Addis Ababa University, Collage of Health Science, School of Public Health

Ethiopian Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

By: -

Deribe Girma (BSc in MLT)

Submitted to the School of Graduate Studies of Addis Ababa University College of Health Science and School of Public Health in Partial Fulfillment of the Degree of Master of Public Health in Field Epidemiology

June, 2019

Addis Ababa, Ethiopia

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June, 2019

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

Ethiopian Field Epidemiology Training Program (EFETP)

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By:

Deribe Girma Bedane

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

Approval by Examining Board

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Chairman, School Graduate Committee

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Advisors:

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Examiner

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Examine

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List of Abbreviations and ACRONOMY

AA	Addis Ababa
AAU	Addis Ababa University
AFP	Acute Flaccid Paralysis
AIDS	Acquired Immune Deficiency Syndrome
ANC	Anti Natal Care
AOR	Adjusted Odds Ratio
AR	Attack Rate
ART	Anti-Retro Viral Therapy
BCG	Bacilli Chalmette Guerin
BPR	Business Process Re-engineering
BSc	Bachelor of Science
CBHI	Community Based Health Insurance
CBN	Community Based Nutrition
CDC	Centers for Disease Control and Prevention
CFR	Case Fatality Rate
CHS	Collage of Health Science
CHW	Community Health Workers
CI	Confidence Interval
COR	Crude Odds Ratio
CRED	Centre for Research on the Epidemiology of Disasters
CRS	Congenital Rubella Syndrome
DOT	Direct Observed Treatment
EC	Ethiopian Calendar
EDS	Ethiopian Demographic Survey
EPHI	Ethiopian Public Health Institute
EPI	Expanded Program of Immunization
Epi	Epidemiologically
EPTB	Extra Pulmonary Tuberculosis
FDRE	Federal Democratic Republic of Ethiopia
FMOH	Federal Ministry of Health
FP	Family Planning

GC	Gregorian Calendar
GCAO	Government Communication Affairs Office
GO	Governmental Organization
HC	Health Center
HEW	Health Extension Worker
HIV	Human Immune deficiency Virus
HMIS	Health Management Information System
HP	Health Post
HRH	Human Resource Health
IDP	Internal Displaced People
IHR	International Health Regulations
IPD	Inpatient Department
IRS	Indoor Residual Spray
ITNs	Insecticide Treated Nets
KG	Kindergarten
LAFP	Long Acting Family Planning
MCH	Maternal and Child Health
MDR TB	Mult-Drug Resistance Tuberculosis
MDSR	Maternal Death Surveillance Response
MUAC	Mid Upper Arm Circumference
MV	Measles Virus
NGO	Non-Governmental Organization
NNT	Neo Natal Tetanus
NPW	Non Pregnant Women
ODF	Open Defecation Free
OPD	Out Patient Department
OPV	Oral Polio Vaccine
OR	Odds Ratio
ORHB	Oromia Regional Health Bureau
OTP	Oral Therapeutic Program
PAB	Protected At Birth
PCV	Pneumonia Conjugated Vaccine

PFSA	Pharmaceutical Fund and Supply Agency
PHCU	Primary Health Care Unit
PHEM	Public Health Emergency Management
PLWHA	People Living With AIDS
PMTCT	Prevention of HIV from Mother to Child Transmission
PNC	Post Natal Care
PTB	Pulmonary Tuberculosis
PW	Pregnant Women
RDT	Rapid Diagnostic Test
RDV	Rural Drug Vendor
RNA	Rapid Need Assessment
SAM	Sever Acute Malnutrition
SC	Stabilization Center
SIAs	Supplemental Immunization Activities
SNNP	Southern Nations Nationalities and Peoples
TB	Tuberculosis
TBA	Traditional Birth attendant
TSF	Targeted Supplementary Feeding
TT	Tetanus Toxoid
VCT	Voluntary Counseling and Testing
WHO	World Health Organization
WoHO	Woreda Health Office
ZHD	Zonal Health Department

EXECUTIVE SUMMARY

This document contains a two years Field Epidemiology Training Program outputs which was equivalent with thesis submitted for fulfillment of master's degree in Field Epidemiology from Addis Ababa University collage of Health Science School of Public health Department of Field Epidemiology. The documents contain two measles outbreak investigations, surveillance data analysis, Surveillance system evaluation, Health Profile assessment, narrative summary of Land slide situation report, manuscripts, abstracts, research project, Training report, ORHB prepared Bulletin, and Annexes. The document was divided to nine chapters.

Chapter One: Contains Measles outbreak investigations. I had conducted two outbreak investigations as main investigator and two as a co-investigator with other field epidemiology residents. I conducted measles outbreak in Babile Woreda of East Hararge Zone and the second in Ginnir Woreda of Bale Zone. Both the investigations were case control study design. The investigation report contains abstract, introduction, Rational of the study, methods, Result, discussions, Limitation, conclusion, recommendations, and references.

Chapter Two: Contains report of measles surveillance data analysis conducted on North Shewa Zone Oromia region. The objective of this study was to assess the Epidemiology of Measles morbidity and mortality and its trends from 2013 to 2017G.C in North Shewa zone Oromia Region, Ethiopia.

Chapter Three: In this chapters Public health surveillance system of malaria and measles report was documented. The chapter presents clear objective of surveillance system to evaluate the surveillance system of malaria and measles in North Shewa Zone, and recommend solutions for improvement. The surveillance key attributes were also assessed.

Chapter Four: It Contains report of Health Profile assessment conducted in Yaya Gulale Woreda of North Shewa Zone Oromia region. In this chapter health and health related data of Woreda populations were evidently presented that was very useful for prioritizing problems. Seven sectors and all Stake holders of health and health related issues had accessed and presented with evidence.

Chapter Five: One **s**cientific Manuscript for Peer reviewed Journals was written in this chapter. The written manuscript was Measles surveillance data analysis of North shewa Zone Oromia Region.

Chapter Six: Under this chapter two abstracts for scientific presentation on measles outbreak investigation in Babile Woreda of East Hararge Zone and five years measles surveillance data

analysis of north shewa zone Oromia Regional state was included. Abstract of measles outbreak investigation was sent for 3rd annual conference of EFELTP conducted at EPHI.

Chapter Seven: Narrative summary of the disaster situation report of displaced people by land slide in three Woredas of North Shewa Zone Oromia Region was written. The assessment was conducted to identify potential problems that need humanitarian assistance. Based on the report from the assessment support requirement document was developed and shared with all stake holders government sector and potential partners for immediate response.

Chapter Eight: Epidemiological projects proposal was developed on prevalence of MDR-TB and treatment outcome among tuberculosis patients attending at Fitche General Hospital oromia, Ethiopia, 2019, that submitted to Addis Ababa University collage of Health Science School of Public Health Department of Field epidemiology.

Chapter Nine: This chapter contain two additional out puts: training report given to health facilities, Woredas and zones of oromia regional states focal persons and PHEM officers, and ORHB PHEM Directorate Weekly Bulletin prepared.

Annex of this Body of Works is divided into 7 parts. Annex 1 and 2 was questionnaire for measles outbreak investigation. Tools for Public health surveillance system evaluation, health profile assessment were included in 3 and 4 respectively. Annex 5 was consent form of assessing of Prevalence's of MDRTB from TB patients. MDR TB Data Collection Tool and Post and Pretest for PHEM Basic training for PHEM officers were documented in annex 6 and 7 respectively.

CHAPTER 1: OUTBREAK INVESTIGATION

1.1 Measles Outbreak investigation and response in Babile Woreda of East Hararge Zone, Oromia Region Ethiopia-February, 2019

Abstract

Introduction: Measles is a vaccine preventable and contagious outbreak-prone viral disease characterized by maculopapular rash. Globally, 128,170 suspected and 20,582 confirmed measles cases were reported in 2018. In Ethiopia, 547 confirmed measles cases were reported in the same year. The aim of investigation was to describe cases and determine potential risk factors.

Methods: We conducted unmatched case control study (1:2) with 55 cases and 110 controls. Data was collected from November 24 – December 12, 2018 among internally displaced population and two rural kebeles of Babile Woreda. We used national standard case definition, to described line list of cases and controls were from neighbors of cases without symptoms of measles. We described the outbreak by descriptive epidemiology followed by unmatched case-control study. Epi Info version 7.2.0.1 and SPSS were used for bivariate and multivariate analysis. Mean, Standard Deviation, COR, AOR, and P values at 95% CI were used to measures the variables.

Result: The Outbreak was started on October 28, 2018 reaching its peak on November 25, 2018 and controlled on December 5, 2018. We identified A total of 55 cases (Mean age 4.4 years; SD 5.08) and 31(56%) were males. All cases and 110 controls were recruited to investigation. The attack rate and case fatality rate were 56/100,000 and 7.3% respectively. Total of 50(90%) of them were unvaccinated against measles antigen. Forty (73%) reported in under 5 children with case fatality rate of 4(10%). Five blood samples were sent to Ethiopian public Health institute for confirmation and all of them were positive. Based on case control finding: we identified that Being unvaccinated against measles antigen (AOR 8, 95% CI: 0.05, 0.11) and Being Malnourished (AOR 4.2, 95% CI: 1.9-12) were factors associated with the outbreak.

Conclusion The outbreak was associated with unvaccination status and malnourished. There were high cases fatality rate in under five children; more than one third of the cases didn't receive measles containing vaccine (MCV1).

Recommendations: We recommend to the Woreda health office to enhance the routine vaccination coverage, and early screening and treatment of malnourished children.

Key Words: Case control, Measles, Outbreak, Oromia, Risk factors

1.1. Back ground

1.1.1. Introduction

Measles is one of the vaccine preventable an acute systematic, highly contagious outbreak-prone viral diseases characterized by maculopapular rash.(1,2) It was caused by virus's genus/family Morbilli virus and have incubation period of ranging from 7-18 days. The primary site of infection is the respiratory epithelium of the nasopharynx. The viruses transmitted via the respiratory route (aerosolized in respiratory droplets) or by direct or indirect contact with nasal and throat secretions of infected person. Measles virus is particularly contagious, with >90% secondary attack rates among susceptible individuals. (1)

Infected persons shed virus and are contagious shortly before the onset of clinical symptoms and several days afterwards (includes 4 days before rash on set and 4 days after rash onset). The incubation period of measles, from exposure to prodrome averages 10 to 12 days. It is characterized by fever, which increases in stepwise fashion and followed by the onset of cough, coryza (runny nose), or conjunctivitis. The disease was higher in temperate areas, and incidence is usually higher in late winter and spring.(1–3)

In settings with endemic transmission, they are characterized by winter–spring seasonality and periodic epidemics every few years, followed by inter-epidemic intervals with lower incidence. As disease incidence declines, the inter-epidemic periods become longer with eventual disappearance of a cyclical pattern. Also, the infections tend to occur at a later time in life and the average age of cases increases because of reduced opportunities for exposure due to less widespread transmission.(2)

Measles transmission with subsequent outbreaks can occur in communities and congregate settings such as households, workplaces, the military, schools and universities. The setting, extent of spread and size of the outbreak will determine the magnitude of the response. Because measles virus is highly contagious and the infection is normally accompanied by an evident rash.(2,4,5)

The infected persons can show different sign and Symptoms of measles that include: Fever, Rash, Cough, and runny nose, Mild pink eye (redness or swelling of the eyes). Sometimes, measles can lead to Ear infections, Diarrhea (watery poop), Pneumonia (lung infection), and inflammation of the brain.(2)

Measles illness during pregnancy results in a higher risk of premature labor, spontaneous abortion, and low-birth weight infants. Birth defects (with no definable pattern of malformation) have been reported rarely, without confirmation that measles was the cause.(6)

Measles in developing countries has resulted in high attack rates among children younger than 12 months of age. It is more severe in malnourished children, particularly those with vitamin A deficiency. Complications include diarrhea, dehydration, stomatitis, inability to feed, and bacterial infections (skin and elsewhere). The case-fatality rate may be as high as 25% and also a leading cause of blindness in African children. (4,6–8)

Before a vaccine was available, infection with measles virus was nearly universal during childhood, and more than 90% of persons were immune by age 15 years. Still measles was a common and often fatal disease in developing countries.(6,7)

Measles virus can be isolated from urine, nasopharyngeal aspirates, heparinized blood, or throat swabs. Specimens for virus culture should be obtained from every person with a clinically suspected case of measles and should be shipped to the laboratory that can perform the culture. Serum samples can be collected and referred to the EPHI for serological test in Ethiopian context. (9,10)

The disease can be prevented by getting vaccination and when enough people get vaccinated against measles; the entire community is less likely to get the disease. Therefore all children need to get the measles vaccine and also some adults may need it. The current routine immunization schedules recommend a dose of measles vaccination at 9 months of age. In America the disease decreases by 99% as a result of vaccination (11)

The global estimated Measles cases were 277,846 with a total 42,271(15.2%) laboratory confirmed were reported from six regions of WHO in 2017. A total of 51,541 cases and 9.5% laboratory confirmed reported from Africa Region in the same year. In the same year Ethiopia reports 547 confirmed measles cases.(12) The numbers of reported cases were 98,621 (incidence of 100/million) for the African region, 423 (0.6/million) for the region of the Americas, 21,335 (33/million) for the Eastern Mediterranean region, 25,974 (31/million) for the European Region, 29,109 (17/million) for the South-East Asian region and 65,176 (35/million) for the Western Pacific Region. The region of the Americas verified the elimination of measles in 2016, demonstrating the feasibility of elimination in low- and middle-income countries. (10,13)

As study conducted from 2013- 2016 a total of 176,785 confirmed measles cases were reported in Africa region through case-based surveillance. The number of confirmed measles cases

declined from 71,529 in 2013 to 28,279 in 2016. During 2013–2016, total of 103,161 (60%) measles cases were reported among children aged 9–59 months, 79% of them were either unvaccinated or had unknown vaccination status. Confirmed measles incidence decreased 63% from 76.3 per 1 million populations in 2013 to 27.9 in 2016. The largest percentage decreases in incidence occurred in Angola (99%), Namibia (97%), and Togo (92%). The highest confirmed measles incidences in 2016 were reported in Equatorial Guinea (1,938 per 1 million), Gabon (723), and Liberia (85). The number of countries that reported less than one case per 1 million population decreased from 19 (41%) to 15 (32%). (13)

Despite the availability of a safe and highly effective vaccine, measles still remains one of the leading causes of vaccine-preventable deaths in children of 5 years of age worldwide, especially in developing countries, with up to 20% of these deaths. In the 1990s it was estimated that about 45 million cases and one million measles deaths occurred worldwide. However in 2008 the number decreased to an approximated 20 million or more cases and 164,000 deaths with over 95% of these occurring in low-income countries with poor health systems. (12)

In the World Health Organization (WHO) African region, routine measles vaccination is offered at nine months of age but about 15% of children vaccinated at this age will not develop protective immune response. In addition, not all children will receive measles vaccine. As a result the number of susceptible individuals may accumulate over time with the potential for outbreaks to occur. To prevent this, a second opportunity for measles vaccination is offered through routine services or supplemental immunization activities (SIAs). (13)

As data analysis conducted in Ethiopia from 2006 to 2016 a total of 92,461 Measles cases were reported from different regions. Out of reported cases 65,865(71.2%) of them were laboratory confirmed and 27,646(42%) of them were under 5 years age group. The median age of the cases was 5 years and incidences of measles per million populations were 102. During this data analysis in Oromia regional state a total of 41,191 Measles cases were reported out of which 31,802(77.2%) cases was laboratory confirmed. From cases 14,528(46%) of them were under five years of age. The median age of the reported cases was 4 years and incidence per million populations was 130.(11)

The case fatality rate of measles estimated to be 3 – 6% in developing countries like Ethiopia, but may reach more than 10% in epidemics, during periods of famine, refugees and internally displaced people.(11)

In Ethiopia, a seasonal pattern of occurrence of measles has been observed over the years, with increased number of measles cases during the late-early part of the year (December to February). Even though measles incidence rate has showed significant increase in the country since 2010 a dramatic increase is observed from 2012 up to 2014.(2)

Measles outbreak occurs at different time in different place of Ethiopia. In 2015 a total of 1059 Measles cases and 2 deaths with case fatality rate of 0.2% were reported from different Woredas of the Guji zone. Five blood samples were collected and tested for confirmatory of the cases from which all of them were positive, but the rest were epidemiologically linked and clinically compatible cases. Among the 1,059 cases, 698 (65.9%) were <5 years old. The age-specific attack rates vary and were 17/100,000 and 36/100,000 populations for the age group <1 year and 1-4 years respectively, while the overall attack rate was 81/100,000 population. (15)

Regardless of its remoteness and difficulties in providing immunization service, the review of immunization coverage for the last 6 years indicate an overall coverage of 93.5%, while it varied from woreda to woreda (ranged 70-112%). On the other hand of those affected children, 792 (75%) of them were with zero doses, while 163 (16%) of the cases had received only 1-2 doses of measles, and interestingly of those cases unvaccinated, 496(71%) were < 5 years old. (14–16)

East Hararge Zone notifies Oromia Regional health Bureau on November 18, 2018 Occurrences of suspected measles outbreak in Babile Woreda, of IDP sites. As a result ORHB sent a team composed of; Ethiopian Field Epidemiology Training Program (EFETP) residents, with ORHB PHEM expert to respond to the problem and investigate an outbreak in collaboration with the zonal health department (ZHD), and Woreda Health Office on December 3, 2018.

1.1.2 Rationale for investigating measles outbreaks

The primary reason for measles outbreak investigation and response is to control the outbreak and to prevent future outbreaks. During this outbreak investigation the main was to facilitate rapid implementation of control measures to reduce the extent of disease spread and associated morbidity and mortality to ensure that virus transmission is interrupted as soon as possible.

On the other hands we conducted this outbreak investigation because of:-

- Monitoring the changing epidemiologic distribution of measles;
- Identifying high-risk and affected population subgroups/geographic areas, for immunization strategies;
- Assisting in the identification and correction of weaknesses in immunization and surveillance systems; and

- Raising community and health care professionals' awareness about these diseases and their prevention.

1.1.3 Objective

1.1.3.1 General Objective:

❖ To determine the magnitude of morbidity and mortality due to measles infection and risk factors associated with the outbreak in Babile Woreda.

1.1.3.2 Specific objectives

✓ To conduct descriptive analysis of the outbreak

✓ To identify the risk factors associated with measles outbreaks

✓ To undertake appropriate control measures and recommend for future action

1.1.4 Methodology and Materials

1.1.4.1 Study Area

We conducted the outbreak investigation in Babile woreda. Babile Woreda was one of the 21 Woredas found in East Hararge Zone, Oromia regional state. It was divided in to 22 rural kebeles and one town administration. It is located at a distance of 27 KM from Zonal Town (Harar) and 582 KM from country City Finfinne. It has three health centers and 22 health posts. Potential health service coverage of the woreda was 76% and 100% by health centers health post respectively. Share boundaries on the south and east by the Somali Region, on the west by Fedis, and Midaga Tola, and Gursum Woreda on north; the Fafen River defines a portion of Babile's eastern border. The altitude ranges from 950 to 2000 meters above sea level. As the total population estimated from 2007 national census report a total population for the Woreda was 98,617 of whom 49,649 were men and 18.9% of its population were urban dwellers.

