

Total population by Kebele (each Kebele pop)____Ethnic composition/language_____

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

Main source of the economy_____

Average income per HH/year_____

2. Education and school Health

Distribution of Schools:

kG___Primary (1-8) __1st Cycle(1-4)___2ndCycle (5-8)__Secondary (9-10)___

Preparatory schools (11-12) TVET/colleges_____

School health activities:

Water supply: schools with water supply_____

Toilets: schools with functional latrines (Male& Female)_____

Schools with HIV/other Health clubs_____

Dropout rate_____

Eligible enrollment_____

3. Facilities (Transport, Telecommunication, Power supply, Water supply…)

How many of the health posts have access to transportation_____ (%)

Telecommunication_____ (%)

Electric power_____ (%)

8. Health delivery system

8.1 District **Health Structure/**organo-gram

8.2 Health Facilities

Type	**Number**	**Total No. of beds**
Hospital		
Health center		
PrivateHFs(clinics/diag.lab/drug stores)		
Health posts		

Health institution to pop ratio:

Hospital: Pop-------- HC: Pop---------HP: Pop---------Health service coverage----------

8.3 Human resource for health (all type)

Type	No.	Remark
Physicians		
Health officers		
Nurses		
Lab.		
Pharmacy		
Environmental Health		
HEWS		

Others		

Doctor: population ratio_____, Nurse: pop ratio_____ HEW: pop ratio_____

8.4. **Top causes of morbidity and mortality**

Top ten leading causes of OPD visit (morbidity):

	Adult	Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Top ten causes of admissions

	Adult	Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Top ten causes of deaths (mortality).

	Adult	Pediatrics
1		
2		
3		
4		

5		
6		
7		
8		
9		
10		

8.5 Vital Statistics and Health Indicators

Infant Mortality Rate (IMR) _____

Total <1yr deaths this yr_____)

PMR_____ (The last year 2005yr:

Total live births_____

Total still births_____

Total neonatal deaths_____

Child Mortality Rate_____

2003EFY year's total <15yr deaths_____)

Crude Birth Rate_____

Crude Death Rate_____(total deaths this yr____)

Maternal Mortality Rate_____

(2003EFY total maternal deaths_____)

Contraceptive Prevalence rate_____

ANC rate (how many of the total expected pregnancies attended

ANC) _____

Percentage of deliveries attended by skilled birth attendants_____

8.6 Immunization Coverage (for children);

BCG ___OPV__Measles ___ Penta1____Penta3 ___fully immunized___

a. Health **budget allocation**:

Gov't---------- (break down to d/t activitiesNGO---------- Purpose/programs)____

9. 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_____

10. Community Health Services;

Status of services provided by community health workers namely

TBAs_____(no of TBAs)_____

CHWs/CHPs_____ (no. of CHPs)_____

HEWs_____(no .Of HEWs If Others_____

Status of Primary Health Care Components – with focus on the eight PHC elements

MCH_____

FP _____

EPI: _____

_____

Environmental Health, Sanitation Hygiene . (WASH)

Latrine coverage_____ & utilization rate_____

Water supply_____

others_____

Health Education_____

11. Endemic diseases;

11.1 Malaria:

Total malarious kebeles_____ & Pop at risk_____

ITNs coverage (including current dist) ___is there IRS this year (No of kebeles) _____

Total malaria cases/yr_____ Deaths/yr_____<5yr cases_____ deaths_____

Malaria supplies (Coartem, RDT, etc) shortage ____ If, Other issues_____

11.2. TB/Leprosy

Total TB cases_____

PTB negative_____

PTB positive____

Extra PTB _____

TB detection rate _____

TB Rx completion rate _____

TB cure rate _____

TB Rx success rate _____

TB defaulter_____

Death on TB Rx_____

Total TB patients screened for HIV_____

Total Leprosy cases_____ on Rx_____

11.3 HIV/AIDS;

Total people screened for HIV (last one year)_____

VCT_____ PIHTC_____PMTCT_____

HIV prevalence_____

HIV Incidence (new cases/yr)_____

Total PLWHA_____

ON ART_____ on Pre-ART

Other HIV prevention activities_____

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

Total OTP sites_____, total admissions to OTP/yr_____

Total SC sites,_____, Newly opened/yr_____,

Total admissions to SC/yr_____

Is there TSF (targeted supplementary feeding) program in the woreda ?

CBN program_____ PSNP_____ other_____

General food security condition_____

Essential drugs (shortage):_____

What do you think the major Health problem/s of the woreda?

13. Discussion of the highlights and the main findings of the health profile assessment and description____

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

Annex 5: Questionnaire for Assessment of magnitude of vaccination statue and factors related Among Children Age 12 – 23 Months in Abuna Gindeberet District-2015.

CHARACTERS	RESPONSES
I. SOCIO-ECONOMIC DEMOGRAPHY OF CARETAKER AND IDENTIFYING INFORMATION OF CHILDREN	
1. Name of the children	1._____ 2. _____ 3. _____ If more, state below; _____
2. Sex of children	1. Male/Female 2. Male/Female 3. Male/Female
3. Birth Date of Children (E.C)	1. _____//___//_____ (D/ M/ Y) 2. _____//___//_____ (D/ M/ Y) 3. _____//___//_____ (D/ M/ Y) 4. Don't Know
4. Birth Order of the Children	1. 1st, 2nd, 3rd (if other, specify _____) 2. 1st, 2nd, 3rd (if other, specify _____) 3. 1st, 2nd, 3rd (if other, specify _____)
5. Who is Mother/caretaker for children?	A. Mother B. Father C. Relative D. If other, specify_____
6. Age of the Mother/caretaker	1. ___ years 2. Don't know
7. Religion of the mother/caretaker	1. Muslim 2. Orthodox 3. Protestant 4. If other, specify _____
8. Occupation of the mother/caretaker	1. Farmer 5. Daily Labor 2. Pastoralist 6. House Wife 3. Agro-pastoralist 7. Student 4. Merchant 8. If other, specify__
9. Educational status of the mother/caretaker	1. Illiterate 2. Read and Write 3. Primary 4. Secondary and Above 5. If other, specify _____

10. Family monthly income	_____

II. CHILD IMMUNIZATION

1. Is there vaccination card or family folder?	1. Yes/No 2. Yes/No 3. Don't know
1.1. **If Yes,** can I see?	1. Yes, I have seen 2. Yes, but I haven't seen 3. No Card
1.2. **If No**, did 1.3. Have you ever received a card?	1. Yes 2. No 3. Don't know

2. Fill the following vaccination history based on data recorded on the card or family planning **(ONLY** from card or family folder**)**	**Date of Immunization (E.C/GC)** Day/Month/Year			
	Child 1	**Child 2**	**Child 3**	
1. Date of Birth as recorded	__/__/____	__/__/____	__/__/____	
2. BCG	__/__/____	__/__/____	__/__/____	
3. Polio at Birth	__/__/____	__/__/____	__/__/____	
4. OPV 1	__/__/____	__/__/____	__/__/____	
5. OPV 2	__/__/____	__/__/____	__/__/____	
6. OPV 3	__/__/____	__/__/____	__/__/____	
7. Penta 1	__/__/____	__/__/____	__/__/____	
8. Penta 2	__/__/____	__/__/____	__/__/____	
9. Penta 3	__/__/____	__/__/____	__/__/____	
10. PCV 1	__/__/____	__/__/____	__/__/____	
11. PCV 2	__/__/____	__/__/____	__/__/____	
12. PCV 3	__/__/____	__/__/____	__/__/____	
13. Rota Virus 1	__/__/____	__/__/____	__/__/____	
14. Rota Virus 2	__/__/____	__/__/____	__/__/____	
15. Vitamin A	__/__/____	__/__/____	__/__/____	

3. Number of doses received by the child those did not recorded (during routine Immunization or Campaign)	**Child 1**	**Child 2**	**Child 3**	
	BCG___ Penta __ PCV___ Rota___ Meas.__ Vit. A___	BCG___ Penta __ PCV___ Rota___ Meas.__ Vit. A___	BCG___ Penta __ PCV___ Rota___ Meas.___ Vit. A___	

4. Record number of doses and date for those children who did not have **CARD** (based on caretaker recall). Tell the caretaker site of injection and others remembering issues for each antigen.		Record **2**, if child did not take the vaccine; Record **3**, if caretaker did not know whether the child take vaccine or not in each row.			
		Child 1	**Child 2**	**Child 3**	
1. BCG	Date received	__/__/___	__/__/___	__/__/___	
2. OPV	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
3. Penta	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
4. PCV	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
5. Rota Virus	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
6. Measles	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
7. Vitamin A	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
5. Where did the child received his/her last routine immunization		**Child 1**	**Child 2**	**Child 3**	
		1. Health centre 2. Health post 3. Private clinic 4. Outreach 5. Other, ____ 6. Don't know	1. Health centre 2. Health post 3. Private clinic 4. Outreach 5. Other, ____ 6. Don't know	1. Health centre 2. Health post 3. Private clinic 4. Outreach 5. Other, ____ 6. Don't know	