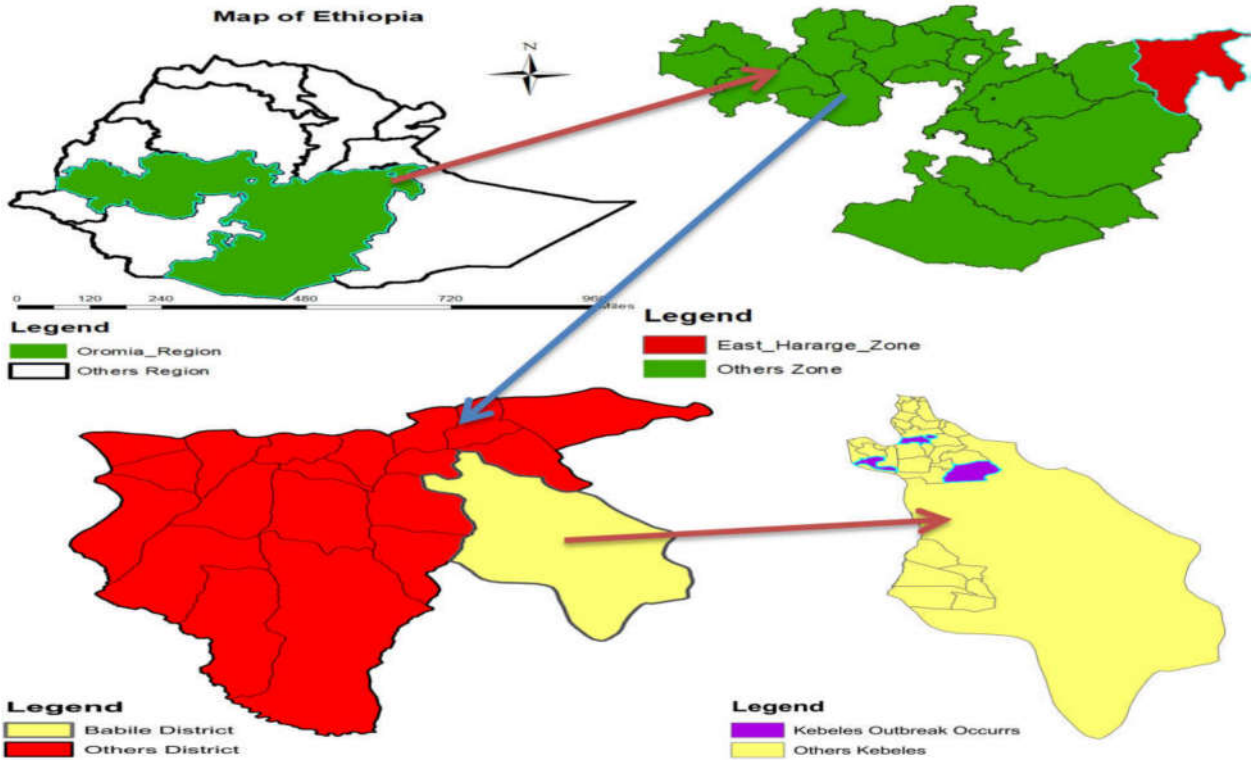

Figure 1: Map of Babile Woreda East Hararge Zone Oromia region, Ethiopia, December, 2018 G.C.

1.1.4.2 Study Period

The investigation was conducted from November 24 – December 12, 2018 G.C.

1.1.4.3 Study Design

We conducted descriptive cross sectional study design followed by unmatched case-control study to identify risk factors that contributed for the measles outbreak occurrences in the area.

1.1.4.4 Sampling Technique and Sample size

Since all lines listed and reported measles cases during the outbreak were included in the study for the interview; no need of sample size calculation. Cases were collected from woreda line list reported to zonal health department. Following identification of cases two controls were selected by purposive sampling technique from place of residence of case or community. As a result total of 55 cases and 110 controls were recruited to the investigation.

1.1.4.5 Source Population

All Babile Woreda Population

1.1.4.6 Study Population

All Measles cases that full fill case definition

1.1.4.7 Inclusion Criteria

Cases: Any persons with fever, generalized maculopapular rash, cough coryza or conjunctivitis and suspected cases with laboratory confirmed or epidemiologically linked to the laboratory confirmed cases in Babile Woreda from October 26 to December 4, 2018 listed on line list, agreed to respond to the questionnaire.

Controls: An individual who was a neighbor to a case and who did not develop signs and symptoms of measles and agreed to participate in the investigation.

1.1.4.8 Exclusion Criteria

Cases: Those with measles sign and symptoms who refuse to participate in the investigation

Controls: Those who were neighbor from cases and refuse to participate and family members from same house hold

1.1.4.9 Descriptive Epidemiology

We collected the line listed cases and describe the outbreak in person, place and time. We calculated over all attack rate age-specific, sex-specific attack rate, and Case fatality rate. We generated hypothesis for the possible causes of infection. After reviewing different studies, we hypothesized different factors as risk factors for the occurrence of measles outbreak.

1.1.4.10 Analytic Epidemiology (Case-control study)

We compared cases with controls in unmatched case-control study. We recruited community based controls of all age groups after having four days contact with measles ill person. We calculated Crude Odds ratio (bivariate analysis) and adjusted odds ratio (multivariate analysis).

1.1.4.11 Data Collection

Data was collected by using a structured questionnaire (Annex 1) to collect information including socio- demography, Knowledge to disease, clinical status of the cases, the possible risk factors and awareness on mode of transmission and control/prevention measures for measles infection. The data was collected through interview with the respondents' case, by collecting the line list data from health facility and properly registering the geographical location of individual households.

Information collected from controls that reside in the same neighborhood(s) with the cases. They were identified by going door-to-door, and interviewed in the same area on the same day with the cases. Because the cases and controls were from the same neighborhood, we matched for potentially confounding variables such as socioeconomic factors and living conditions.

1.1.4.12 Data Analysis

Collected data were entered and analyzed using Epi-Info7.2.0.1 software and SPSS. We conducted descriptive analysis followed by bivariate (Crude odds ratio) and multivariate (adjusted odds ratio) analysis. We perform multivariate logistic regression analysis by including variables having p-values <0.6 in bivariate analysis in the model and removing others. Accordingly we includes; Vaccination status, Contact history with ill person, Travel history out of village during outbreak, having malnutrition symptoms', Distance from health centers, ventilation of house, Number of sleeping rooms, and overcrowding condition used for constructing of the multivariate model. We used 95% confidence level and less than 5% level of significance ($p<0.05$). Results were presented using graph, charts, and table. Attack rate and case fatality rate were calculated.

1.1.4.13 Data Dissemination

Oral and Formal written feedback were given for all stake holders (ZHD, Woreda health office, health center and health posts) whereas full written result was submitted to ORHB PHEM directorate, field base and university mentors' and Addis Ababa University school of Public health Department of Field Epidemiology. Additionally, Abstract and manuscript of the investigation will be prepared and submitted for publication on peer-reviewed journals.

1.1.4.14 Data quality assurance and quality control

To decreases biases controls were selected from neighbors of cases where cases were seen. Data was collected by using both open ended and close-ended structured questionnaires. An open ended questionnaire was changed to close ended depending on the answers. Moreover, all study participants in both controls and cases were interviewed in a similar fashion to increases data comparability. Furthermore, data were checked for completeness before and after entering into Epi Info for analysis. We used multivariate analysis (AOR) was used to control potential confounders in interpreting the results of the investigation.

1.1.4.15 Operational Definition

No Education: an individual who cannot read and Write

Primary: Those who attend school from grade 1-8

Secondary: Those attend school from grade 9 to 12

Above Secondary: Those who were from TVT to University

1.1.4.16 Case Definitions

Measles cases at community level: Any person with fever and rash coming to the health workers in Babile Woreda

Suspected measles case: Any person with generalized maculo-papular rash and fever plus one of cough or coryza (runny nose) or conjunctivitis (red eyes) in Babile Woreda**.**

Laboratory confirmed measles case: A suspected case which has laboratory results indicating, IgM positive in Babile Woreda.

Epidemiologically linked case: A suspected measles case that has not had a specimen taken for serologic confirmation and is linked (in place, person and time) to a laboratory confirmed case; (living in the same Woreda with a laboratory confirmed case where there is a likelihood of transmission; onset of rash of the two cases being within 30 days of each other) in Babile Woreda.

Measles death: Any death from an illness that occurs in a confirmed case or epidemiologically linked case of measles within one month of the onset of rash in Babile Woreda.

Primary case: Suspected measles case (case that met the criteria for standard measles case definition) that initiates the public health attention and not visits health facility, or the first case who possibly the source of infection for the other cases emerging in Babile Woreda.

Index case: Suspected measles case (case that met the criteria for standard measles case definition) that initiates the public health attention and visit health facility, and the first case who possibly the source of infection for the other cases emerging in Babile Woreda.

1.1.4.17 Supportive Letter

Even though a formal support letter was obtained from Oromia Regional Health Bureau to East Hararge zonal health departments no need of formal letter from zonal health department to the Babile Woreda, because the condition was an emergency and need immediate action. So, we take Zonal PHEM Officer from zonal health department and Oral informed consent was obtained from participants and from their parents to participate in the study. Confidentiality was assured and no personal details were recorded or produced in this documentation and we also used confidential codes to protect participant privacy.

1.1.4.18 Variables of the Study

Dependent Variables: - Measles infection

Independent Variables: - Some of the independent Variables that included in the investigation were: -Vaccination status, Overcrowding, Travel History**,** Contact History**,** Nutritional status**,** Knowledge on transmissions and prevention

1.1.5 Result

Descriptive Analysis

We identified a total of 55 measles cases and 4 deaths (CFR of 7.3%) were reported from October 26, 2018 to December 4, 2018 from two rural kebele and Babile IDP sites of the Woreda. **(Figure 5)**

From total cases 31(54%) of them were males. The attack rates of male and female were 0.063% and 0.049% respectively. The number of cases increased rapidly to a peak at the 47 WHO week of 2018 (November 26th to 2nd December) after the index case seen. The age of the cases ranges 8 month to 25 years with mean and standard deviation of 4.4 and 4.6 respectively. **(Figure 2, 3, 5 and Table 1)**

Description of cases by Person

Forty (72.7%) of the cases occurs in age groups of under five years followed by 5-14 ages accounts 12(18%). Age specific case fatality rate was 10% in under five years children's. The overall attack rates were 56/100,000. The attack rate is highest in under 5 years population that account 247/100,000 populations and followed by 5-14 years age which account about 39/100,000. **(Table 1 and Figure 2)**

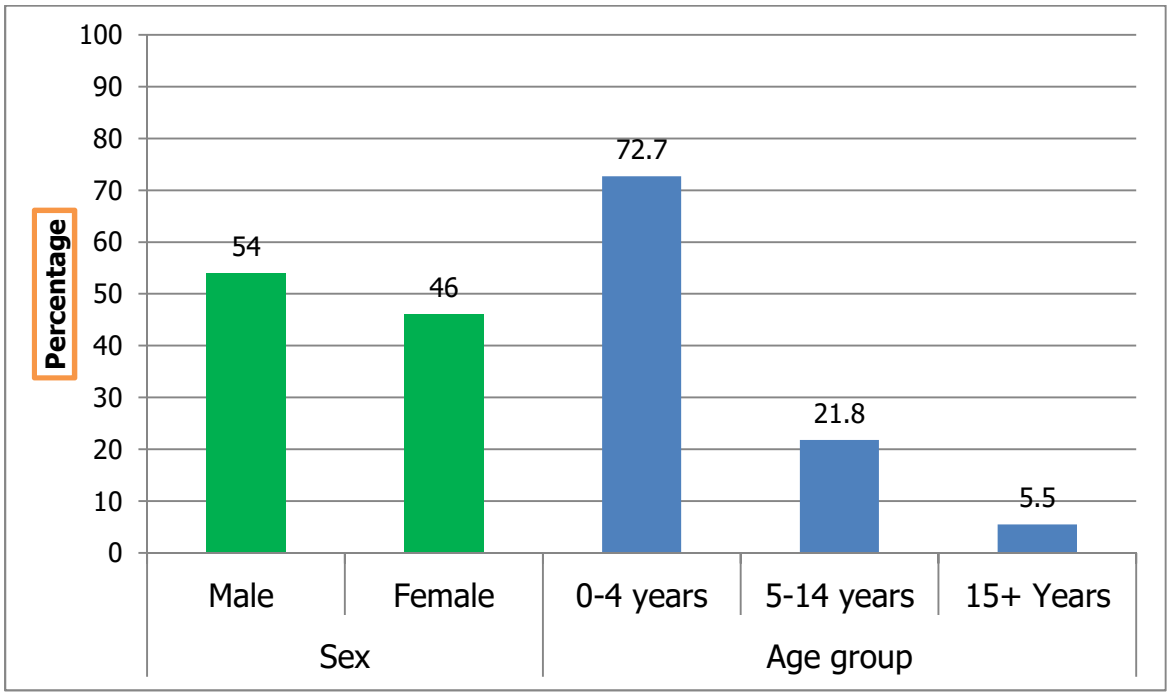

Figure 2: Proportions of Measles cases by sex and age group in Babile Woreda, East Hararge Zone, Oromia region, Ethiopia, January, 2019

Table 1: Attack Rate and CFR of Measles cases by age groups and sex in Babile Woreda, East Hararge Zone, Oromia region, Ethiopia, January, 2019

Age Group	Population	Measles Cases	Measles Death	Percentage %	Attack Rate/100,000	CFR
0-4	16173	40	4	73	247	0.1
5—14	30769	12	0	22	39	0
>15	51675	3	0	5	6	0
Total	98617	55	4	100	56	0.073

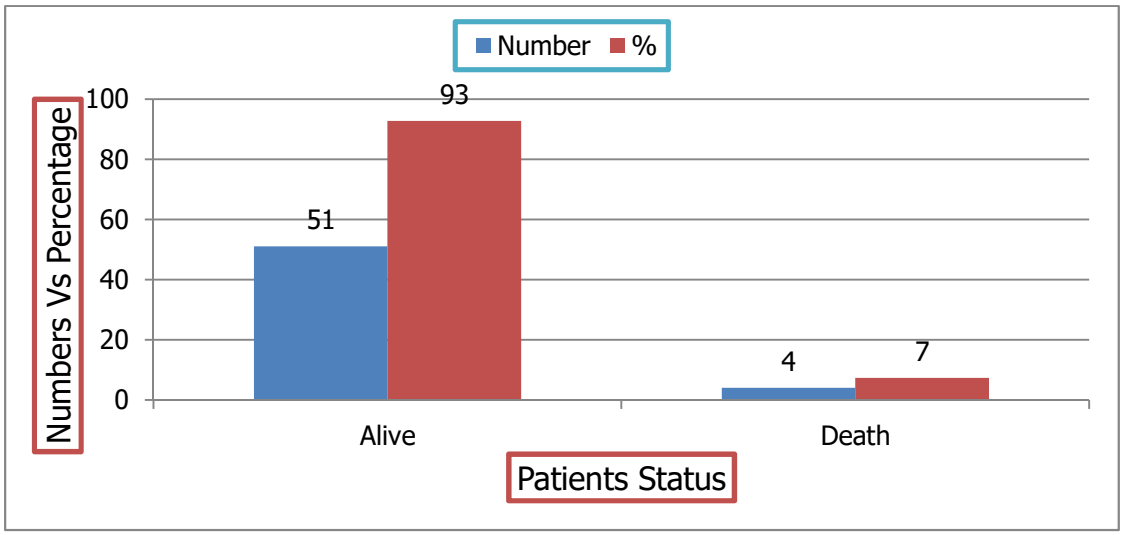

Figure 3: Proportion of Measles cases and Death in Babile Woreda East Hararge Zone Oromia region Ethiopia, January 2019

Description of cases by Place

The cases reported from three sites (IDP in Babile Town, Tuula and Ibada Gamachu Kebele). 25(45%) of the cases were reported from Ibada Gamachu Kebele followed by Tuula Kebele 21(38%) and 9(16%) of the cases were reported from IDP site in Babile town. **(Figure 4)**

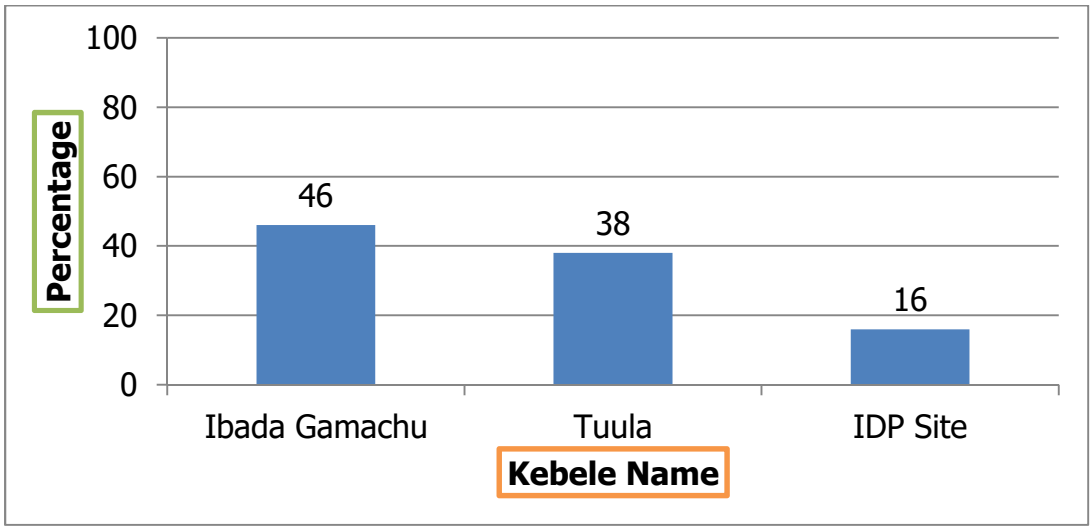

Figure 4: Distribution of Measles cases by kebele (site) in Babile Woreda East Hararge Zone Oromia region, Ethiopia, January, 2019

Description of cases by Time

The index case was seen at health facility on October 26, 2018 from Ibada Gamachu Kebele. The index case was female of 2 years and five month age with unvaccination status of measles vaccine. The parents of patient didn't know time for vaccination to be given for all antigens. There were eight family members in the index cases house hold. The patient was breast feeding and has travel history to Babile town with her mother's in the IDP site after onset of rash. Even though the case has no sign and symptoms of malnutrition she was severely ill. Her mother's took her to the hospitals after three days of rash onset and she was admitted in Bisdimo Hospitals for three days due to complication of pneumonia and diarrhea. The Health facility was far from the Index case sites which take more than one hour by foot walk. Her families were farmers and both mother and father were illiterate. Even though the cases start to seen in the Woreda in 42 weeks nobody did not identify and report the cases. The health centers miss diagnosis the measles cases until Bisidimo Hospital informs the Woreda.

Sample collected after additional case reported from different facility on October 28, 2018 and sent to EPHI for confirmation purpose. Even though measles was immediate reportable disease woreda health office notify zonal health department after one week of the index case. Zonal health department start public action and notify to the regional health Bureau for further investigation and intervention on November 18, 2018. Regional health Bureau starts intervention and investigation with EFETP residents on November 24, 2018. The number of case rapidly increases from end of November to the first week of December. **(Figure 5)**

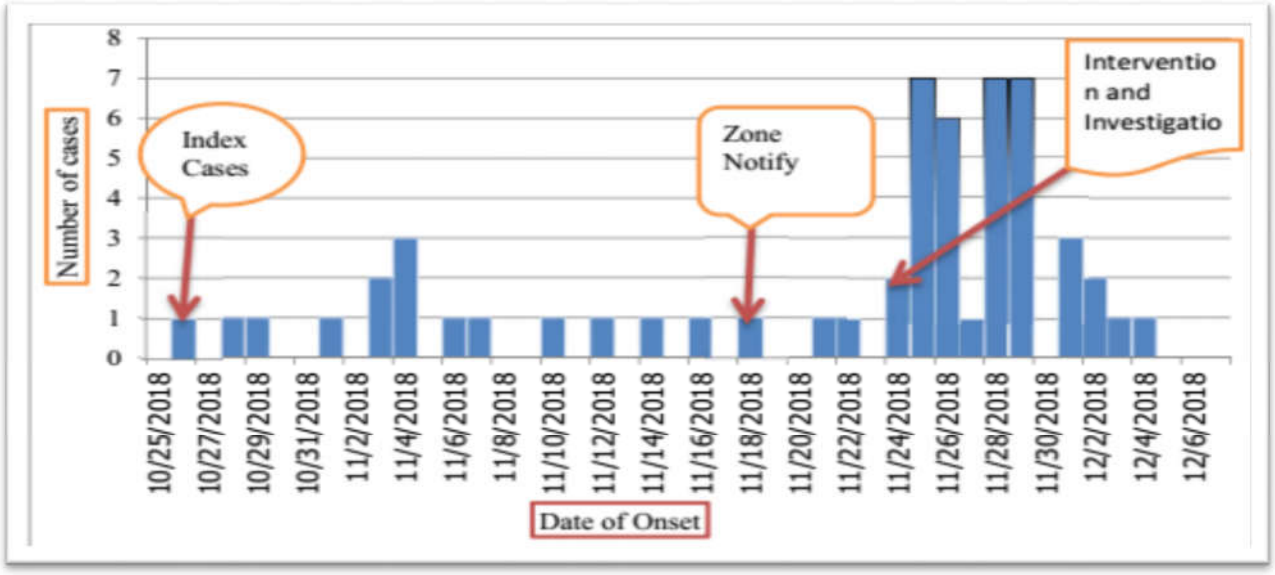

Figure 5: Epi Curve of outbreak based on date of onset of rash in Babile Woreda, East Hararge Zone, Oromia region Ethiopia, January, 2019

Vaccination status of the cases

From of total cases 45(82 %) of them were unvaccinated against measles vaccine, whereas 5 (9%) cases do not know their vaccination status or missing their vaccination status. Only 5(9%) cases were vaccinated with measles vaccine from which 3(60%) of them take one dose and 2(40%) of them take two doses of vaccine. From total vaccinated cases 4(80%) of them were vaccinated by routine program. (**Figure 7)**

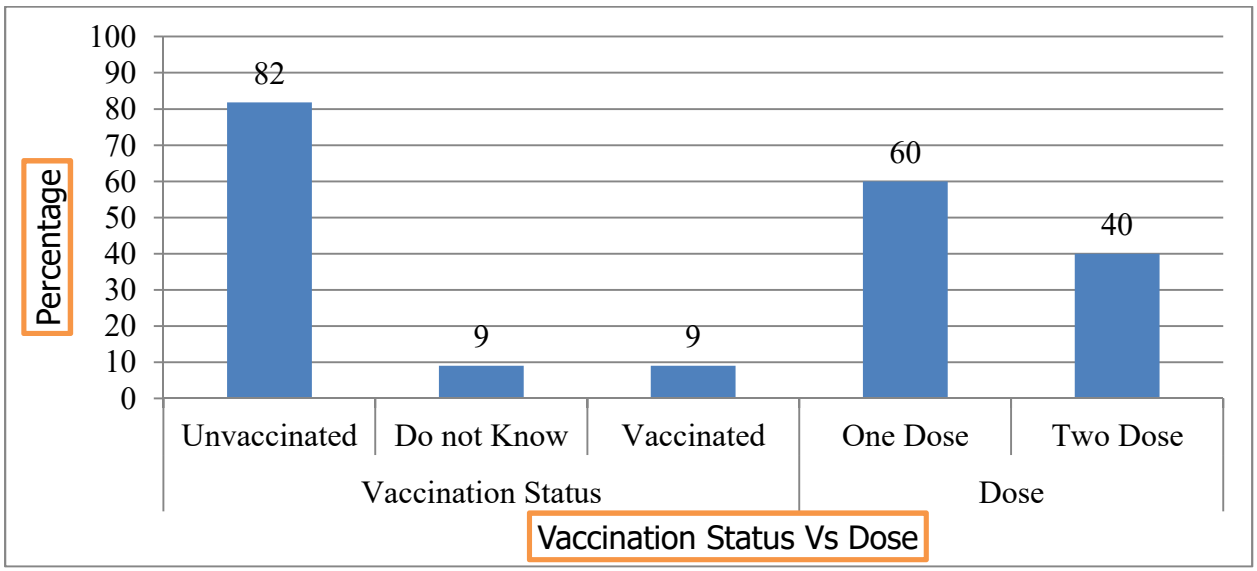

Figure 6; Vaccination Status of Measles cases in Babile Woreda East Hararge Zone Oromia Region Ethiopia January, 2019 G.C

Vaccination status of the Interviewed Kebeles vs. Coverage of the Woreda

Even though the vaccination coverage of five consecutive previous years of the Woreda was above regional target (90%); which was very high when compared to the result seen by interviewing community of the affected kebeles by outbreak. The report of vaccination of the woreda in the previous three years was above 100%. (**Figure 7)**

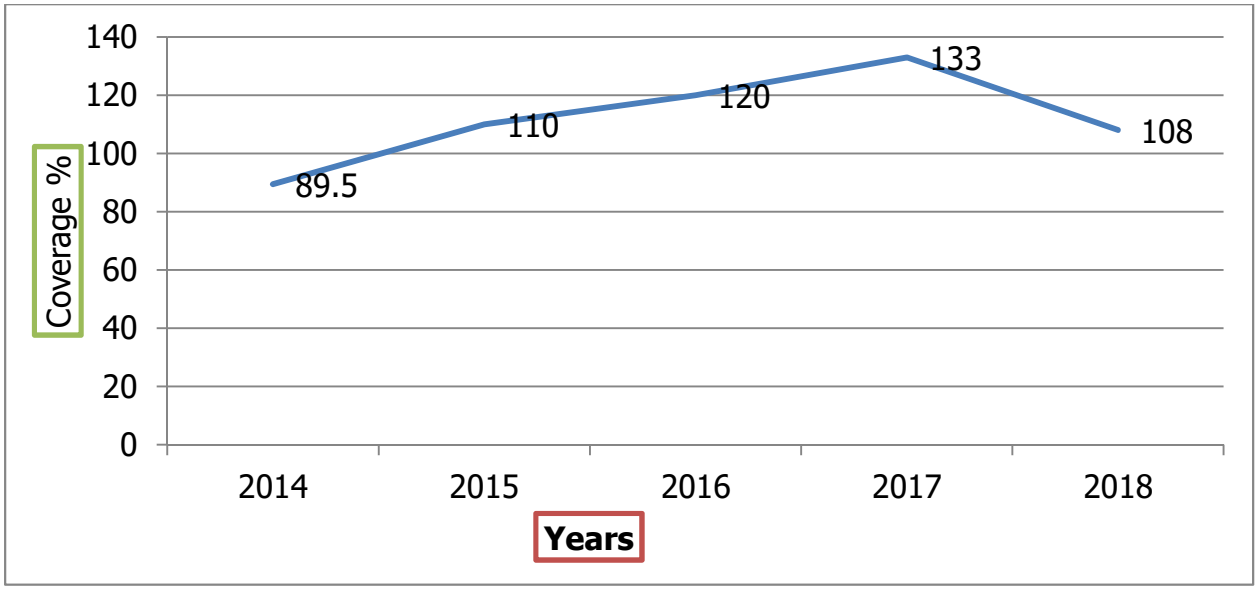

Figure 7: Report of Five years vaccination coverage of Babile Woreda East Haraage Zone, Oromia Region, Ethiopia, 2019 G.C.

Characteristics of cases and controls

During the outbreak investigation all the measles cases (55) and recruited controls (110) were asked for different variables like knowledge of measles transmission, ways of prevention, knowledge on age affected, vaccination status, contact history, travel history, house condition, health seeking behavior and level of education. From a total of 55 measles cases with mean age of 4.4 and 110 controls with mean age of 5.84 were included in the investigation. During data collection participants were matched by sex, age and place of residence. The median age of cases and controls were 3 and 4 respectively that range from 8 month to 25 year. Among total 55 interviewed cases 56% of them were males. Almost more than 95% of the cases show measles sign and symptoms. The major complications reported were diarrhea 47 (85%), pneumonia 39(71%), change of vision 30(55%), Convulsion 13(24%) ear infection 4 (7.3%), and no one developed blindness. Out of 55 cases 45(82%) of them visited health facility from which only 28(51%) of them admitted in different health facilities.

Socio Demographic Information

Table 2**:** Socio-demographic characteristics of cases and controls in Babile Woreda, East Hararge Zone, Oromia-January, 2019

Sr.No	Variables	category	Cases		Control	
			Number	(%)	Number	%
1	Age	Mean	4.4		5.84	
		Median	3		4	
		Range	0.8– 25		1.5- 24	
		0-4	40	73	58	53
		5--9	10	18	38	35
		10--14	2	4	9	8
		15-19	1	2	2	2
		20-24	1	2	3	3
		25-29	1	2	3	0
2	Sex	Male	31	56	62	56
		Female	24	44	48	44
3	Occupation of Case/Control	Farmer	4	4	3	2
		Student	11	20	36	33
		House Wife	1	2	1	1
		Government Employed	1	2	1	1
		Not applicable	40	73	69	63
4	Ethnicity	Oromo	55	100	110	100
5	Religion	Muslims	55	100	110	100
6	Marital status of Cases/Controls	Single	0	0	1	1
		Married	3	5.5	7	6
		Not applicable	52	95	157	143
7	Level of Education	Not applicable	45	82	122	111
		Primary	10	18	41	37

		secondary	0	0	1	1
		College/University	0	0	1	1
8	Family Occupation	Farmer	52	95	109	99
		Government Employed	1	2	1	1
		Student	2	4	0	0
9	Father Level of Education	No education	53	96	93	85
		Primary	1	2	16	15
		secondary	1	2	1	1
10	Mother Level of Education	No education	54	98	103	94
		Primary	1	2	7	6

Cold chain management

During outbreak investigation we observe the cold chain management of the health office as well as health facilities. The cold chain management of zonal health department was followed by daily and recorded, but Woreda health office have no refrigerator all the vaccine and drug supply stored in the health centers. However, in the visited health centers (Erer Valley Health Center) there was no functional refrigerators as a result all vaccines were stored in ice bag in which difficult to know and follow the correct temperature. In general storage of Vaccine was under questions situation in Erer valley health center where there was an outbreak of measles cases reported.

Laboratory Results

To confirm the occurrences of measles outbreak in the Babile Woreda five Blood Samples were collected from measles suspected patients on November 28 and sent to Ethiopian Public Health Institute laboratory on November 29, 2018 for laboratory confirmation of cases. As the result turned on December 13, 2018 indicates all 5(100%) of the sent samples were positive for measles IgM antibodies in the indicated periods of time. During this outbreak occurrences a total of 15(27.3%) samples were sent to EPHI from different health facilities of the same kebele for the confirmation; all the sent samples were positive for IgM.

From a total of 55 cases 47(61.8%) of them lives in house with only one door and window whereas 38.2% of them lives in house hold with two and above window and doors. **(Figure 8)**

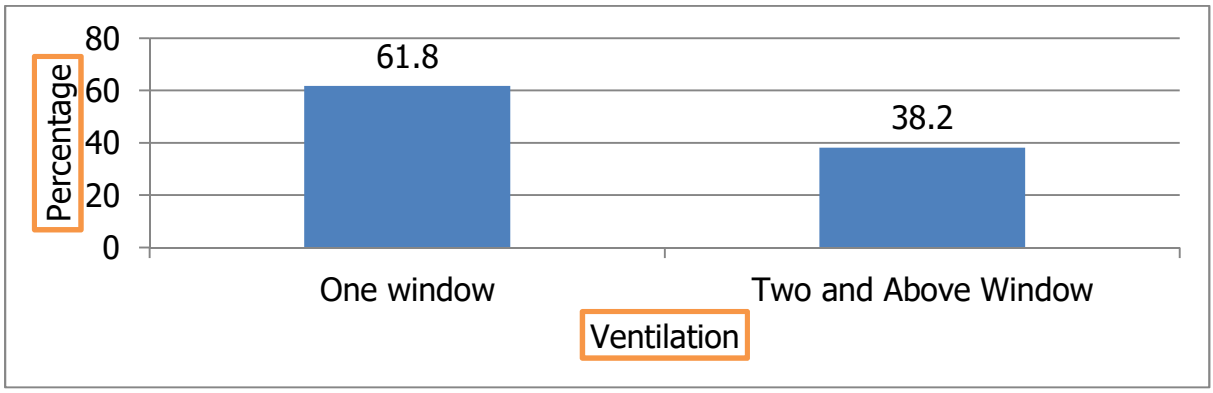

Figure 8: House Hold Condition of the cases in Babile Woreda East Hararge Zone, Oromia Region, Ethiopia, January 2019

Analytic Epidemiology

During the outbreak investigation we used all of the 55 cases (mean age: 4.4 years; SD: 5.08) and recruited 110 controls (mean age: 5.84 years; SD: 6.2) for the case-control study. We assessed variables like knowledge of measles transmission, and prevention, knowledge on age affected, vaccination status, contact history with ill, travel history out of the village, family size, health seeking behavior and level of education. None of the demographic characteristics and knowledge about disease was associated with measles outbreak. (Tables 2 and 3)

Performed multivariate logistic regression analysis showed that the odds of developing measles illness were 8 times higher among unvaccinated than vaccinated population against measles vaccine (AOR: 8, 95% CI: 0.05, 0.11), and also identified that odds of developing measles illness was 4.2 times in malnourished than other population (AOR:4.2, 95% CI:1.9-12). (Table 3)

Risk Factor for Measles Outbreak Occurrence

Table 3: Risk Factors assessment of Measles Outbreak Occurrence in Babile Woreda East Hararge Zone Oromia Region, Ethiopia-January, 2019 G.C.

Variables	category	Case (n=55)	Control (n=110)	COR, 95% CI	AOR, 95% CI	P Value
Vaccinated	No	45(82%)	46 (42%)	11.74 (0.014-0.108)	8 (0.05-0.11)	0.0001 ***
	Yes	5(9.1%)	60 (54.5%)	1	1	
Contact history with ill	Yes	43(78.1%)	104 (95%)	0.21 (1.706-13.719)	1.8 (0.6-2.7)	0.003
	No	12(21.8%)	6 (5%)	1	1	
Travel History	Yes	13(23.6%)	23(21%)	1.17 (0.394-1.85)	0.298 (0.481-3.6)	0.589
	No	42(76.4%)	87(79%)	1	1	
symptoms of Malnutrition	Yes	32(58.2%)	31(28%)	3.54 (1.8-6.98)	4.2 (1.9-12)	0.001**
	No	23(41.8%)	79(72%)	1	1	
Distance from Health Center	Less than 10 Km	30(54.5%)	64(58%)	0.86 (0.604-2.23)	2.26 (0.805-5.216)	0.57
	More than 10Km	25(45.5%)	46(42%)	1	1	
Ventilation	One window and Door	34(61.8%)	70(64%)	0.93 (0.554-2.1)	0.684 (0.58-0.73)	0.52
	two and above windows	21(38.2%)	40(36%)	1	1	
Number of Sleeping Room	One	48(87.3%)	90(82%)	1.5 (0.259-1.662)	0.228 (0.378-4.943)	0.374
	Two	7(12.7%)	20(18%)	1	1	
Over crowding	<= 5 person	11(20%)	29(26%)	0.7 (0.653-3.14)	1.36 (0.65-5.475)	0.37
	> 5 Person	44(80%)	81(74%)	1	1	

95% Confidence interval, *** has significantly associated variables

NB. All variables with p<0.6 in bivariate analysis were included in multivariate logistic regression analysis.

Outbreak response

The outbreak reported from East Hararge Zone, Babile Woreda to ORHB PHEM core processor was propagated types. As a result ORHB PHEM Core processor formulates team. One of the main aims of the team that dispatched from ORHB to the site of suspected cases reported (Babile Woreda) were making intervention and investigation of the outbreak at area during the occurrences of outbreak.

Outbreak response activities including contact tracing and measles vaccinations were carried out in community and health facilities. Community mobilization activities, face-to-face meetings were carried out in collaboration with local community representatives and kebele leader in order to encourage vaccine uptake during immunization campaigns. Active case search in the community with zonal, and Woreda health departments, Health center and health post staff to interrupt the transmission of the diseases to others kebele. Drug, and vaccine were given for Health centers and Hospitals to treat the cases without payments and all health workers were technically assisted on the ways of case management, recording and reporting the situation. Cases were carefully treated to prevent further spread, and to reduce morbidity and mortality attributed by measles outbreak. During outbreak investigation two kebeles and IDP sites in Babile town were visited home to home and health education was given for all the community in that areas. The investigator teams inform East Hararge zonal health Department to support and work closely with Babile Woreda health office in the affected Sites and kebeles and the entire neighboring kebeles to prevent further expansions of the outbreak in the Woreda by alarming all stake holders, the community, health extension worker and community leader to strength the Woreda surveillance system. Additionally vaccination coverage of the Woredas were reviewed and mass vaccination campaign was given for age group of 6 month to 15 years in the woreda and bordering kebeles of the others Woredas of the affected kebeles. After investigation completed close follow up was performed daily by telephone from ORHB PHEM directorate until ending of outbreak declared.

1.1.6 Discussion

We saw that the outbreak was associated with being not vaccinated against measles and having nutritional problems. Vaccination against measles antigen at the age of nine month was a protective factor for the occurrences of measles outbreak. All Measles cases were reported from two kebele and Babile IDP site. More than half of the cases were males with over all case fatality rate of 7.3% and attack rate of 0.056%. Three fourth of the cases were seen in under five years population. This study was in the same sex distribution, but has difference with age group in which 20- 44 were highly affected in south Africa.(7)

The age of the cases ranges 8 month to 25 years with mean and standard deviation age of 4 and 4.6 years respectively. The mean age of the cases were similar with the study conducted in Ethiopia from 2006 to 2016.(1)

The attack rate was higher in under five years children which account 247/100,000 population. Age specific case fatality rate was 10% in under five years children's. This study was similar with that conducted in Guji Zone in 2015(14).

The index cases seen in rural kebele with no vaccination status and outbreak occur in two rural kebeles and Babile IDP site camp that accommodates population in one place. This was similar with that outbreak occurs in Kenya refugee camp.(17)

All collected Samples that sent to EPHI were positive for measles IgM and shows 15(27.3%) positivity rate. This was higher than study conducted in South Africa in 2017 that shows only 210(3.4%) positivity rate.(7)

Out of total cases 82% of them did not have measles vaccination whereas 9% of them did not know their vaccination status. This study was similar with investigation conducted in Guji zone of oromia regional state.(14)

Woreda health office has no refrigerator all vaccine stored in the health centers. However, in the visited health centers (Erer Valley Health Center) there was no functional refrigerators as a result all vaccines were stored in ice bag in which the temperature did not followed.

The major identified risks for the occurrences of outbreak in the Woreda were being unvaccinated, and being malnourished in both kebeles and IDP sites. This study was agreed with study conducted in Abaya woreda of Borena zone (18).

1.1.7 Limitations

The main limitation seen during this study was incomplete measles line-List filled and sent to zonal health department by the Woreda health office until the correction was made by the deployed team from regional health bureau.

Additionally, recall bias (forget) of the Patients/guardians about their own or their Children health condition/status.

1.1.8 Conclusion and Recommendation

The occurrence of the outbreak was confirmed by laboratory diagnosis; we conclude that low immunization coverage has resulted in the occurrences of measles outbreak affecting mostly under five year's children with unvaccination status and malnourished. In addition we notice weak active case search and delay in detecting and confirming of the outbreak. On the other hand we conclude low attention was given for hard to reach area and population living in the IDP site.

Therefore, we recommend to strength immunization coverage with proper cold chain management in all health facilities of the woreda. Proper plan should prepared and applied for identification of high risk population in the IDP site and hard to reach area of the woreda for mass vaccination. Additionally, social mobilization and community sensitization on immunization service and health seeking behavior of the community should perform. Finally, proper and immediate measles case management should conduct in the nearest health facility to reduce expansion of the outbreak.

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18. Measles Outbreak investigation in Abaya Woreda of Borena Zone, Oromia 2013 Birhanu

1.2 Measles Outbreak investigation in Ginnir Woreda, Bale Zone, Oromia Region, Ethiopia-February, 2019

Abstract

Background: Measles is an acute, viral disease caused by a Morbilli virus. Humans are the only reservoirs. The transmission was person-to-person via aerosolized droplets or by direct contact with the nasal and throat secretions of infected persons. The outbreak was investigated for rapid implementation of control measures to decreases morbidity and mortality.

General Objective: To assess measles magnitude, identify risk factors associated with measles outbreak and undertake appropriate public health action measures.

Methodology: We described the outbreak in person, place and time. We calculated attack rate and case fatality rate. We investigated house to house in the community. We conducted unmatched case controls from December 28, 2018 to February 28, 2019 in 52 kebeles of Ginnir Woreda. Line list and prepared questionnaire was used to perform analysis of the outbreak with ratio case to control 1:1. We enrolled 134 cases and 134 controls to the study. We use Epi info software and SPSS to analyze the data. Mean, SD, COR and AOR were used to interpret and graph and tables used for displaying results.

Results: The outbreak began on 8 December 2018 having multiple propagating peaks during its occurrence, and reaching its highest peak on October 16, 2019. We identified 760 cases with case fatality rate of 4(0.5%). From total cases 412(54%) of them were males. The index case was reported from Haraw Misira kebeles. Majority of cases 507 (67%) were under five children with attach rate of 1.9%. More than one third 627(82.5%) of them did not vaccinated. On bivariate analysis, measles illness has statistically significant association with being unvaccinated (AOR: 2, 95% CI: 0.081-0.384), Contact history with known cases (AOR: 6, 95% CI: 0.045-0.442), having symptoms' of mal nutrition (AOR: 4.2, 95% CI: 1.209-4.88), and having unventilated house (AOR: 4.2, 95% CI: 0.04-0.387).