II. THE FOLLOWING QUESTIONS REFER TO YOUR EXPERIENCE GETTING IMMUNIZATION SERVICES FOR THIS CHILD DURING THE PAST TWO YEARS	
1. Have you ever been at health facility for any purpose rather than vaccination?	2. Yes 3. No 4. Don't know
2. How long time will take to the nearest health facility?	1. Less than 10 minutes 2. 10-30 minutes 3. 31-50 minutes 4. More than 50 minutes 5. Don't know
3. Sometimes vaccinations are given for children when they go to health facility for other purposes rather than vaccination. Have your children ever vaccinated in this situation so far?	1. Yes 2. No 3. Don't know
3.1. If yes, how many of your children vaccinated?	_____
4. Have you ever decided **NOT** to take your children to get vaccination?	1. Yes 2. No 3. Don't know
4.1. If yes, why did you not to take the child to vaccination? (Circle all responses)	A. Child Ill, B. Not Important C. Too Busy D. No one to take child E. Did not know where to take child F. Did not know when to take child G. Fear side-effects H. Place too far I. Time of visit was inconvenient J. Others (Specify) _____ K. Do not know
5. Were there any child you taken to a health facility for vaccination but not vaccinated then?	1. Yes 2. No 3. Don't remember
5.1. If yes, why was the child not vaccinated? (Circle all responses)	A. No vaccine B. No vaccinator (not closed) C. Health Facility closed when I went D. Vaccinator refused to vaccinate child E. Vaccinator refused because not able to (e.g. too busy, NOT no vaccine)
5.2. Have you ever refused vaccination for this child?	1. Yes 2. No 3. Don't remember

5.2.1. If you refused then, why? (Circle all responses)	1. Too many shots at visit 2. Child Ill 3. Wait too long, so left 4. Other, specify _____ 5. Don't know
V. NOW I WANT TO ASK YOU ABOUT WHAT AND WHERE YOU HAVE HEARD ABOUT VACCINATION.	
1. From where have ever heard message about vaccination? (Circle all responses)	I. Community members II. Health workers III. Health workers at home visit IV. Radio V. TV VI. Newspaper VII. Kebele administrator VIII. Other, specify IX. I don't remember
2. What messages have you heard about immunizations? (Circle all responses)	i. About campaigns (date, target group) **About Routine EPI** ii. Importance of routine vaccination iii. Where to get routine vaccination iv. Age to get vaccination v. Return date to get the next doses of vaccination vi. About new vaccines (Pneumococcal/Rota virus) vii. Others, specify _____ viii. Don't know
VI. NOW I WANTED TO ASK YOU SOME QUESTIONS ABOUT WHAT YOU DO WITH YOUR CHILD IF THEY ARE SICK (OR IF THEY HAVE BEEN SICK, ON YOUR EXPERIENCE)	
1. When your child is seek, where would you take the child? (Circle all responses)	A. Health facility B. Holly water C. Traditional healer D. Prayer place E. Other, specify _____ F. Don't know
2. Usually, where do you prefer more to take your child when they sick?	A. Health facility B. Holly water C. Traditional healer D. Prayer place E. Other, specify _____ F. Don't know
VII. SOME INFORMATION ON MATERNAL HEALTH OFFERED	

1. Have you ever visit anyone for pregnancy care during your pregnancy?	1. Yes 2. No 3. I don't remember
1.1. If yes, who do you seen? (Circle all responses)	1. Doctor 2. Health Officer 3. Nurse/Midwife 4. Health Extension Worker 5. Traditional Birth Attendant 6. Community Health Worker 7. Other, specify_____ 8. Don't Remember
2. Were you offered tetanus vaccination during the visit? (injection in the left upper arm)	1. Yes 2. Not 3. I don't remember
3. Where did you deliver your last child?	1. Home 2. Relative/Neighbor's home 3. Health Post 4. Health Centre (Gov.) 5. Hospital (Gov.) 6. Private or NGO Facility 7. Other, specify
8. Who attend the delivery of your last child? (Circle all responses)	A. Doctor B. Health Officer C. Nurse D. Midwife E. Health Extension Worker F. Traditional Attendant G. Community Health Worker H. Relative/Friend I. Other, specify _____ J. Don't Remember