Conclusions: Higher attack rate was seen in under five children. The outbreak was associated with vaccination status, contact history, being malnourished and ventilation of house hold as risk factors in the community. Measles vaccination should encourage in all health facilities and proper case management to reduce morbidity and mortality. Proper and timely screening and treating of malnourished children should perform. Health education and community awareness should be performed at all level of health facilities about measles.

Key Words: Descriptive analysis, Measles outbreak, Bale Zone, Vaccination

1.2 Introduction

1.2.1 Background

Measles is systemic acute, highly infectious viral disease caused by a Morbilli virus and only humans are the reservoirs. Primarily the transmission of the virus was person-to-person via aerosolized droplets or by direct contact with the nasal and throat secretions of infected persons. When measles virus is introduced to a non-immune population, nearly 100% of individuals will become infected and develop clinical illness. The incubation period of measles is about 10 to 12 days (range 7-18 days). Malnourished persons are at higher risk of developing complications and mortality from measles infection.(1,2)

In a non-immune person exposed to measles virus, prodromal symptoms of fever, malaise, cough, coryza (runny nose), and conjunctivitis appear after the incubation period. Although there is no rash at disease onset, the patient is shedding virus and is highly contagious. The rash spreads to the trunk and extremities and typically lasts 3 - 7 days. The rash disappears be desquamation in the same order as its appearance during the infection. Individuals with measles are infectious 4 days before the onset of the rash through to 4 days after rash onset.(3)

In one third of the cases, measles is followed by complication that caused by the disruption of epithelial surfaces and immuno-suppression. Some of the measles complications includes pneumonia, ear and sinus infections, persistent diarrhea, upper airway obstruction from croup (laryngo- tracheo- bronchitis), and mouth ulcers. Less common complications include corneal drying that could progress to ulceration (keratomalacia) and blindness, protein energy malnutrition, convulsions and brain damage. Complications are more common in young children below 5 years of age.(1).

During 2013, it was estimated that, measles caused around 40,000 deaths annually in the African Region and remains, among the top causes of death in children less than 5 years of age in many African countries.(1,4) A person is naturally immune if he or she has had contact with the measles virus and has developed antibodies against it. Infants born to mothers, who have either had measles or have been vaccinated, are protected by trans-placental acquired maternal antibodies; that is they have passive immunity. This protection lasts six to nine months on average, after which the child becomes susceptible to measles infection.(5)

Active immunity may be acquired through natural infection or following vaccination. Persons who have taken measles vaccine and have formed antibodies in response to the vaccine are also immune. Measles vaccines contain live, attenuated viruses. In the African Region, it is

recommended that the first dose of measles vaccine (MCV1) be administered 9 months – the age when most children have lost their maternal antibodies. (1) When measles vaccine administered correctly at 9 months of age: it can produce life-long protection to approximately 85% of those vaccinated.(5)

Measles Outbreaks may occur in areas of low vaccine coverage, which are likely to occur in certain geographic areas, such as urban slums, squatter communities, remote rural areas, border communities, and in certain population groups with habitually low vaccination coverage rates such as nomadic peoples, marginalized population groups, or persons with religious or philosophical objections to immunization.(1).

As a result as the quality immunization coverage increases, the size of the occurrences of epidemics decreases and additionally, the inter-epidemic period lengthens, and the proportion of cases among older children increases.(1,4)

Case fatality rates of measles vary from 0.1% in the developed country to 15% in the less developed country with death usually caused by pneumonia or diarrhea.(5) In developing countries infants below the age of 12 months are at high risk for measles virus (MV) infection. Despite the widespread availability of measles vaccine, measles remains a major cause of childhood mortality. There were an estimated 30-40 million cases of measles in 2000, causing 777,000 deaths.(6)

Immunization is one of the most cost-effective public health interventions available, and an immunization programs have been a key component of public health services and primary health care services. Vaccination with an attenuated live virus vaccine has proven to induce protective immunity in sero negative individuals, and even low titers of neutralizing antibodies seem to be protective. In developing countries with a high level of infection, infants below the age of 12 months are at high risk for MV infection. In this age group passively transferred maternal immunoglobulin (Ig) poses a problem because declining maternal antibodies interfere with vaccine-induced sero conversion but do not protect against infection with wild-type MV.(6) A highly-effective measles vaccine has existed since 1963. Nonetheless, in 2014, an estimated 114,900 people, mostly children, died from the disease.(5)

Due to its highly infectious nature, measles effectively seeks out unvaccinated individuals than vaccinated. Therefore it was often considered to be the indicator disease to identify individuals and subpopulations that remain unreached by immunization programs. Measles vaccination coverage serves as an indicator of the quality of immunization programs, while the

epidemiology of measles cases highlights specific geographic areas and populations in which immunization services require further strengthening.(4,5,7)

Measles outbreaks have being reported in three drought-affected countries in the Horn of Africa, including Ethiopia (3481 cases), Kenya (11 cases) and Somalia (7,031 cases).(4)

In Somalia, there have been 7,031 suspected cases of measles reported since the beginning of 2017. This figure exceeds the total number of cases for the whole of 2016 (5,657). More than half of the reported cases were from the central and southern regions, with children (under-5) accounting for 65 per cent of the cases.(3)

All outbreak countries report low first dose coverage of measles at national level, with large disparities between regions and with pockets of low immunity.

In Kenya, an outbreak of measles was declared in Dadaab refugee camp, which currently accommodates as estimated 250,000 refugees from Somalia. All affected children are new arrivals from Somalia aged fewer than five. Sixty-nine per cent of reported cases have unknown vaccination status.(3)

In Ethiopia, 348 cases had been confirmed and 40 outbreaks reported in Addis Ababa, Afar, Amhara, Oromia, Southern Nations Nationalities and Peoples, Somali and Tigray regions, as of 31 March 2017. The majority of the cases (39%) have occurred among children under five years. The Somali region is particularly prone to disasters, and is disproportionately affected by the current drought with high levels of food insecurity, severe acute malnutrition, and acute water shortages as well as significant internal displacement.(3)

In West Hararge zone, a total of 718 cases were identified from August 1 to September 3, 2007; of which 54% are males and 54% is under age of five years old. Among the investigated patients, 579 (80.6%) were unvaccinated for measles, 96 (13.2 %) reported to have received at least one dose of measles vaccine. There were a total of 48 (6.7%) deaths and the cases fatality rate was highest between 12 and 23 months of age and in subjects older than 14 years. Case fatality rate is higher among the non-vaccinated children.(8)

1.2.2 Objective

1.2.2.1 General Objective:

- ❖ To assess measles magnitude, identify risk factors associated with measles outbreak and undertake appropriate public health action measures in Ginnir woreda, January 2019

1.2.2.2 Specific objectives

- ✓ To describe occurrences of outbreak by Time, Person and Place

- ✓ To Determine the risk factors for the occurrence of measles outbreaks
- ✓ To undertake appropriate public health action and control measures

1.2.3 Methodology and Materials

1.2.3.1 Study Area

Ginnir Woreda was one of the 20 Woredas found in Bale zone of oromia regional state with an estimated total population of 164,703. It has a total of 32 kebeles out of which 29 of them were rural kebeles and 3 urban kebeles. It is located at a distance of 130 KM from Zonal Town (Robe) and 560 KM from regional and country City Finfinne. The Woreda has eight health centers and 32 health posts. Potential health service coverage of the woreda was 100%. It share boundary on the south by Goro, west Sinana, northwest Gasera and Golocha, northeast Sawena, and on the east by Rayitu woreda.

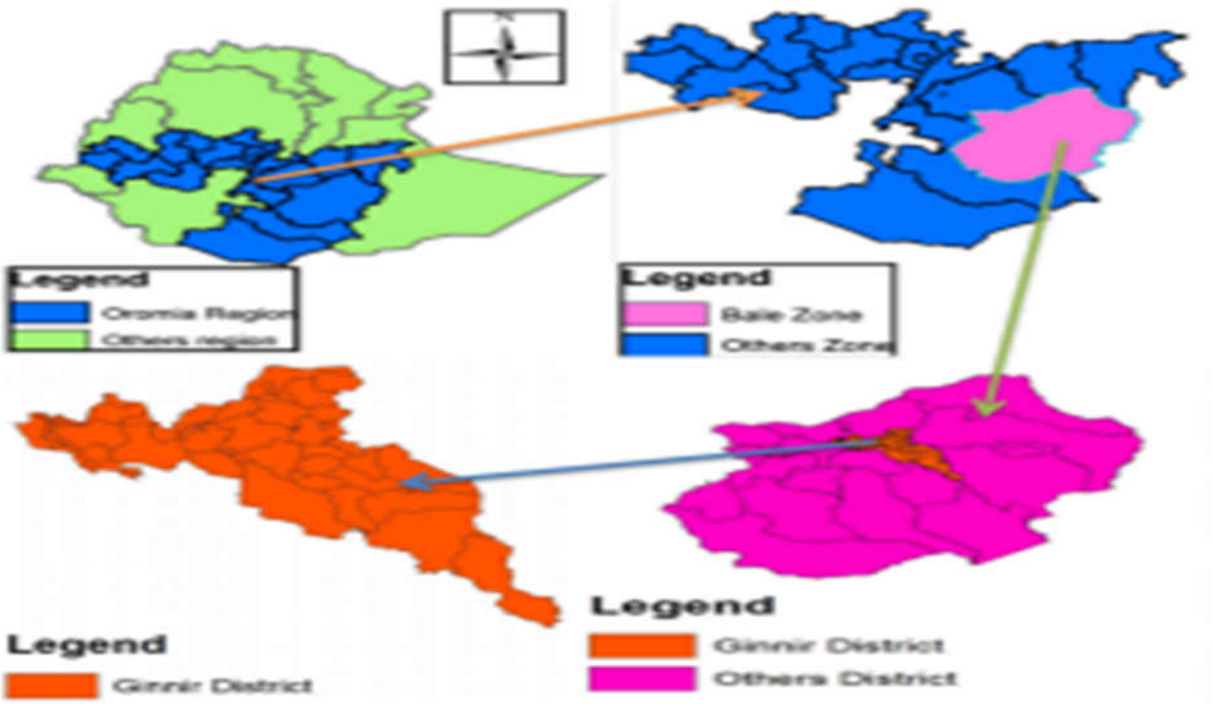

Figure 9: Map of Ginnir Woreda Bale Zone Oromia Region, Ethiopia- February, 2019 G.C.

1.2.3.2 Study Period

Descriptive data was analyzed from line list reported since January 4 until on February 28, 2019 whereas the case control study conducted from January16 to February 28, 2019 by interviewing of the cases and controls.

1.2.3.3 Study Design

We conducted descriptive cross sectional study design followed by unmatched case-control study to assess associated risk factors for the occurrences of measles outbreak in the Woreda.

1.2.3.4 Sample size

We used single proportion with unmatched case control to calculate sample size determination with 1:1 case to control ratio. Sample size was calculated using Epi-info 7.2.1.0 software for unmatched case-control study. The assumption taken from previous study indicates that, proportion of controls exposed was 40%, with two sided Confidence level (1-α) 95%, power of 80%, and OR of 2. Therefore, calculated sample size was 268 samples, 134 cases and 134 were selected using 1:1 case to control ratio.

1.2.3.5 Sampling Technique

Calculated sample sizes (134 cases) were collected by systematic random sampling methods from registered line list by starting from index case as the first sample and adding every 5 value to the selected number. Controls were selected from neighbors of cases who did not develop measles sign and symptoms in the period.

1.2.3.6 Source Population

All Ginnir Woreda Population

1.2.3.7 Study Population

All Population in the affected kebeles

1.2.3.8 Study Unit

All Measles cases that fulfills the case definition of measles

Inclusion Criteria

Cases: Any residents of Ginnir Woreda with fever, generalized maculopapular rash, cough coryza or conjunctivitis and suspected cases with laboratory confirmed or epidemiologically linked to the laboratory confirmed cases from December 28, 2018 to October 28, 2019 listed on line list, agreed to respond to the questionnaire.

Controls: An individual who was a neighbor to a case, did not develop signs and symptoms of measles and agreed to participate in the investigation.

Exclusion Criteria

Cases: Those with measles sign and symptoms who refuse to participate in the investigation

Controls: Those who were neighbor from cases and refuse to participate during interview

1.2.3.9 Data Collection

We collected data by using a prepared questionnaire (Annex 2) to collect information including socio- demography, Knowledge of disease, clinical status of the cases, the possible risk factors and awareness on mode of transmission and prevention measures for measles infection. The data

was collected through interview with cases or parents of cases, by collecting the line list data from woreda health office.

Controls were identified by going door-to-door, and interviewed in the same area on the same day with the cases.

During data collection active case search was conducted and cold chain management of the health facilities and health office was assessed and vaccination status of the woreda was obtained as well as clinical register of the cases those admitted at health facilities were reviewed. Before and after data collection discussions were conducted with the Zonal Health Office, Woreda Administration (all political Leaders), Health Office, health centers staff, school directors, community leaders and members of the kebeles.

1.2.3.10 Data Analysis

We analyzed collected data using Epi-Info7.2.1.0 software and SPSS software. Descriptive results were presented using graph, charts and table. Attack rate and case fatality rate were calculated. Analytical result was done by bivariate and multivariate analysis. P value was used and declared at < 0.05.

1.2.3.11 Data Dissemination

Findings of the investigation was communicated Oral and Formal for all stake holders (ZHD, Woreda health office, health center and health posts) whereas full written result was submitted to ORHB PHEM directorate, field base and university mentors' and Addis Ababa University school of Public health Department of Field Epidemiology. Moreover, the findings will also be presented at Addis Ababa University school of Public health.

1.2.3.12 Descriptive epidemiology

We described the outbreak in Place, person and time. We also described the outbreak distribution among the kebeles. We calculated attack rate and case fatality rate.

1.2.3.13 Environmental investigations

We investigated 52 out of 54 kebeles to assess the magnitude of outbreak, case management, and health care service given in hospital, health centers and health posts. On the others hands we assess ventilation of the house condition, and family size in house hold. Furthermore, we assessed the availability of vaccine supply, vitamin A stock and other supplies for measles case management in the woreda.

1.2.3.14 **Analytic Epidemiology (Case-control study)**

We compared cases with controls in unmatched case-control study. We recruited community based controls. We calculated Crude Odds ratio (bivariate analysis) and adjusted odds ratio (multivariate analysis) to identify risk factors for the occurrences of outbreak.

1.2.3.15 **Supportive Letter**

Even though a formal support letter was obtained from Oromia Regional Health Bureau to Bale zonal health departments no need of formal letter from zonal health department to the Ginnir Woreda, because the condition was an emergency and need immediate action. So we took experts from zonal and woreda health department and Oral informed consent was obtained from participants and from their parents to participate in the study. Confidentiality was assured and no personal details were recorded or produced in this documentation.

Operational Definition

No education: an individual who cannot read and Write

Primary: Those who attend school from grade 1-8

Secondary: Those attend school from grade 9 to 12

Above Secondary: Those who were from TVT to University

Ventilated: Two and above Door and windows

Unventilated: Less than two Door and windows

Not Crowded: Less than five people in the House

Crowdedness: Five and above in one house

Standard Case Definitions

Measles cases at community level: Any person with fever and rash coming to the health workers

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: A suspected case which has laboratory results indicating, IgM positive or isolated for a measles virus.

Measles outbreak: When three or more laboratory confirmed measles cases IgM -positive occur in a health facility or woreda within a month

Epidemiologically linked case: A suspected measles case that has not had a specimen taken for serologic confirmation and is linked (in place, person and time) to a laboratory confirmed case;

(living in the same or in an adjacent woreda with a laboratory confirmed case where there is a likelihood of transmission; onset of rash of the two cases being within 30 days of each other).

Measles death: Any death from an illness that occurs in a confirmed case or epidemiologically linked case of measles within one month of the onset of rash.

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

Index case: Suspected measles case (case that met the criteria for standard measles case definition) initiates the public health attention and visit health facility, and the first case who possibly the source of infection for the other cases emerging.

Cases- individuals, who fulfills the measles case definition criteria

Controls- individuals, who does not fulfill the measles case definition criteria and selected from similar village where cases were identified.

Variables of the Study

Dependent Variables: - Measles infection was the dependent variables in the investigation

Independent Variables: - Some of the independent Variables that included in the investigation were: -Vaccination status, Overcrowding, Travel History outside the village**,** Contact History with ill person**,** Nutritional status**,** Knowledge on transmissions and on prevention

1.2.4 Result

Descriptive Analysis

Ginnir woreda health office notifies one measles cases on December 28, 2018 to Bale zonal health department. Bale Zone health department sent report on January 9, 2019 to ORHB PHEM Directorate the occurrence of measles outbreak in Ginnir woreda. Regional deployed team on January 16, 2019, and start to investigate the outbreak. We identify a total of 760 Measles cases and 4 deaths with CFR of 0.5% were reported from December 28, 2018 to February 28, 2019 from 52 kebeles of Ginnir Woreda. The first (index) case was reported from Haraw Misira kebeles that share boundary with Sawena Woreda. The case was female age of 4 month breast feeding child and has travel history to Sawena Woreda kebele (Arda Galma) a place where community death of Measles cases where reported. The case was not applicable for vaccination of measles as a result not vaccinated.

Description of cases by Person

From total suspected cases 412(54%) of them were males. The age ranges from 1 month to 40 years with mean age of 5.03 and standard deviation of 6.08. A total of 387(51%) of cases occurs in age group of 1-4 years followed by 181(24%) in age group of 5-14 years. A total of 120(16%) of the cases were reported from under one year children. The cumulative attach rate was 461/100,000 population and the highest attach rate was seen in under one year children that account 2263/100,000 population. Registered case fatality rate was 4(0.5%) and high 2(1.1%) case fatality rate was seen in 5-14 age group followed by 1(0.8%) in under one year's children.

(Figure 10 and Table 4)

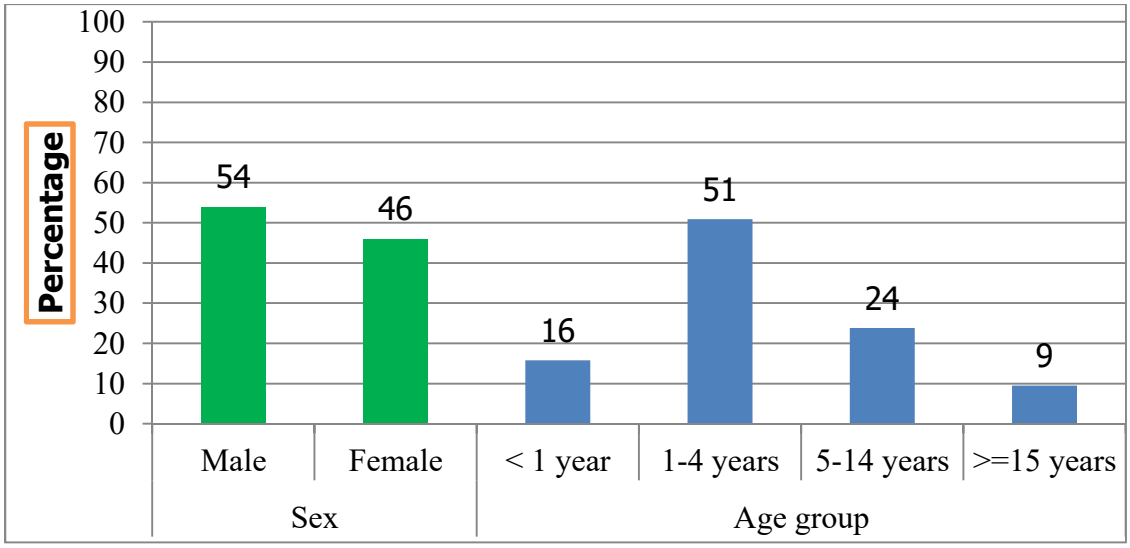

Figure 10 : Distribution of Measles cases by sex and age group in Ginnir Woreda, Bale Zone Oromia Region, Ethiopia-February, 2019

Table 4:- Distribution of Measles by age groups in Ginnir Woreda Bale Zone of Oromia Region, Ethiopia- February, 2019

Age Group	Population	Measles Cases	Measles Death	Percentage %	Attack Rate/100,000	CFR (%)
Under 1 years	5303	120	1	16	2263	0.8
1-4 years	21757	387	1	51	1779	0.3
5-14 years	27060	181	2	24	669	1.1
>=15 years	110,582	72	0	9	65	0.0
Total	164,702	760	4		461	0.5

Description of cases by Place

From total reported cases 280(36.8%) of them were reported from Getera Kebeles followed by Harawa Misira a place where index case was reported. The cases were seen in 52(96.3%) kebeles of the woreda. We identified high attack rate (40/1000 population) in Getera kebele and low attack rate Delo Sebro (1/1000). **(Figure 11)**

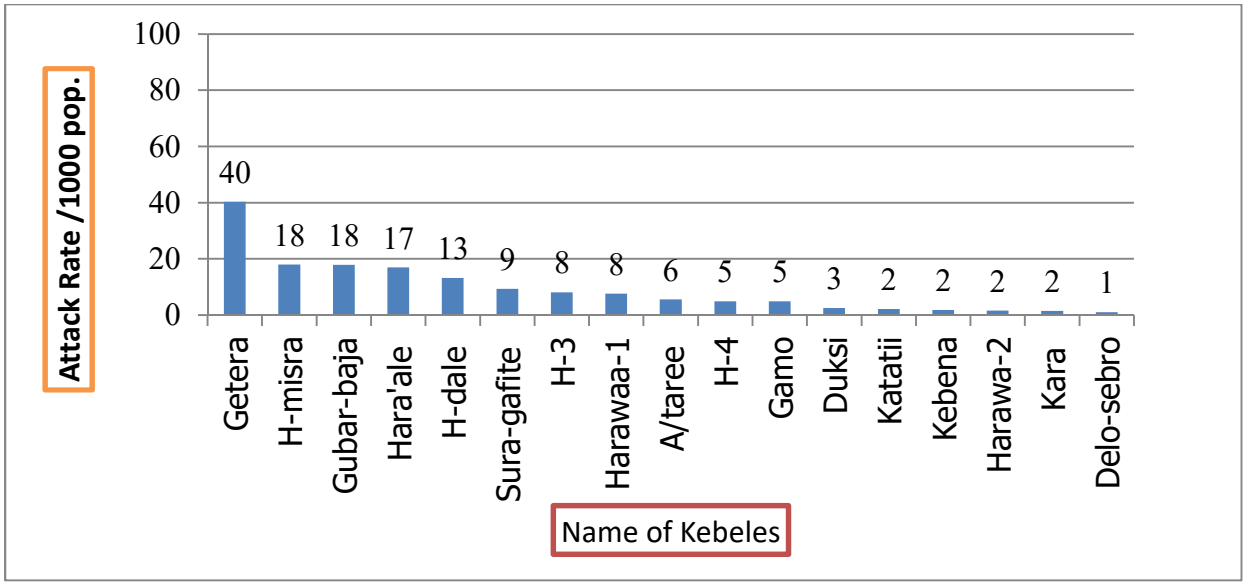

Figure 11: Attack Rate of measles cases by kebele in Ginnir Woreda Bale Zone, Oromia Region, Ethiopia-February, 2019 G.C

Description of cases by Time

The occurrences of the outbreak were propagated types by rising in some of the reporting weeks. The index Case was reported on Week 52, 2018(December 28, 2018). The cases were notified to the regional PHEM Directorate after two weeks of Occurrences on January 9, 2019. After four days oromia regional health Bureau PHEM Directorate deployed the team on January 13, 2019 to conduct investigation and interventions of the outbreak at the woreda. The team starts to intervene and investigate the outbreak on January 16, 2019. High numbers of cases were reported in Week 7 (127) followed by Week 1 (121). Few numbers of cases were reported in week 5 (46) and Week 8 (68). **(Figure 12 and 13)**

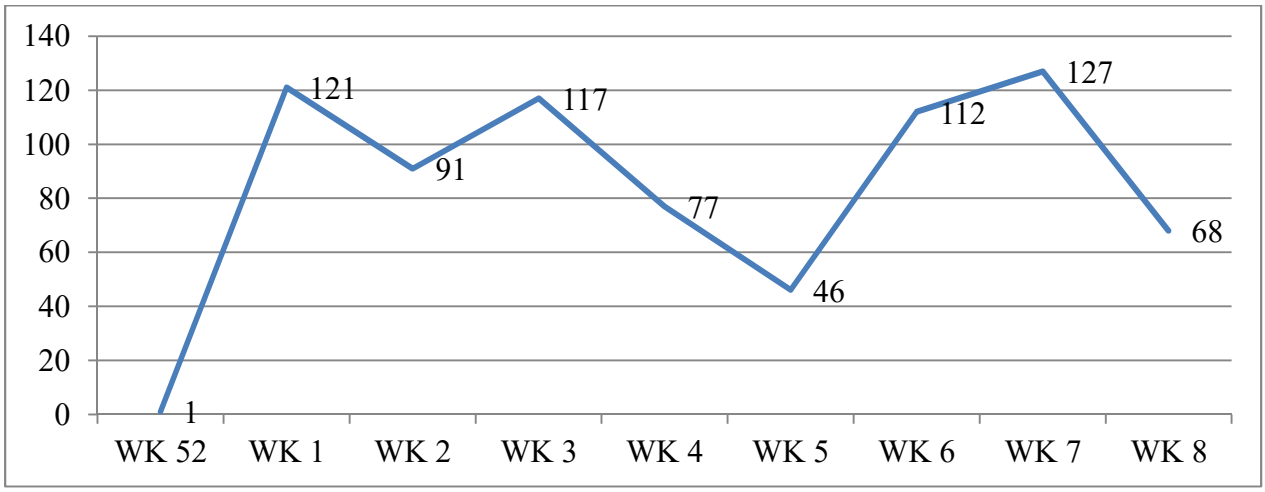

Figure 12: Distribution of measles cases by WHO week in Ginnir Woreda Bale Zone Oromia Region Ethiopia-February, 2019 G.C

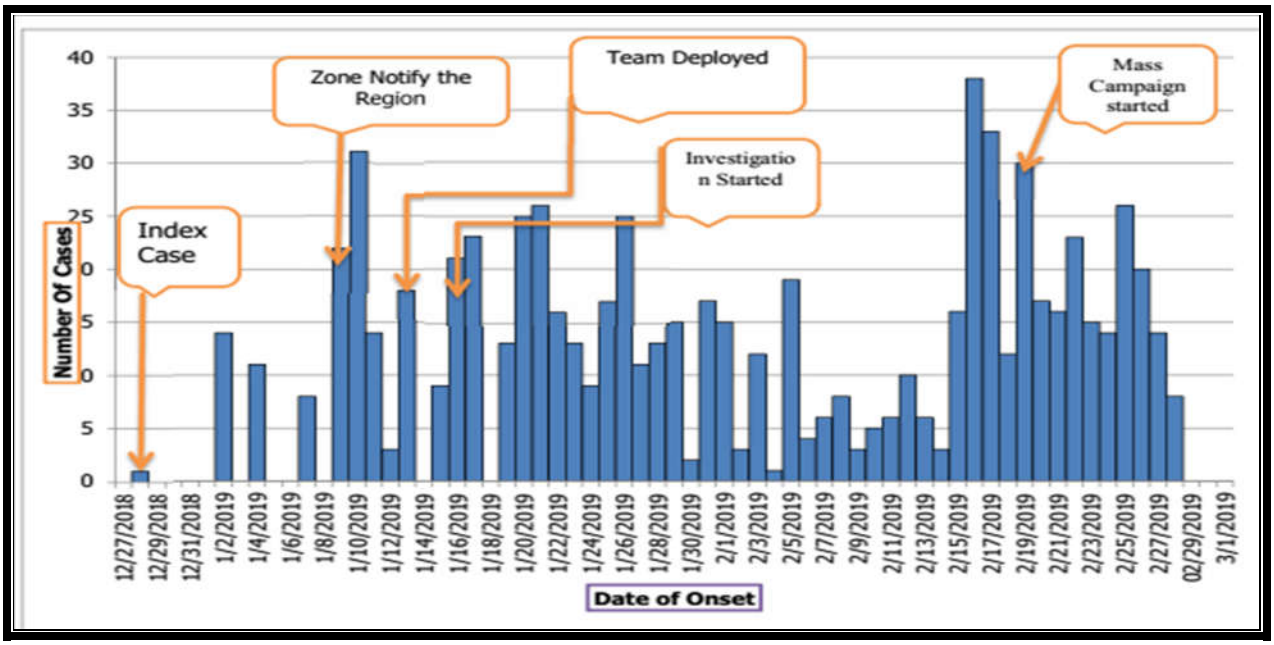

Figure 13: Distribution of Measles cases by Date of onset in Ginnir Woreda Bale Zone Oromia Region Ethiopia-February, 2019 G.C

Vaccination Status

From total reported cases 627(82.5%) of them did not vaccinated or miss their vaccination history. Regarding to vaccine doses 131(98.5%) of them takes only one dose whereas the rest 2(1.5%) of them took two doses. Five years trends of measles vaccination status of the woreda show decrement and all five years coverage's were less regional targets (90%).

(Figure 14and 15)

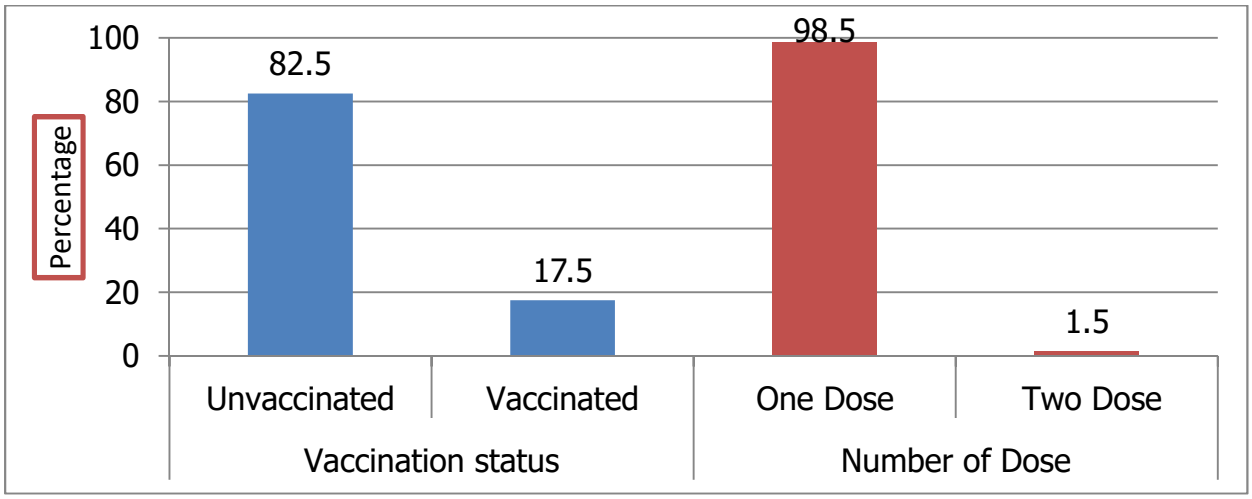

Figure 14: Distribution of the measles cases by vaccination of vaccination and dose at Ginnir Woreda Bale Zone Oromia region Ethiopia-February, 2019 G.C

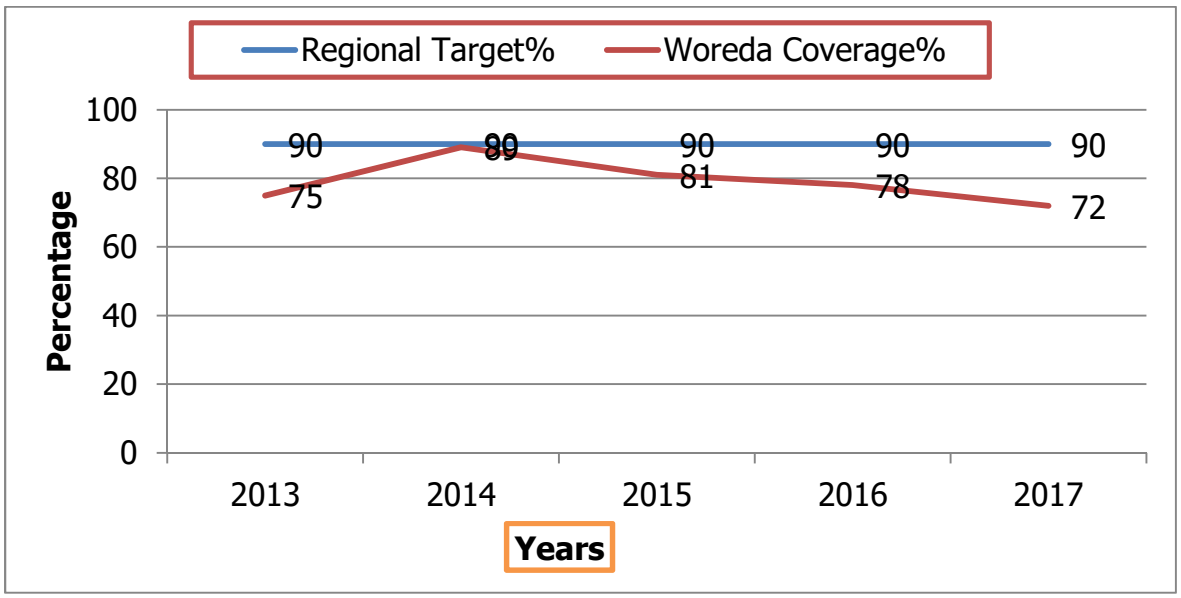

Figure 15: Trends of five Years Measles vaccination coverage of Ginnir Woreda Bale Zone Oromia region Ethiopia-February, 2019 G.C

Out of reported cases 392(51.6%) of them have complication and admitted in the health facilities for treatment and prevention of others community. Case fatality rate in the woreda was 4 health facility deaths out of 760 cases (0.5%). (Figure 16)

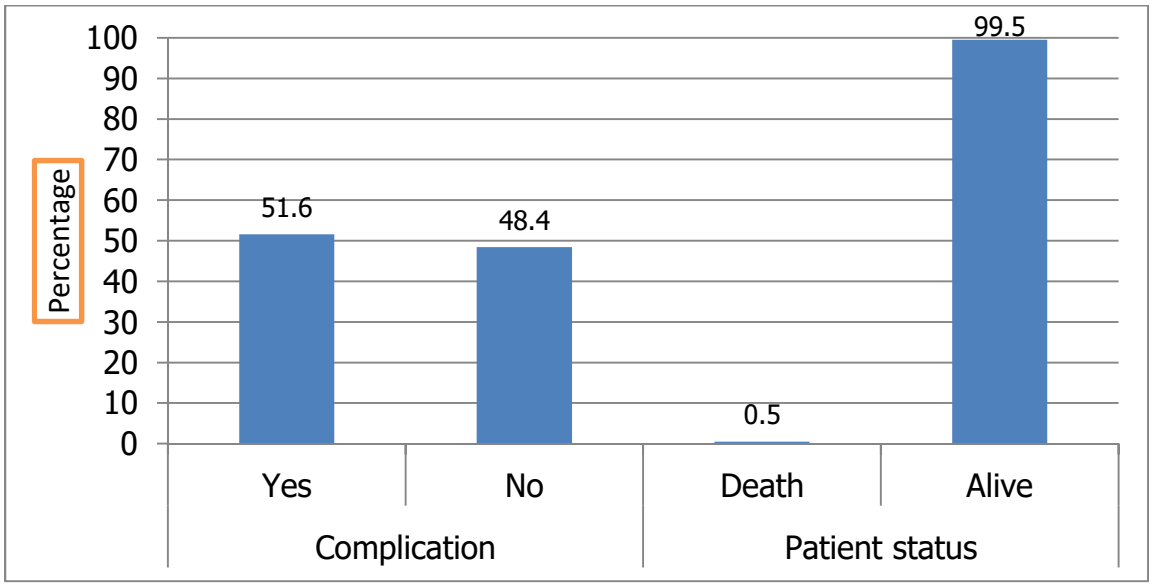

Figure 16: Distribution of Measles complication and case fatality rate among affected population in Ginnir Woreda Bale zone Oromia region Ethiopia-February, 2019

Characteristics of Case and Controls

We analysis that more than half of the cases and controls found in age group 1 to 4 years followed by 5 to 14 years age group. In both cases and controls 56% of them were males. All the cases and controls included in the study were Muslims and their families were farmers.

Socio Demographic Information

Table 5**:** Socio-demographic characteristics of cases and controls in Ginnir Woreda, Bale Zone, Oromia region Ethiopia-February, 2019

Sr.No	Variables	category	Cases		Control	
			Number	(%)	Number	%
1	Age	<1 year	120	16	8	5.9
		1-4 years	387	51	87	64.9
		5-14	181	24	28	20.9
		>=15	72	9	11	8.2
2	Sex	Male	75	56	75	56
		Female	59	44	59	44
3	Occupation of Case/Control	Farmer	12	9	11	8
		Student	26	19	32	24
		Not applicable	96	72	91	68
4	Ethnicity	Oromo	134	100	134	100

5	Religion	Muslim	134	100	134	100
6	Marital status of Cases/Controls	Single	1	1	4	3
		Married	6	4	6	4
		Not applicable	127	95	124	93
7	Level of Education of Case/Controls	Not applicable	101	75	95	71
		No education	28	21	29	22
		Primary	1	1	3	2
		secondary	4	3	7	5
8	Family Occupation	Farmer	134	100	134	100

Analytic Epidemiology

During the outbreak investigation recruited measles cases(134 cases) and respective controls were assessed for different variables like knowledge of measles transmission, ways of prevention, knowledge on age affected, vaccination status, contact history with ill person, travel history out of village, ventilation condition, health seeking behavior and level of education. The age ranges from 1 month to 40 years with mean 5.03 and standard deviation of 6.08

On the bivariate logistic regression analysis, developing measles illness has statistically significant association with being not vaccinated (AOR: 2, 95% CI: 0.081-0.384), Contact history with known cases (AOR: 6, 95% CI: 0.045-0.442, having symptoms' of mal nutrition (AOR: 4.2, 95% CI: 1.209-4.88), and unventilated house (AOR: 4.2, 95% CI: 0.04-0.387). Factors like family size, travel history out of their village, number of sleeping room, distance from health centers, knowledge age of vaccination and ways of transmissions those assessed during investigation had no significant association with the occurrence of the measles outbreak. **(Table 6)**

Risk Factor for Measles Outbreak Occurrence

Table 6: Multivariate analysis of measles Outbreak Occurrence in Ginnir Woreda, Bale Zone, Oromia region Ethiopia-February, 2019

Variables	category	Case (n=134)	Control (n=134)	COR, 95% CI	P- Value	AOR, 95% CI
Vaccinated	No	111 (82.8%)	94 (70.1%)	2.05 (2.29-7.083)	0***	2 (0.081-038)
	Yes	23 (17.2%)	40 (29.9%)	**1**		**1**
Contact history with Case	Yes	129 (96.3%)	107 (79.9%)	6.51 (4.05-13.76)	0.001***	6 (0.05-0.44)
	No	5(3.7%)	27 (20.1)	**1**		**1**
Travel History outside the village	Yes	38 (28.4%)	48 (35.8%)	0.71 (0.42-1.19)	0.191	0.119 (0.40-1.89)
	No	96 (71.6%)	86 (64.2%)	**1**		**1**
Symptoms of Malnutrition	Yes	64 (47.8%)	28 (20.9%)	3.46 (2.02-5.92)	0.013***	4.2 (1.21-4.88)
	No	70 (52.2%)	106(79.1%)	**1**		**1**
Distance from Health Center	< 10 Km	24 (17.9%)	18 (13.4)	1.41 (0.37-1.38)	0.315	1.249 (0.04-0.34)
	>10 Km	110(82.1%)	116(86.6%)	**1**		**1**
Ventilation (HH Condition)	1 Door and windows	116 (87%)	70 (52.2%)	5.89 (3.23-10.75)	0***	4.2 (0.04-0.39)
	>= 2 Door and window	18 (13%)	64 (47.8%)	**1**		**1**
Number of Sleeping Room	One	75 (56%)	30 (22%)	4.41 (0.91-2.18)	0.124	2.3 (0.56 1.77)
	>=2	59 (44%)	104(78%)	**1**		**1**
Family Size	less than or equal to 5 person	58 (43%)	59 (44%)	0.97 (0.99-2.62)	0.51	2.303 (0.85-3.70)
	> 5 Person	76 (57%)	75 (56%)	**1**		**1**

Knowledge of Age of Vaccination	Yes	15 (11.2%)	13 (9.7%)	1.17 (0.54-2.57)	0.69	0.414 (0.42-1.54)
	No	119(88.8%)	121(90.3%)	**1**		**1**
Knowledge of Transmission	Yes	16 (11.9%)	122 (91%)	0.01 (0.63-3.04)	0.426	0.112 (0.41-3.5)
	No	118(88.1%)	12 (9%)	**1**		**1**

95% Confidence interval, *** has significantly associated variables

NB. All variables with p<0.7 in bivariate analysis were included in multivariate logistic regression analysis.