Annex 5.1. Dummy Tables

Table 5.1.1: Socio-demographic characteristics of mothers/caregivers, Abuna Gindeberet, Oromia, Ethiopia, 2015

Variable	Frequency	Percent (%)
Educational status		
Illiterate		
Primary		
Secondary and above		
Marital status		
Unmarried		
Married		
Divorced		
Occupation		
House wife		
Gov. Employee		
Merchant		
Daily labourer		
Farmer		
Ethnicity		
Oromo		
Amahara		
Religion		
Orthodox		
Protestant		
Others		
sex of child		
Male		
Female		
Child's place of delivery		
Home		
Health facility		

Annex 5.1. 2. : Immunization status of children 12-23 months by card and card plus mother's recall in Abuna Gindeberet, Oromia, Ethiopia, 2014

Vaccine	Card plus recall		Card only	
	Frequency	Percent	Frequency	Percent
BCG				
OPV1				
OPV2				
OPV3				
Pentavalent1				
Pentavalent2				
Pentavalent3				
PCV-1				
PCV-2				
Rota 1				
Rota 2				
Measles				
Vitamin A				
Unvaccinated				
Vaccinated				

Annex 6: Consent form for assessment of magnitude of immunization status and Associated Factors among children Age 12 – 23 Months in Abuna Gindeberet District-2015

Hello, my name is_____. I am here on be on behalf of the researcher.

We would like to understand the expanded program of immunization coverage and associated factors among children age 12 – 23 months. To get this information, we are caring out interviews, now I will ask you to complete this questionnaire about socio-demography, economic condition, maternal and child factors, and vaccination practice. The results of this research will help to improve vaccination services. The interview takes 30 minute. What you tell me will be kept strictly confidential and will be kept securely and no one outside of this researcher will find out the answers that you give me. Your name and address or child's status never appears on this study separately. Participation is voluntary and you may withdraw from the session at any time or refuse to answer any questions that make uncomfortable. Participation in this study will not affect your personal or your child dignity. If you have further questions about the study, you can contact Wake Abebe Mob. +251-911-31-39-25 or e-mail wa.abebe2006@gmail.com.

Are you willing to take part in the interview? Yes ☐ No ☐

Thank you for your participation. We are very grateful for your help

Informed consent certified by:

Interviewer name_____ signature_____

Date of interview_____

Result of interview: 1. Completed 2. Completed partially 3. Refused

Annex 7: Questionnaire for assessments of Hospitals preparedness towards Ebola Virus Diseases

Questionnaire Name of Hospital _____ Type of Hospital ☐ Private ☐ Public ☐ NGO ☐ Other _____	Name of Interviewed _____ Responsibility _____ Respondent telephone number _____ Date of Interview _____

A. General Information

10. Human Resources

	Professions	Number of staff	# of staffs trained/oriented on Ebola
10.1.	Total Hospital Staff (Technical and Supportive)	_____	_____
10.2.	Specialist	_____	_____
10.3.	General Practitioner	_____	_____
10.4.	Health Officer	_____	_____
10.5.	Nurses (all types)	_____	_____
10.6.	Laboratory Personnel	_____	_____
10.7.	Pharmacy Personnel	_____	_____
10.8.	Environmental Health Personnel	_____	_____
10.9.	Occupational Health	_____	_____
10.10.	Health Education	_____	_____
10.11.	Cleaners	_____	_____
10.12.	Guards	_____	_____
10.13.	Ambulance Team: Ambulances Ambulance Drivers Ambulance Assistances	_____	_____
10.14.	Are there initiatives by the hospital to raise the awareness and reduce panic among the staff?		Yes ☐ No ☐ planned
10.15.	If yes, what tools/messages/mechanisms have been used to provide awareness among staff?		☐Leaflets ☐Posters ☐Power point presentation ☐ Discussion in morning section ☐Other _____