Public health Intervention undertaken

During the outbreak investigation the team collects different logistics, drugs and materials for the interventions of the outbreak. Drugs like Amoxicillin, TTC eye ointment, Vitamin A, Paracetamol, ORS were given for the Woreda. The deployed team performs active case search home to home. Active cases were treated with injection and oral antibiotics to prevent bacterial infections, tetracycline eye ointment, oral rehydration salt (ORS), anti-pyretic, and vitamin A for patients to prevent further spread, and to reduce morbidity and mortality attributed by measles pathogenesis. Routine surveillance system was initiated and closely followed at each level on a daily bases. Health education was given for the community members, kebele leaders, private and governmental health workers, as well as religious leaders in all kebeles of the Woreda. All schools in the Woreda were closed for three weeks to prevent cross contamination/ spread of the outbreak. All suspected measles case was linked to nearby health facilities and active case search was conducted in all kebeles of the Woreda. Additionally, resource (Refrigerator and drugs) mobilized to health facilities of the woreda

Cold chain management

During outbreak investigation cold chain management of the health office as well as health facilities observed. The cold chain management of zonal health department and Woreda health office was followed regular manner and recorded correctly. However, out of eight health centers in the Woreda only two health centers have functional refrigerators and store vaccines properly. In 6(75%) of health centers did not functional refrigerators; as a result store all vaccines in room temperature to vaccinate the children.

Laboratory result

Five blood samples were collected from patients on December 28, 2018 and sent to the EPHI for laboratory confirmation of the measles. All sent samples were positive for measles IgM during

the specified outbreak period with 5(0.7%) positive. Since, based on the result of the laboratory test in the woreda, clinical manifestation and epidemiologically linked with laboratory confirmed cases of the boarder Goro Woreda, the outbreak was confirmed and all cases were treated as measles.

1.2.5 Discussion

We observed higher measles cases in 1 to 4 years age group and Getera kebeles with unvaccination history against measles vaccine. Beside outbreak investigation in the Ginnir Woreda of Bale Zone of oromia regional state the interventions was performed in different woredas of the zone. Primarily the outbreak starts on 21st November in the boarder Goro Woreda and expand in different woredas of the zone. The outbreak was seen in Ginnir Woreda after one month of occurrence in boarder (Goro woreda) that indicates epidemiological linkage of the cases. The cases affects highly in age group of 1 to four years and Getera kebels that have low vaccination coverage in the last five years and improper cold chain managements of the health facilities. This findings was similar with the fact that measles outbreak occurred in an area of low vaccination coverage and improper vaccination management. (1, 4)

The index case was reported from Harawa Misira kebele from which the outbreak expanded to nearby kebeles immediately due to high population mobility as well as weak intervention conducted by Woreda health office. After the first case seen from this kebele on 28, December, 2018; it expands to Ginnir Town immediately. This shows weak active case search and poor surveillance system in the Woreda. As assessment conducted indicates in all kebeles of the Woreda there was low vaccination coverage of five years less than regional target (90%). From total cases 82.8% of the cases were not vaccinated. This was similar with study conducted in West Harerge that shows outbreak occurrences in 80.6% of unvaccinated against measles antigen.(8)

In this study measles infection highly affects age group of 1-4 years followed by age group of 5-14 years age. Out of total cases 387(51%) of them were in age group of 1-4 years followed by 181(24%) in age group of 5-14 years. A total of 120(16%) of the cases were reported from under one year children. High attack rate 2263/100,000 population was seen in under one year children followed by 1779/100,000 in age group of 1-4 years. This study was similar with study conducted in Somalia and Ethiopia in 2017 in which under five children were highly affected. (3)

The case fatality rate of the outbreak was 0.5% and this was much lower than the expected case fatality rate of developing country estimated to be 3 – 5%.(1)

The major risks for the occurrences of the measles outbreak in the Woreda were being unvaccinated, Contact history with known cases, having symptoms' of mal nutrition, and ventilation condition of house even in kebeles with high vaccination coverage. This study was agreed with study conducted in Kenya.(3)

In both bivariate and multivariate analysis the risk factor that was statistically associated with measles illness were being unvaccinated against measles antigen, Contact history with known cases, having symptoms' of malnutrition, and poor ventilation of the house condition of the community. These result as similar west Hararge zone in 2007.(8)

1.2.6 Limitation/ Identified gap

The main limitation observed during outbreak investigations were:-

- ✓ Absence of health extension workers at health post level (all Visited kebele)
- ✓ Poor case management and patient handling at HC level (Harawa HC)
- ✓ Lack of notification of the outbreak and integration of private health facilities in response and case management
- ✓ Incomplete measles line-List filled and sent to Regional Health Bureau.
- ✓ Patients/guardians forget the evidence about their own or their Children health condition/status. E.g. Date of onset (Recall bias).

1.2.7 Conclusion and Recommendation

As the finding of investigation indicates the outbreak was confirmed based on laboratory diagnosis and epidemiological linkage. Primarily the outbreak affected 1-4 years, those have contact with known measles cases, those who were malnourished, and those have unventilated house. Being unvaccinated, Contact history with known cases, having symptoms' of malnutrition, and having unventilated house of the community were the major risk factor identified. We recommend enhancing supplementary immunization activities, strong active case search, and health education on transmission, prevention and proper case managements of diseased person by health workers. Improve measles active surveillance and case management by training the health workers on active surveillance system and case management.

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CHAPTER 2: SURVEILLANCE DATA ANALYSIS

2.1 Measles Surveillance Data Analysis, North Shewa Zone, Oromia Region, 2013-2017 G.C

Abstract

Background: Measles is a Vaccine preventable viral infectious disease caused by the genus Morbilli virus and characterized by fever, cough, coryza, conjunctivitis and generalized maculopapular erythematous rash. We analyzed five years measles data to identify morbidity and mortality trends in North Shewa Zone, Oromia Region. North Shewa Zone is one of the twenty zones found in Oromia Regional State. There were few numbers of measles cases reported every year of analysis. The study was conducted to analyze the magnitude and epidemiology of measles cases reported during 2013-2017 to understand its risks and propose recommendation.

General Objective: To describe morbidity and mortality of measles and its trends from 2013 to 2017G.c in North Shewa zone Oromia Region, Ethiopia. .

Methods: We conducted retrospective record reviewing of past five years (2013-2017) measles data from line list and case based registration of North Shewa Zone from March 10 -15, 2018. We used Micro Soft Excel and Epi Info version 7.10 to analyze data. The result was presented as narration, tables and graphs.

Result: Three hundred twenty two measles cases were reported to North shewa Zonal PHEM department from 2013-2017 G.C, 195(61%) of them were males. Total of 171(53%) of the cases occurs in under five children. A total 165(57.1%) of them were laboratory confirmed, 109(37.7%) confirmed by epidemiological linkage, 4(1.4%) clinical compatible and 11(3.8%) of cases were Suspected. The incidences of the measles in five years were 22cases/100,000 with two deaths (CFR of 0.6%). Measles vaccination coverage was increased intermittently from 2013 to 2017 with 42% lowest and 97% highest.

Conclusion and Recommendation

More than half measles cases were laboratory confirmed and occur in under five year children. As a result strengthening of routine immunization and mass campaign need to target for all children under five years with strong active case search of the cases.

2.1 Introduction

Background:

Measles is a viral disease and Vaccine preventable infectious disease caused by the genus Morbilli virus.(1) It is a highly contagious, serious respiratory viral disease characterized by fever, cough, coryza, conjunctivitis and generalized maculopapular erythematous rash. Infection can result in serious complications such as blindness, encephalitis, or severe respiratory infections such as pneumonia. (1)

Before widespread vaccination in 1980, measles was responsible for an estimated 2.6 million deaths worldwide each year. Despite the availability of a safe and effective vaccine, measles remains one of the leading causes of death among young children around the world, according to the WHO. (1)

The measles virus is most commonly acquired by inhaling microscopic droplets that contain viral particles ("airborne" transmission). Sometimes, Measles is acquired by direct contact with body fluids such as nasal and throat secretions of infected patients.(1)

The sign and Symptoms of measles will appear about 9 to 11 days after initial infection. Symptoms may include:- runny nose, dry hacking cough, conjunctivitis, or swollen eyelids and inflamed eyes, watery eyes, photophobia, or sensitivity to light, sneezing, a reddish-brown rash, Koplik's spots, or very small grayish-white spots with bluish-white centers in the mouth, insides of cheeks, and throat and generalized body aches.(1) The fever can range from mild severe to 40.6 degrees Centigrade. It can last several days, and it may fall and then rise again when the rash appears. The reddish-brown rash appears around 3 to 4 days after initial symptoms. This can last for over a week. The rash usually starts behind the ears and spreads over the head and neck. After two days, it spreads to the rest of the body, including the legs. As the spots grow, they often join together.(1,2)

The measles vaccine is widely available and is said to have decreased global rates of measles by over 75 percent. Complications from measles are fairly common and some of them are seriously ill. People most at risk are patients with a weak immune system, such as those with HIV/ AIDS, leukemia or a vitamin deficiency, very young children, and adults over the age of 20 years. Older people are more likely to have complications than children less than the age of 5 years(1–3).

Some of the Complications caused by measles are: - diarrhea, vomiting, eye infection, respiratory tract infections, such as laryngitis and bronchitis, difficulty breathing, ear infections, which can lead to permanent hearing loss, febrile seizures and etc. Patients with a weakened immune system who have measles are more susceptible to bacterial pneumonia. This can be fatal if not treated. Measles during pregnancy can lead to miscarriage, early delivery, or low birth weight. A woman who is planning to become pregnant and has not been vaccinated should ask physician for advice.(3,4)

As soon as the virus enters the body, it multiplies in the back of the throat, lungs, and the lymphatic system. It later infects and replicates in the urinary tract, eyes, blood vessels, and central nervous system. The virus takes 1 to 3 weeks to establish it, but symptoms appear between 9 and 11 days after initial infection. Anyone who has never been infected or vaccinated is likely to become ill if they have a droplets or in close physical contact with an infected person. Approximately 90 percent of people who are not immune will develop measles if they share a house with an infected person. (2,3)

2.1.1 Rationale of the study

As known Measles is a highly contagious virus that lives in the nose and throat mucus of an infected person which can spread to others through coughing and sneezing. An ongoing systematic surveillance data analysis is important for detecting this cases and unexpected increase in disease occurrence which help monitoring of diseases trends and evaluating the effectiveness of disease control program in the surveillance system and policies.

According to the National Public Health Emergency Management (PHEM) guide line, every suspected measles case should be detected and reported using the cases based form and undergo laboratory investigation. During an outbreak all cases must be entered on a line listing, investigated and reported to next government level (Community → Health Facility → Woreda Health Office → ZHD → RHB → EPHI or FMOH). Ethiopia has experienced numerous measles outbreaks and increasing morbidity and Mortality. As a vaccine preventable disease, measles surveillance data analysis is critical to guide intervention and vaccination activities. So the aim of the study was to assess the measles trend in the Zone, Region than after in the country to describe measles epidemiologically and identify locations where occurrence of cases is high for providing further investigation and to guide interventions.(5)

Routinely analysis of surveillance data is a key function for:

- describing measles epidemiology within the zone
- characterize the disease burden
- develop guidance to improve measles control efforts
- monitoring disease trends
- evaluating the effectiveness of disease control programs and policies
- to guide intervention and vaccination activities
- to trigger public health action

As already seen from the reports in North Shewa zone there were many measles reported cases and also share boundary with the desert part of Amhara regional state from which measles out breaks happens sometimes.

2.2 Objectives

2.2.1 General Objective

✓ To describe morbidity and mortality of measles and its trends from 2013 to 2017G.c in North Shewa zone Oromia Region Ethiopia, 2018

2.2.2 Specific Objectives.

✓ To describe morbidity and mortality of measles cases in Person, place and time
✓ To demonstrate the five years trend of measles morbidity and mortality
✓ To compare the burden of measles in different woredas within the zone
✓ To compare the immunization status and disease occurrence.

2.3 Methods and Materials

2.3.1 Study Area

The Surveillance data analysis of measles was conducted in North Shewa zone, oromia region, 2018. North Shewa Zone the former Selale Zone is one of the twenty zones found in oromia regional state. It was 114Km away from the capital city of the region as well as country Ethiopia. The Zone Share boundaries with Amhara Regional state in Northern and Eastern part, FSSZ in South and West Shewa Zone in west. There were 13Rural Woreda and one Town Administration with a total of 267 rural and 24 urban kebeles. As estimation of 2007 population census, there were a total population of 1,594,647 with 76,543 House Holds, 798918(50.1%) were males and 89% of the total population live in rural.

There were three climatic zones, highland > 2500m altitude accounts for 42%, Mid-land 2000-2500m altitude constitutes 35% and low land <2000m accounts the remaining.

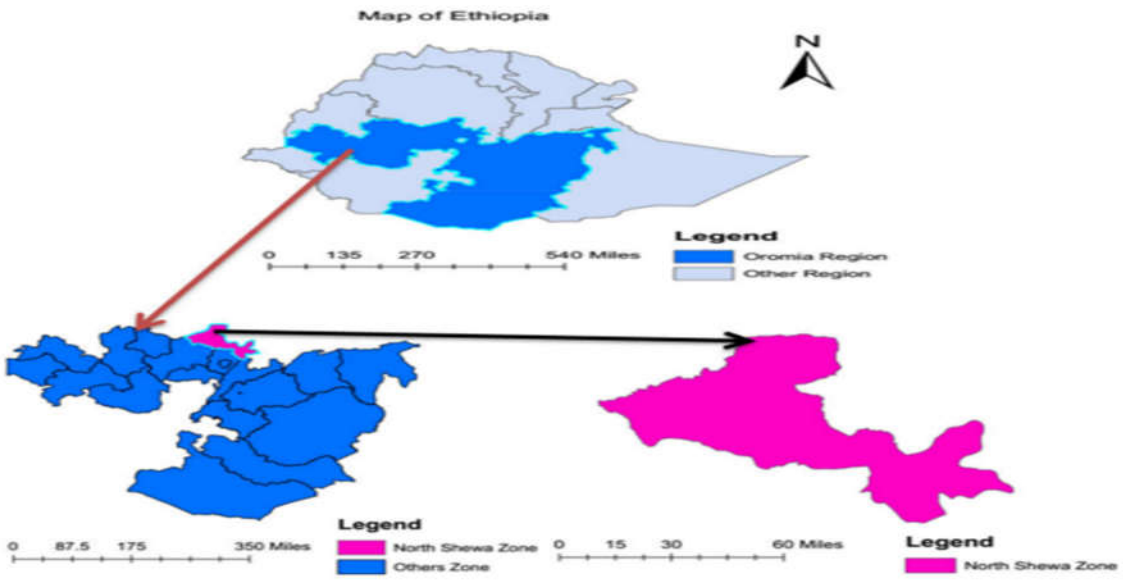

Figure 17: Map of North Shewa Zone Oromia Region Ethiopia-December, 2018 G.C.

2.3.2 Study Period

The five years surveillance data was collected from March 8-18, 2018.

2.3.3 Study Design

Retrospective Descriptive study design was used to assess the five years measles data.

2.3.4 Source Population

All population of North Shewa Zone Oromia Region

2.3.5 Study population

All Population Suspected as measles cases.

2.3.6 Study Unit

All suspected Measles case registered on line list and reported to Zonal health office.

2.3.6.1 Inclusion criteria

Any Measles cases and deaths reported from each woreda during 2013 to 2017.

2.3.6.2 Exclusion criteria

Any Measles cases and deaths that registered or reported with incomplete variables

2.3.7 Data collection methods

Secondary data of measles from 2013-2017 G.C were reviewed and collected from weekly surveillance format and HMIS Report of North shewa zonal PHEM departments and plan directorate respectively by using prepared checklist.

2.3.8 Data analysis

Data was analyzed by using Epi info 7.1 and Microsoft Office Excel 2007.

2.3.9 Data dissemination

The findings were communicated through Oral communication, submission of hard copy and soft copy to zonal Health Office, Oromia Regional Health Bureau and AAU, SPH.

2.3.10 Case Definitions

2.3.10.1 Suspected measles case:-

Was any case with a few typical clinical features or any person with generalized maculo-papular rash and fever plus one of the following symptoms: cough or coryza (runny nose) or conjunctivitis (red eyes).

2.3.10.2 Probable Measles Case:-

Was any case with typical clinical features of the measles disease without laboratory confirmation or any person with generalized maculo-papular rash, fever, cough or coryza (runny nose) or conjunctivitis (red eyes).

2.3.10.3 Laboratory confirmed case:-

Was a suspected case which has appropriate laboratory results indicating infection either Measles virus detection by PCR or detection of Measles IgM by serological testing.

(Source of Diagram: National Measles Guide Lines)

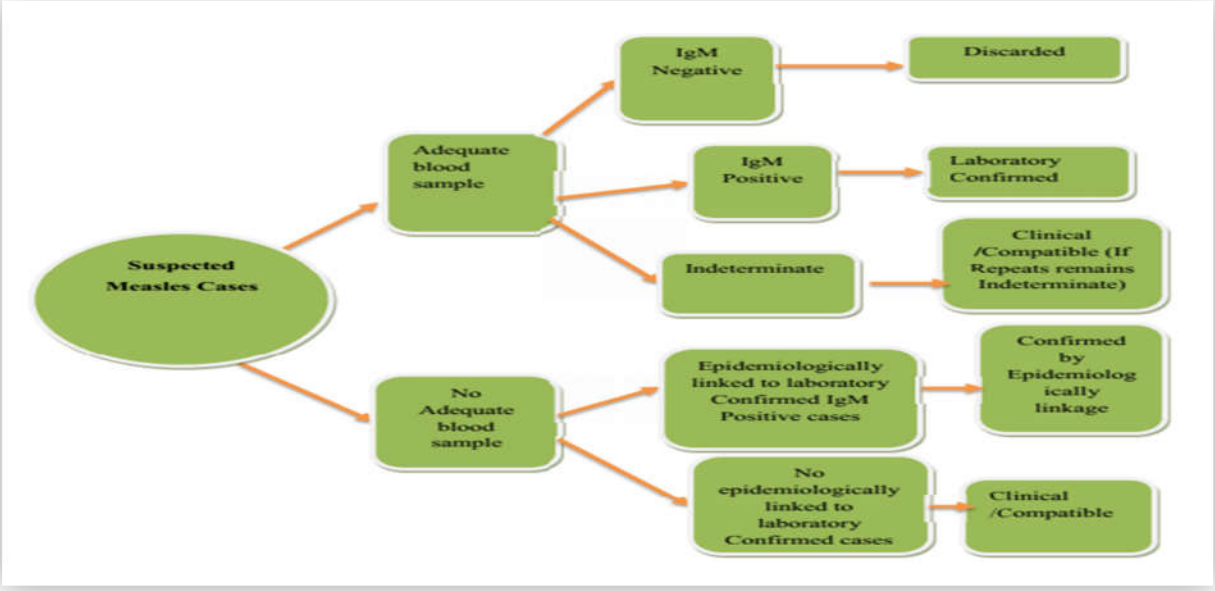

Figure 18: Measles cases Laboratory confirmed flow chart definition.

2.3.10.4 Epidemiologically suspected case: -

A suspected case, which has contacts with laboratory confirmed case or another epidemiologically confirmed case.

2.3.10.5 Measles-related death: -

Was 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.