11. Waste Disposal Management System		
11	Does the hospital has functional incinerator (Observe & Picture)	Yes ☐ No ☐ Under maintenance ☐
11	Does the hospital has liquid waste disposal system (septic tank) (observe)	Yes ☐ No ☐
11	Is there color coded waste disposal bins? (Yellow, red and black)	Yes ☐ No ☐
11	Does the hospital has sharp waste disposal system?(observe)	Yes ☐ No ☐
11	If yes, is the hospital have been practicing safe disposal of sharp materials? (observe and have a pictures safety boxes)	Yes ☐ No ☐
11	Does the hospital have Infection Prevention and Control Guideline? (observe)	Yes ☐ No ☐
11	Does Infection Prevention and Control Committee available?	Yes ☐ No ☐
11	If yes, does the Infection prevention committee has regular meeting?	Yes ☐ No ☐
12. Water source and supply		
12	What is the source of water for the hospital?	Pipe ☐ Ground water ☐ Other if any ☐
12	Does the hospital has water storage container/s in case there is interruption of water supply?	Yes ☐ No ☐ On procurement ☐
12	If Yes, what is the capacity of the container/s?	1,000lt ☐ 5,000lt ☐ 10,000lt ☐ 15,000lt ☐
13. Power		
13	Does the hospital has electric power for 24 hours?	Yes ☐ No ☐
13	Does the hospital has generator in case there is electric power interruption?	Yes ☐ No ☐
13	If yes, do you have enough naphthalene?	Yes ☐ No ☐ On procurement ☐

B. **Ebola Detection and Management**

14. Case detection		
14	Is the hospital has emergency triage unit?	Yes ☐ No ☐
14	Is there EVD Case definition available (Observe)?	Yes ☐ No ☐
14	Was the case definition posted at triage unit (Observe and Have Picture?	Yes ☐ No ☐
14	Is National Ebola Interim Guideline available in the triage unit (Observe)?	Yes ☐ No ☐
14	Is screening procedure- for suspected Ebola patient available (Ask and document? _____	Yes ☐ No ☐
14	If yes, what screening procedure do they use to identify and prioritize EVD suspected case/s?	Yes ☐ No ☐

14	Is the patient and clinician seat arrangement at 90^0 and 1 meter distance apart? (observe)		Yes ☐ No ☐
14	Is the notification system to next higher public health authority established?		Yes ☐ No ☐
14	Do you have focal person-assigned person for- who is responsible for reporting and coordinating isolation, transfer /referral of suspected EVD patient?		Yes ☐ No ☐
14	If yes, to whom	EPHI☐Region☐ Sub city☐ Woreda☐ Other☐ _____	
14	Is the hotline telephone number identified and known by all health workers for notification? (ask the number)		Yes ☐ No ☐ I don't know☐
14	Availability of essential Personal protective equipment		
	Glove	Yes ☐ No ☐ On procurement ☐	If Yes, number _____
	Eye Google	Yes ☐ No ☐ On procurement ☐	If Yes, number _____
	Surgical Mask	Yes ☐ No ☐ On procurement ☐	If Yes, number _____
	Apron	Yes ☐ No ☐ On procurement ☐	If Yes, number _____
	Boots	Yes ☐ No ☐ On procurement ☐	If Yes, number _____
14	Availability of hand washing facilities at triage unit		
	Functional Hand Washing Facility (Observe)	Yes ☐ No ☐ Under maintenance ☐	Number _
	Availability of Soap (Observe)	Yes☐ No ☐ On procurement ☐	Number _
	Availability of Alcohol based hand rubs (Observe)	Yes☐ No ☐ On procurement ☐	
	Availability of Hand washing procedure (Observe)	Yes ☐ No ☐ On procurement ☐	
	Availability of Alcohol based hand rubs procedures (Observe)	Yes ☐ No ☐ On procurement ☐	
14	Availability of disinfection materials at triage unit in case there is body fluids		
	Availability of chlorine solution or house hold bleach (Observe)	Yes☐ No ☐ On procurement ☐	
	Availability of Chlorine preparation procedure (Observe)	Yes ☐ No ☐ I don't know ☐	
	Availability of chlorine solution preparation materials (Observe)	Yes ☐ No ☐ On procurement ☐	
14	Is there procedure in place to take suspected EVD patient to designated Isolation room?	Yes ☐ No ☐ I don't know ☐	
14	If Yes, what is the procedure and how you transfer the patient to the isolation room?	☐ I will take the patient to the Isolation room ☐ I will call the clinician on duty to take the patient to the isolation room ☐ I will late the patient to go to the isolation room ☐ Other, _____	

15. Isolation and management of Ebola Patient

15	Availability and readiness of isolation room at hospital to manage suspected Ebola patient		
15	Availability of isolation room		Yes ☐ No ☐ Under establishment ☐
15	If Yes to 6.2		
	Is the isolation room separated from other wards? (Observe)		Yes ☐ No ☐ Under preparation ☐
	Is the room labeled by safety sign and fenced?		Yes ☐No ☐Under Process ☐

	Is foot bath available at the gate of Isolation room?	Yes ☐ No ☐ Under Process ☐
	Does the room have bed (Observe)?	Yes ☐ No ☐ Under Process ☐
	Does the mattress properly cover with rubber sheet? (observe)	Yes ☐ No ☐
	Does the room have linens?	Yes ☐ No ☐ Under Process ☐
	Availability of dedicated toilet for Isolation room (Observe)	Yes ☐ No ☐ Under preparation ☐
	Availability of separate hand washing facility (Observe)	Yes ☐ No ☐ Under preparation ☐
	Is puncture resistance safety box available for sharp waste?	Yes ☐ No ☐ Under procurement ☐
	Is solid waste plastic bin or biosafety bag available?	Yes ☐ No ☐ Under Procurement ☐
15	Availability of disinfection materials and disinfection protocol in the Isolation room	
	Availability of chlorine solution 0.5% (Observe)	Yes ☐ No ☐ Under Procurement ☐
	Does the disinfection protocol available? (observe)	Yes ☐ No ☐ I don't know ☐
	Is there spray or mopping materials? (observe)	Yes ☐ No ☐ I don't know ☐
15	Availability of essential personal protective equipment to manage suspected Ebola case in the isolation room	
	Glove	Yes ☐ No ☐ On procurement ☐
	Eye Google	Yes ☐ No ☐ On procurement ☐
	Surgical Mask	Yes ☐ No ☐ On procurement ☐
	Apron	Yes ☐ No ☐ On procurement ☐
	Boots	Yes ☐ No ☐ On procurement ☐
	Other	Specify _____
15	Availability of trained clinicians and supportive staffs on Ebola detection and management	
	Trained physicians	Yes ☐ No ☐ I don't know ☐ If yes, number _____
	Trained nurses	Yes ☐ No ☐ I don't know ☐ If yes, number _____
	Trained cleaners	Yes ☐ No ☐ I don't know ☐ If yes, number _____
	Trained spray man	Yes ☐ No ☐ I don't know ☐ If yes, number _____
15	Are they trained- in PPE, patient handling, IP?	Yes ☐ No ☐ I don't know ☐
15	Are they available 24 hours/7days	Yes ☐ No ☐ I don't know ☐
15	Who are in charge of the isolation room during day and night shifts? _____	
15	Where are they currently working and how can the triage person call or contact them in case he suspected EVD? _____	
	16. Patient Referral System to Ebola Treatment Unit	
16	Do you know there is an Ebola Treatment Unit in Addis Ababa?	Yes ☐ No ☐
16	If Yes, How many Ebola Treatments Units are there?	One ☐ Two ☐ Three ☐
16	Is there any system to transfer patient to designated Ebola Treatment Unit?	Yes ☐ No ☐
16	If Yes, how do you transfer the patient to the Ebola Treatment Unit? ☐ I will call the Ebola Treatment Unit and inform them to take the patient ☐ I will take the patient to the Treatment Unit by Hospital's Ambulance ☐ I will Late the patient to go to the Ebola treatment by himself ☐ I will call the relevant health Authority to take the patient to Ebola treatment Unit ☐ Other _____	

16	Is there any delegated technical focal person to communicate with higher authority?		Yes ☐ No ☐
16	Is there any documented telephone number to notify the higher Authority to transfer the suspected Ebola patient to Treatment Unit?		Yes ☐ No ☐
16	If Yes, What is the number?	_____	
16	Do you know Ebola Hotline Number?	Yes ☐ No ☐	If yes, what is the number____
	17. Coordination Mechanism		
17	Is there Ebola Preparedness and response coordination system in place in the hospital?		Yes ☐ No ☐
17	If Yes, who is leading the coordination?		
17	Is there regular coordination meeting?		Yes ☐ No ☐
17	If yes, how frequently?	Every Day ☐ Every other day ☐ Every week ☐ Every two weeks ☐ Monthly ☐	
17	What are the agendas of the coordination meeting? _____		
17	Is there any action plan produced by coordination committee (Observe)?		Yes ☐ No ☐
17	Is there trained Rapid Response Team? (RRT)		Yes ☐ No ☐
17	If Yes, what is the composition of the rapid response team in the hospital?		1. _____ 2. _____
	18. Other		
18	Any additional points you would like to address about Ebola preparedness if any? _____		

Declaration

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

Name: Wake Abebe Lemma

Signature: _____

Place: _____

Date of Submission: _____

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

Name of Advisor: Dr. Adamu Addissie

Signature: _____

Date: _____