2.4 Results

A total of 322 measles cases were reported to North shewa PHEM department from respective 13 Woreda and one Town administration in between 2013-2017 G.C of which 195(61%) of them were male**s.** From total cases 171(53%) of them belongs to age under five years of age, 96(30%) of them were 5-14 years of age and 55(17%) of them were in the age groups of above 14 years old. These indicates that measles cases affect highly those who were less than or equal to four years of age. **(Figure 19 and 20)**

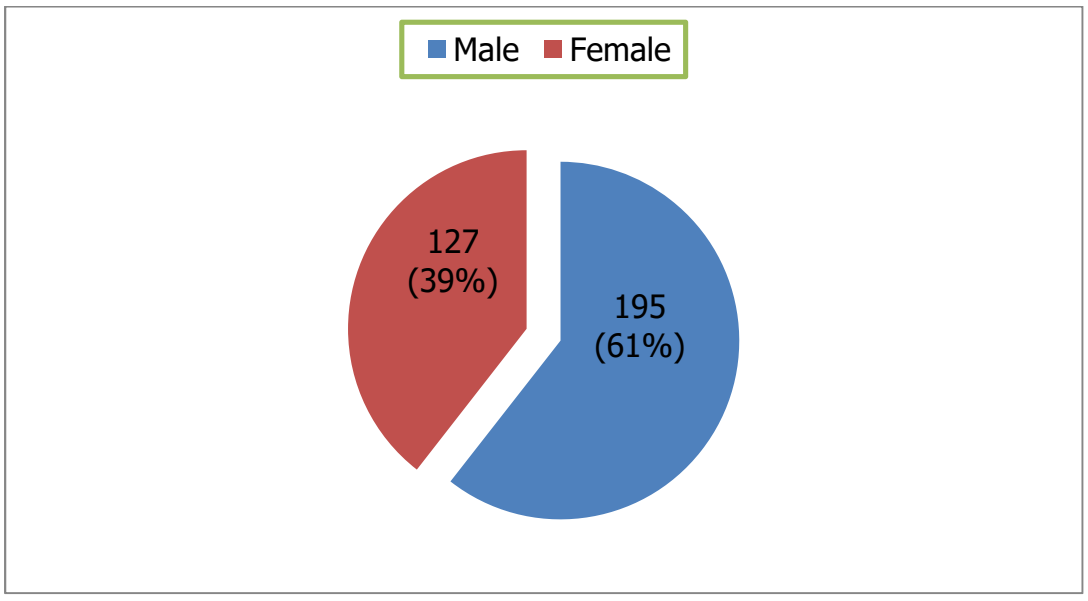

Figure 19: Measles Distribution by sex in North Shewa Zone, Oromia region Ethiopia-December, 2013-2017 G.C

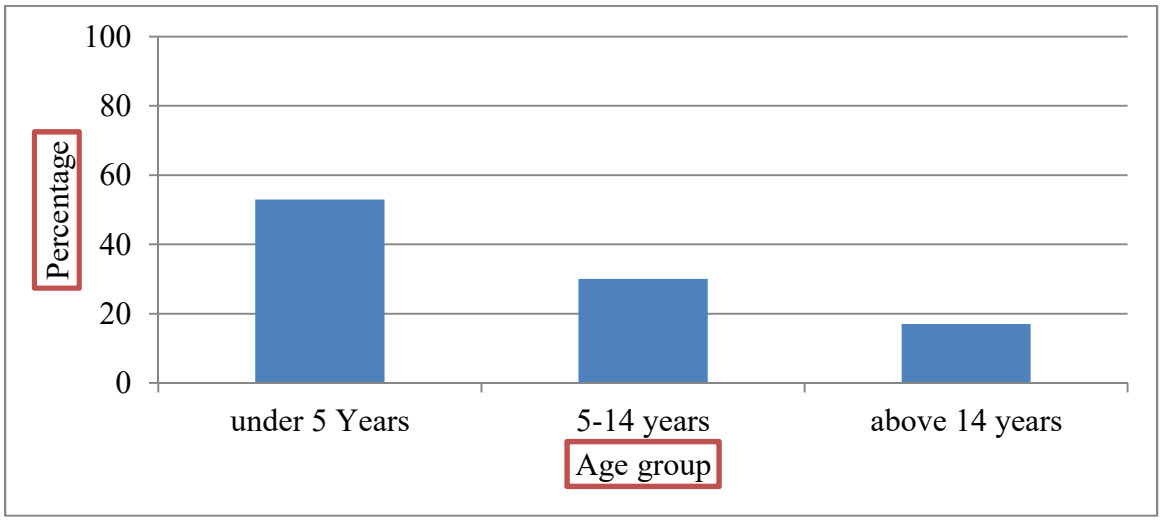

Figure 20: Distribution of Measles cases by Age in North Shewa Zone, Oromia region Ethiopia-December, 2013-2017 G.C

From the total 322 reported measles cases, 165(57.1%) of them were laboratory confirmed, 109(37.7%) of cases were confirmed by epidemiological linkage, 4(1.4%) of cases were clinical compatible and 11(3.8%) of cases were Suspected. **(Figure 21)**

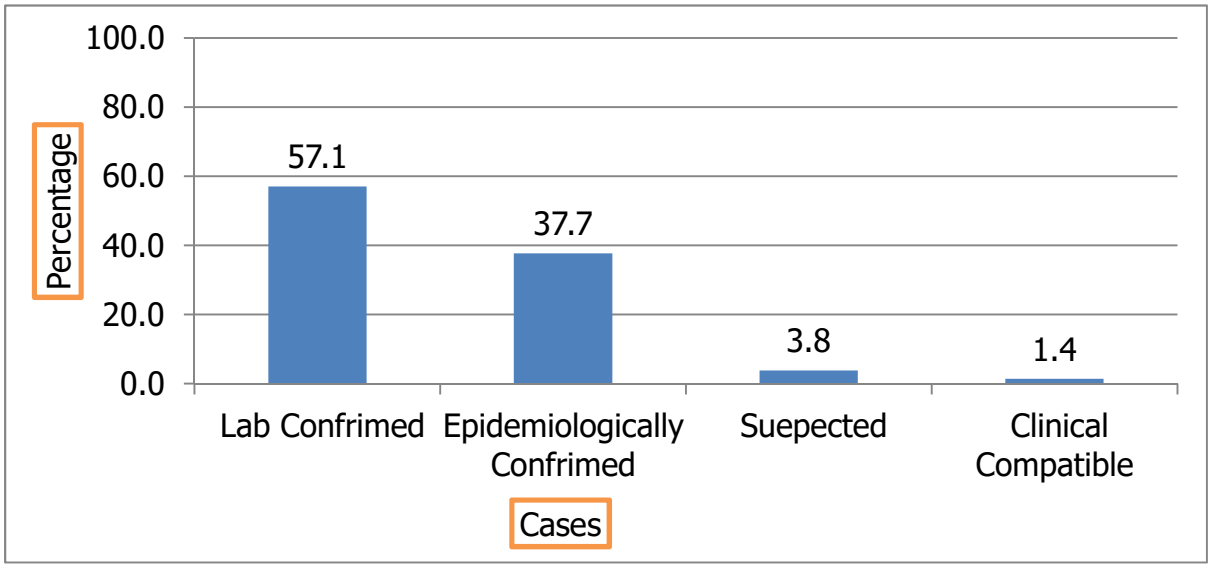

Figure 21: Classification of reported measles cases in North Shewa Zone, Oromia Region Ethiopia, 2013-2017

When compared number of cases reported by using line list from zone and number of sample sent to EPHI for laboratory confirmation; from total 322 reported cases for 289 of them samples

sent to EPHI for confirmation. In 2013 a total of 120 samples were sent even if there were only 72 cases registered on line list of Zonal PHEM which indicates sample sent to the laboratory without reporting to the Zonal PHEM from Respective Woredas which was the same as that of 2015**. (Figure 22)**

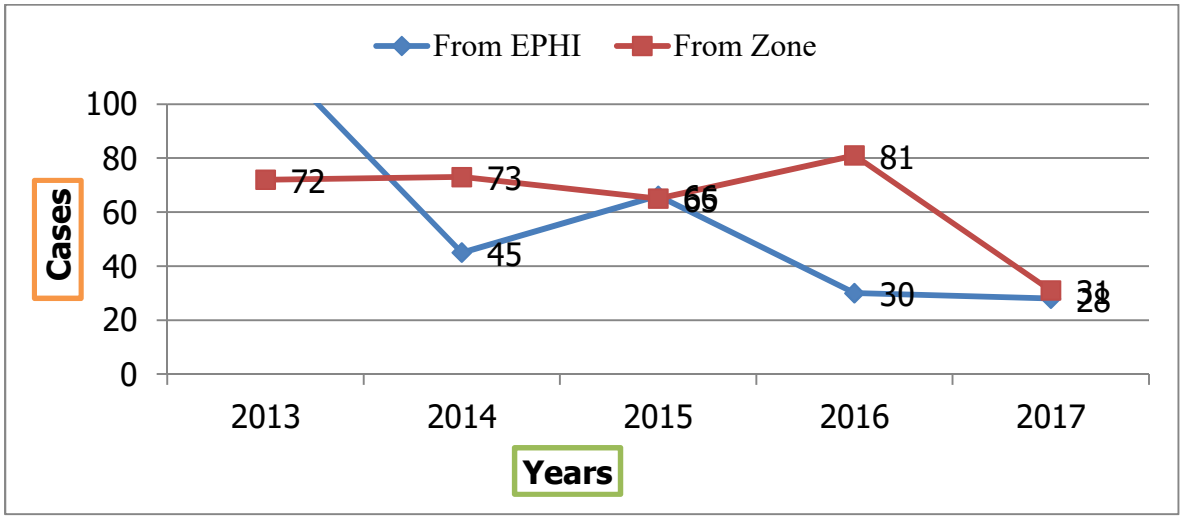

Figure 22: Number of measles cases from Zonal PHEM vs. Number of Cases sent to EPHI for Laboratory in North Shewa Zone Oromia Region Ethiopia, 2013-2017

From total 195 male measles case under five years ages constitute 104(53%) cases followed by 56(29%) cases those were 5-14 years. From 127 cases of females 67(53%) of them were less than or equal to 4 years followed by 40(31%) cases those who were 5-14 years. Age and sex specific incidence and case fatality rate (CFR) were determined during 2013 to 2017 independently.

In 2013, the incidences of measles cases were 17.6/100,000 among under 5 years of age groups followed by 6/100,000 in age group of 5-14 years with no death. In 2014, the incidences of measles cases were 15.4/100,000 among under 5 years of age groups followed by 6.3/100,000 in age group of 5-14 years with no death. In 2015, the incidences of measles cases were 13.7/100,000 among under 5 years of age groups followed by 3.9/100,000 in age group of 5-14 years with no death. In 2016, the incidences of measles cases were 19.4/100,000 among under 5 years of age groups followed by 4.9/100,000 in age group of 5-14 years with Case fatality rate of 2.5%. In 2017, the incidences of measles cases were 5.5/100,000 among under 5 years of age groups followed by 2.1/100,000 in age group of 5-14 years with no death. The incidences of the measles cases were 5.2/100000 and 5.1/100,000 in 2013 and 2014 respectively. In 2015 and

2016 the incidences became 4.4/100,000 and respectively, but in 2017 the incidences of the cases decreases to 2/100,000. (**Table 7, 8 and Figure 23 and 24)**

Table 7: Distribution of Measles incidence by Sex and Age in North Shewa Zone Oromia region Ethiopia-December, 2013-2017

Years	Age in years	Male Population	Male Incidence	Female Population	Female Incidence	Total Population	Incidences
	Under 5	114118	22	113663	13	227781	17.6
	5—14	216943	8	216077	4	433021	6
	>15	364564	1	363109	1	727673	0.8
2013		695625		692849		1388475	**5.2**
	Under 5	117323	18	116854	13	234177	15.4
	5—14	223035	6	222145	3	445180	6.3
	>15	374801	3	373305	2	748106	2.4
2014						1427463	**5.1**
	Under 5	120618	17	120136	11	240754	13.7
	5—14	229299	3	228384	4	457683	3.9
	>15	385328	2	383789	2	769117	1.8
2015						1467554	**4.4**
	Under 5	124003	23	123508	15	247511	19.4
	5—14	235734	6	234793	4	470528	4.9
	>15	396142	2	394561	1	790702	1.3
2016						1508741	**5.4**
	Under 5	127486	7	126977	4	254462	5.5
	5—14	242355	2	241388	2	483743	2.1
2017	>15	407268	1	405642	0.5	812910	0.9
						1,551,115	**2**

Table 8: Distribution of Measles cases and CFR by Sex in North Shewa Zone Oromia region Ethiopia-December, 2013-2017

Years	Total Population	Total Males	Male		Total Female	Females		Total cases	CFR
			cases	Incidence		Cases	Incidence		
2013	1388474	695626	45	6	692849	27	4	72	0
2014	1427463	715159	46	6	712304	27	4	73	0
2015	1467554	735245	36	5	732309	29	4	65	0
2016	1508741	755879	49	6	752862	32	4	81	2.5
2017	1551115	777109	19	2	774006	12	2	31	0

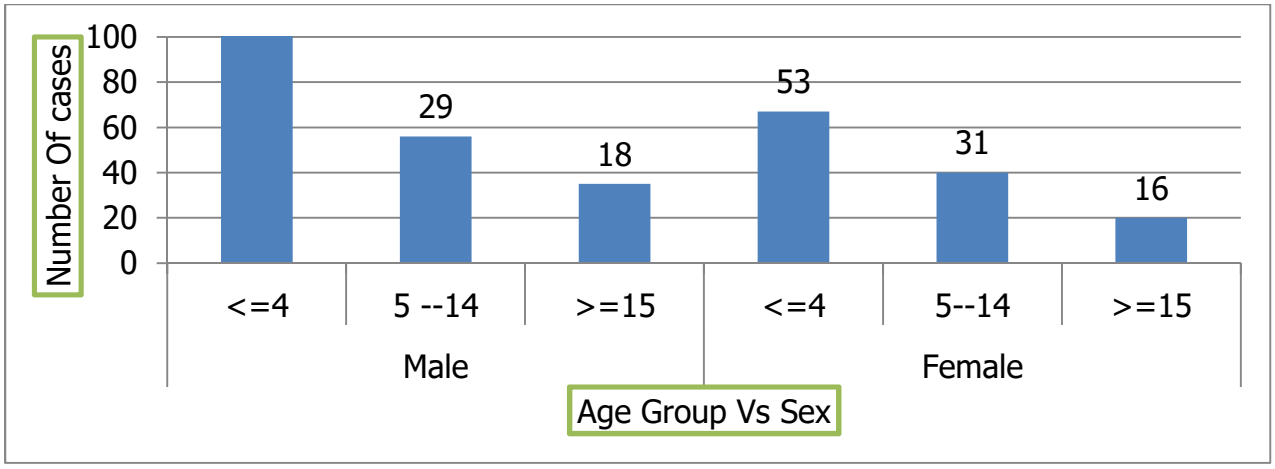

Figure 23: Percentage of Measles cases by Age and Sex in North Shewa Zone Oromia region Ethiopia-December, 2013-2017 G.C

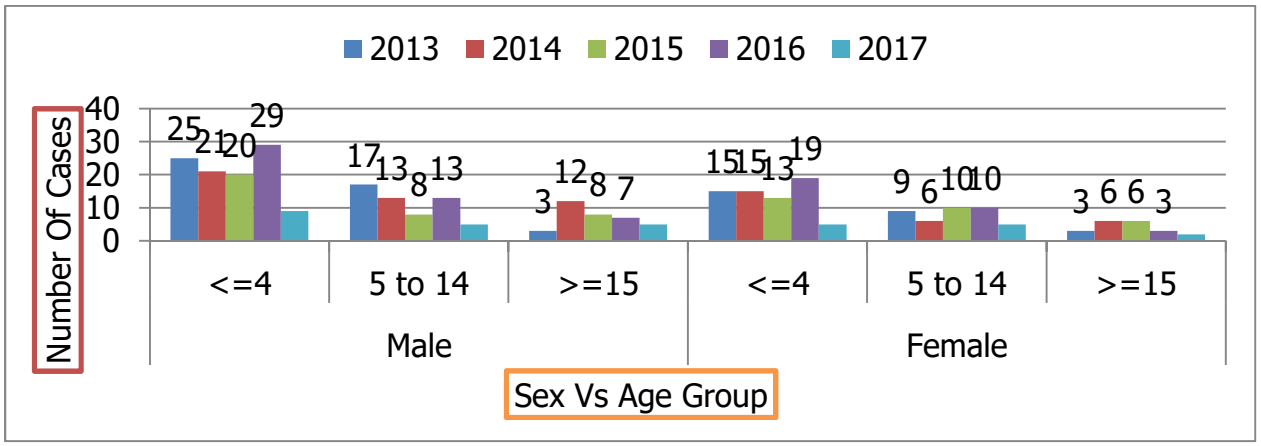

Figure 24: Distribution of Measles cases by year, sex and age from 2013-2017 in North Shewa Zone Oromia Region Ethiopia-December, 2013-2017

A total of 322 measles cases (incidence of 22cases/100,000) and two deaths (CFR of 0.6%) were reported in five years from 2013-2017 G.C to North Shewa Zonal PHEM department from respective 13 Woredas and one Towns. Only two deaths occur in Dara woreda (CFR of 3.4% in 2016) and no death reported in all Woreda in the period. The mean number of cases per year was 64 ranging from 31-81 cases reported. There was high attack rate (59/100,000 population) in Fitche town followed by Wachale Woreda (35/100,000 population). The list attack rate was reported from Were Jarso Woreda (8/100,000 Population).

The number of cases were 72(22%) in 2013, 73(23%) in 2014, 65(20%) in 2015, 81(25%) in 2016 and 31(10%) in 2017. The average annual prevalence was 5.2 per 100,000 populations in 2013, 5.1 per 100,000 in 2014, 4.4 per 100,000 populations in 2015, 5.4 per 100,000 populations and two per 100,000 populations were reported in 2017. **(Figure 25, 26 and Table-9)**

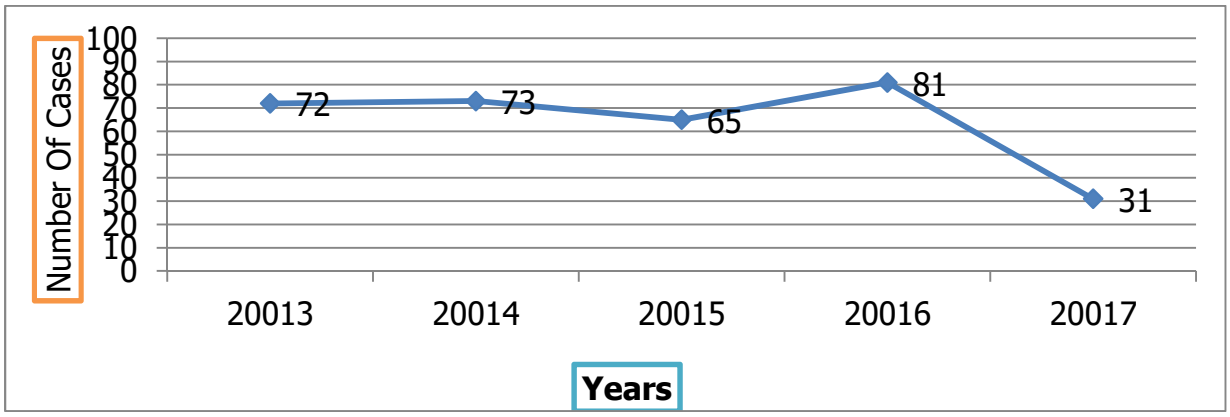

Figure 25: Trends of Measles cases in North Shewa Zone Oromia Region Ethiopia, 2013-2017

Table 9 : Distribution of Measles Deaths by Woreda in North Shewa Zone, Oromia Region Ethiopia-December, 2013-2017

S.N	Woredas (Town)	2013	2014	2015	2016	2017	Total
1	Abichu Gnea	0	0	0	0	0	0
2	Aleltu	0	0	0	0	0	0
3	D/Libanos	0	0	0	0	0	0
4	Degem	0	0	0	0	0	0
5	Dara	0	0	0	2	0	2
6	Fiche Town	0	0	0	0	0	0
7	G/Jarso	0	0	0	0	0	0
8	H/Abote	0	0	0	0	0	0
9	Jida	0	0	0	0	0	0
10	Kimbibit	0	0	0	0	0	0
11	Kuyu	0	0	0	0	0	0
12	W/Jarso	0	0	0	0	0	0
13	Wachale	0	0	0	0	0	0
14	Y/Gulele	0	0	0	0	0	0
Zonal		0	0	0	2	0	2

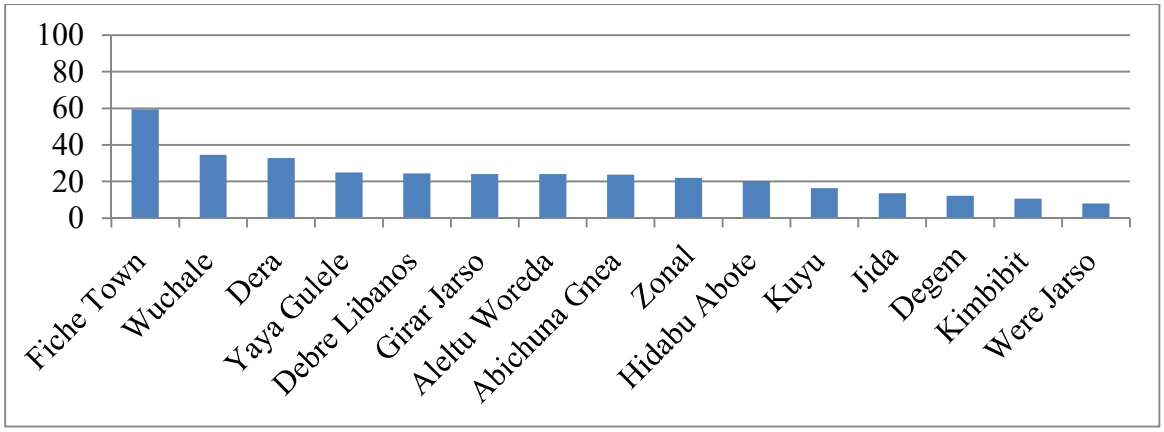

Figure 26: Measles Attack Rate by Woreda in North Shewa zone Oromia region Ethiopia-December, 2013-2017

The highest number of Measles cases were reported from Wachale Woreda 12 cases in 2013 followed by Fitche Town 11 cases and the lowest cases was D/Libanos, Kuyu and Jida each two cases. In 2014 highest cases were in W/Jarso and Abichugnea each 9 cases and only two cases reported from Kuyu Woreda. In 2015 Wachale Woreda was with highest cases 19 followed by H/Abote 13 cases. By 2016 the highest cases were reported from Dara Woreda 59 cases followed by G/Jarso 8 cases and Kuyu Woreda is the leading 10 cases in 2017. **(Figure 27)**

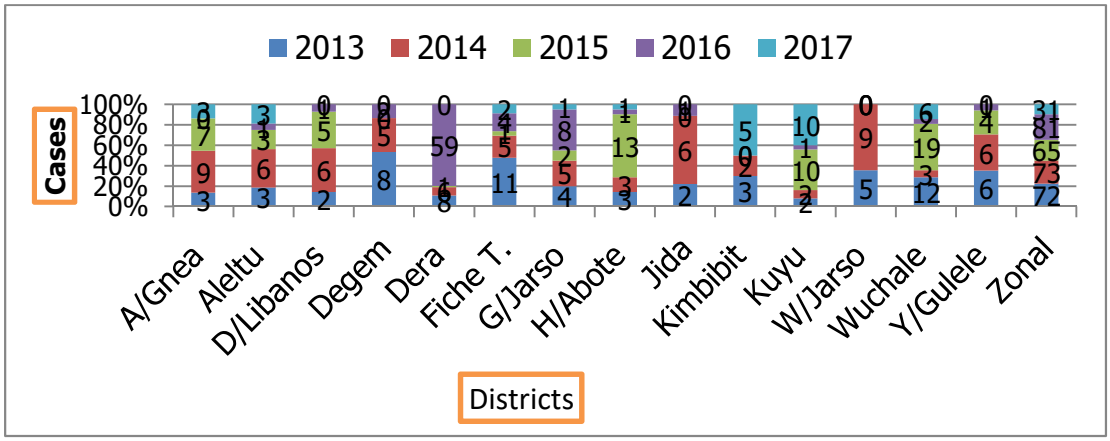

Figure 27: Distributions of Measles cases by Woredas, North Shewa Zone, oromia Region Ethiopia-December, 2013-2017

From 322 measles cases reported in the analysis period 73(22.7%) were reported in April months followed by 44(13.7%) in May month. The lowest 15(4.7%) cases were reported in three months (June, July and November). From 73 cases reported in April month 48(66%) of them were reported in April of 2016 followed by 16(20.5%) of them were reported in April of 2015. **(Figure 28)**

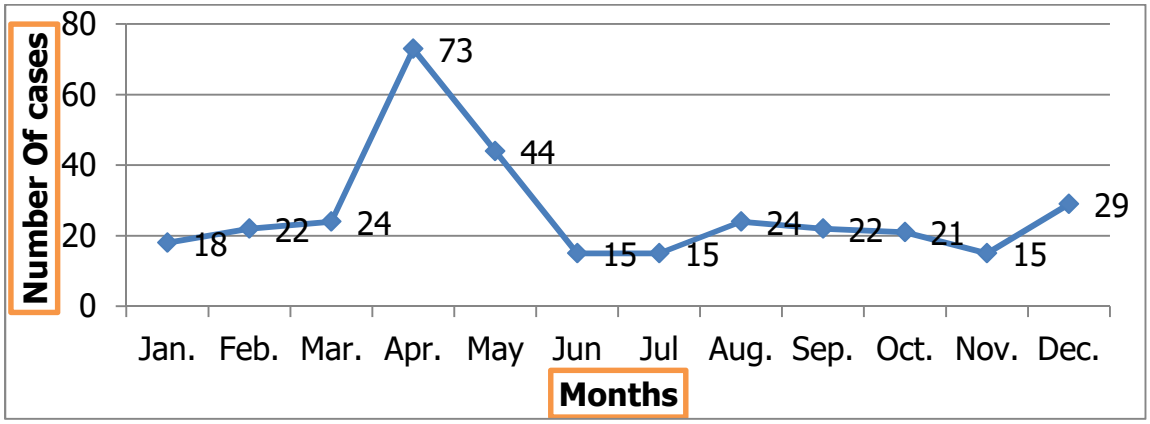

Figure 28: Distribution of Measles cases by months in North shewa Zone Oromia Ethiopia-December, 2013-2017

Measles vaccination coverage of the zonal was increased from 42% in 2013 to 90% in 2014, but decrease from 97% in 2016 to 91% in 2017. The incidence rate was decreased in all age group all over the years, except increases in 2016. Average five Years immunization coverage's of Aleltu Woreda was 100% with three average measles cases; Wara Jarso Woreda of immunization coverage's of 98% with three average measles cases and Debra Libanos Woreda accounts only 75% immunization coverage with only three average measles cases followed by Fitche Town with 83% average measles immunization coverage and with five average measles cases in the five analysis years in the north shewa zone. **(Table: 10)**

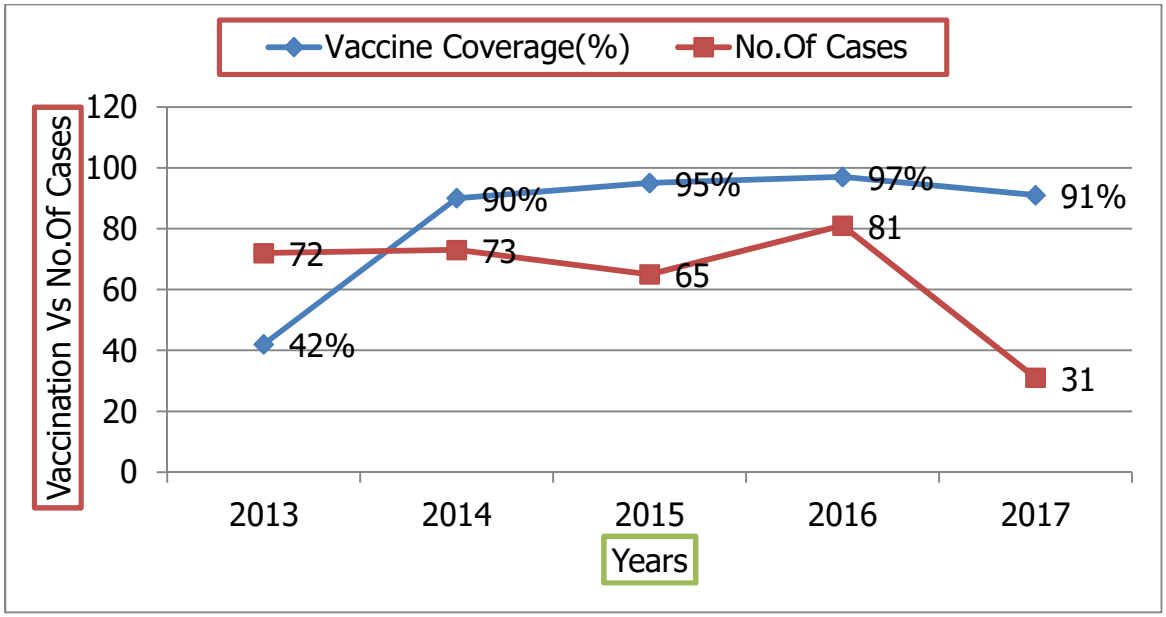

Figure 29: Immunization Coverage vs. Number of cases in North Shewa Zone Oromia Region Ethiopia-December, 2013 -2017.

Table 10 : Vaccination coverage Vs. Number of cases reported in North Shewa Zone Oromia Ethiopia- December, 2013 -2017.

Sr.No	Name Of Woreda	2013		2014		**2015**		**2016**		**2017**	
		EPI coverage (%)	No. of Cases	EPI coverage (%)	No. of Cases	EPI coverage (%)	No. of Cases	EPI coverage (%)	No. of Cases	EPI coverage (%)	No. of Cases
1	A/Gnea	71	3	71	9	99	7	94	0	96	3
2	Aleltu	44	3	88	6	95	3	105	1	100	3
3	D/Libanos	34	2	61	6	90	5	75	1	61	0
4	Degem	23	8	91	5	91	0	100	2	91	0
5	Dara	46	8	85	6	100	1	99	59	88	0
6	Fiche T.	25	11	64	5	84	1	80	4	86	2
7	G/Jarso	40	4	98	5	94	2	91	8	90	1
8	H/Abote	17	3	98	3	93	13	96	1	84	1
9	Jida	10	2	87	6	89	0	90	1	93	0
10	Kimbibit	21	3	92	2	96	0	100	0	96	5
11	Kuyu	39	2	83	2	93	10	94	1	91	10
12	W/Jarso	81	5	130	9	107	0	99	0	89	0
13	Wachale	47	12	75	3	85	19	92	2	89	6
14	Y/Gulele	18	6	73	6	85	4	88	1	85	0
15	Zonal	42	72	90	73	95	65	97	81	91	31

2.5 Discussion

We showed that more than half of the reported measles cases were under five children. of the From 322 reported measles cases to North shewa zone PHEM department in between 2013-2017 G.C 195(61%) of them were males and the ratio of male to females was 1.5:1 cases. This result was nearly similar with national measles surveillance data analysis conducted in Ethiopia from 2005 to 2009 which was 51.9%.(2,3)

From total cases 171(53%) of them were in age groups of under 5 years age, 96(30%) of them were 5-14 years of age and the rest 55(17%) of them were in the age groups of greater than 15 years old, this agreed with analysis conducted in Guji Zone from 2011 to 2015.(17)

In 2013, total number of measles cases were 72(22%) with average annual prevalence of 5.2/100,000 in population of 1388474 and the incidences of measles cases were 17.6/100,000population among under 5 years of age groups followed by 6/100,000 population in age group of 5-14 years with no death. In 2014, total number of measles cases were 73(23%) with average annual prevalence of 5.1/100,000 in population of 1427463 and the incidences of measles cases were 15.4/100,000 under 5 years of age groups followed by 6.3/100,000 in age group of 5-14 years with no death. In 2015, total number of measles cases were 65(20%) with average annual prevalence of 4.4/100,000 in population of 1467554 and the incidences of measles cases were 13.7/100,000 under 5 years of age groups followed by 3.9/100,000 in age group of 5-14 years with no death. In 2016, total number of measles cases were 81(25%) with average annual prevalence of 5.4/100,000 in population of 1508741 and the incidences of measles cases were 19.4/100,000 among under5 years of age groups followed by 4.9/100,000 in age group of 5-14 years with Case fatality rate of 2.5%. In 2017, total number of measles cases were 31(10%) with average annual prevalence of 2.0/100,000 and the incidences of measles cases were 5.5/100,000 among under 5 years of age groups followed by 2.1/100,000 in age group of 5-14 years with no death. This study was different results with data analysis conducted in Guji Zone.(17)

The incidences of the measles cases were 5.2/100000 and 5.1/100,000 in 2013 and 2014 respectively. In 2015 and 2016 the incidences became 4.4/100,000 and respectively, but in 2017 the incidences of the cases decreases to 2/100,000. A total of 322 measles cases (incidence of 22cases/100,000) and two deaths with CFR of 0.6% were reported in five years from 2013-2017 G.C to North Shewa Zonal PHEM department from respective 13 Woredas and one Towns

which are similar with Borena Zone in Which 0.6% CFR registered, but incidences of higher than that of north Shewa Zone. The world wide the case fatality rates in 2001 to 2011 were less than 1/1000, 000 populations which is very low when compared to this findings.(15) The case fatality rate were less than that of the country when compared to the expected case fatality rate of the Ethiopia which is in between 3% and 6% and highest in infants 6 to 11 months of age with malnourished infants at greatest risk.(6,13)

All Woreda of zone reports the cases with incidence varying from 7.9/100,000 population to 59.4/100,000population. The highest incidences were (59.4/100,000 with average population of 38,737) reported from Fitche Town followed by Wachale Woreda (34.6/100,000 with average population 121,424), but in Italy only twenty of 21 regions and autonomous provinces reported cases, with incidences varying from 0.2 per 100,000 population to 246.6 per 100,000 population which was very wide range. The highest incidence rates were reported from two very small regions in northern Italy which accounted for 31.8% of cases South Tyrol (population 507,657; incidence 246.6/100,000) and the neighboring autonomous provinces of Trento (population 529,457; incidence 98.2/100,000). Even though there were high in numbers the incidence in Italy when compared with north shewa zone; there were high incidences in north shewa when related with total population of the Woredas.(1,2)

A seasonal pattern occurrence of measles cases were seen in the zone. From total 322 measles cases reported in the analysis period 73(22.7%) were reported in April months followed by 44(13.7%) in May month which was different from study conducted as a national in which increased number of measles cases reported from December to February. This was different from study conducted in South Africa in which measles cases was detected throughout the year and did not have any seasonal distribution (12,14)

Measles vaccination coverage was increased from 42% in 2013 to 90% in 2014, and increases by 5% and 2% in 2015 and 2016 respectively, but decrease from 97% in 2016 to 91% in 2017 and the cumulative measles vaccination coverage was 94% in five years which was less than that of Borena Zone which was 97%, but Which was similar with the national measles vaccine coverage increased from 42% in 2002 to 72.2% in 2008 and an increased number of reported cases was also observed from 2005 to 2008.(10,14) Sample sent to referral laboratory and delay of Laboratory result seen the analysis period which was different from analysis conducted in South Africa.(14)

The performance monitoring team and rapid response team of PHEM did not cross check the report during reporting to the higher next level. This activity was controversial with HMIS principles guide line.(16)

2.6 Conclusion

- The highest cases of measles occurs in children under five years and from Dara Woreda
- Death reported only in 2016 from Dara Woreda
- No relation seen between immunization and occurrence of cases
- Increased number of measles cases reported during dry season
- High numbers of samples sent to testing laboratory without reporting to the respective Woreda
- Laboratory results do not turned for either zonal health department or referring health facilities
- HMIS and PHEM reports sent from lower level have discrepancy

2.7 Recommendation

2.7.1 For EPHI

- ✓ Laboratory results and Feedback should be returned on time for referring region, zones, and Health facilities.

2.7.2 For ORHB

- ✓ Should confirm the sample sent to EPHI and result returned to the referring sites.
- ✓ Should give feedback for zones on their sample referring performance and result documentation
- ✓ Should perform technical supportive supervisions for zones on PHEM performance.
- ✓ Should facilitate programmatic logistic and budget support for Zonal health departments.

2.7.3 For Zonal health Office

- ✓ MCH department should strengthened routine and SIAs Measles vaccination with regular cold chain management in order to reach unvaccinated children in the zone.
- ✓ Woredas those contribute high proportion and incidence rate of measles cases **(Dera and Wachale Woreda)** should be prioritized for appropriate measures and follow up their immunization activities.
- ✓ The HMIS and PHEM case teams have to crosscheck reports coming from lower level on monthly basis, to identify the gaps for difference in reporting.

2.7.4 For Woreda health office;

- ✓ Should have only one reporting system to avoid report variety.
- ✓ Should improve surveillance system approaches for early detection and timely interventions, for prevention and control of outbreaks.
- ✓ Should increases awareness of the people on measles transmission, control and prevention mechanisms through continual health education programs by HEW in everywhere.
- ✓ Woreda office MCH department should strengthened routine EPI on Measles vaccination with regular cold chain management in order to reach all children in the Woreda.

2.8 Limitations

- o There was no documented data of measles samples sent and their result feedback from national referral laboratory or EPHI in the zone
- o There were in complete reporting of the cases in some of the Woreda of the zone
- o PHEM report form of the zone does not include sex and age group

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CHAPTER 3: EVALUATION OF SURVIELLANCE SYSTEM

3.1 Evaluation of Public Health Surveillance System of Malaria and Measles in North Shewa Zone Oromia Region, 2018 G.C

Abstract

Background: Public health surveillance is an ongoing systematic data collection, analysis, interpretation and dissemination of information about health related event for use in public health action. Public health surveillance evaluation was used to ensure problems of public health importance were being monitored efficiently and effectively.

General Objective: To evaluate the surveillance system of malaria and measles in North Shewa Zone, and to recommend solutions for improvement 2017/2018 G.C

Methods: We conducted a retrospective cross-sectional descriptive study design in North Shewa Zone, Oromia Region of PHEM report

Result: - The overall health services coverage of the zone were 91.4%., and 88.4% of the population lives in the rural areas and of the zone. Hospital and health centers laboratories were able to test malaria and collect samples for measles whereas at health posts level HEW can use only RDT for the conformation of malaria and inform health centers to collect samples of Measles cases for confirmatory tests. Only 17% of the assessed areas of the zone conduct intermittently supportive supervision to their reporting site and only 60% of the Woreda health offices give comprehensive feedback of all health activities quarterly. Even though there were suspected anthrax, measles and AWD outbreak reported from different Woredas; it does not investigated by ZHD.

Conclusion: The surveillance system was useful to detect outbreaks, to assess risk factors of outbreaks, and helps as an entry point for strengthening their surveillance system. Programmatic supportive supervision and Periodic assessment of public health surveillance system was the key activity to identify strengths and weakness of the existing system to continue strength and for improvements of weakness.

Recommendation: In all level Programmatic, problem solving supportive supervision, should be conducted, by giving constructive feedback to improve the quality of PHEM activities in all reporting site of the zone. **S**urveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and attributes.

Key Words: Malaria, Attributes, Surveillance System Evaluation, North Shewa, Oromia

3.1 Introduction

3.1.1 Background

Public health surveillance is an ongoing systematic data collection, analysis, interpretation and dissemination of information regarding a health related event for use in public health action to reduce morbidity and mortality, and to improve health status of community.(1) The essence of public health surveillance is the use of data to monitor health problems to facilitate their prevention and control. Data, and interpretations derived from the evaluation of surveillance data, can be useful in setting priorities, planning, and conducting disease control programs, and in assessing the effectiveness of control efforts. (1,2)

Public health agencies use surveillance data to describe and Monitor health events in their jurisdictions, set priorities, and to assist in the planning, implementation, and evaluation of public health interventions and programs. Surveillance systems are often considered information loops or cycles involving health care providers, public health agencies, and the public in which the cycle begins when cases of disease occur and reported by health care providers to the public health agencies. The cycle is not completed until information about these cases is relayed to those responsible for disease prevention and control and others "who need to know." Because health care providers, health agencies, and the public all have some responsibility for disease prevention and control, they all should be included among those who receive feedback of surveillance information. Depending on the circumstances, others who need to know may include other government agencies, potentially exposed individuals, employers, vaccine manufacturers, private voluntary organizations, legislators on the health subcommittee, and etc.(1,3,4)

Additionally those persons conducting surveillance should:

(i) identify, define, and measure the health problem of interest;

(ii) collect and compile data about the problem, and factors that influence it

(iii) analyze and interpret the data;

(iv) provide the data and their interpretation to those responsible for controlling the health problem; and

(v) Monitor and periodically evaluate the usefulness and quality of surveillance to improve it for future use.

Public health surveillance does not include administration of prevention and control programs, but does include an intended link with those programs. On the other hands, the goal of surveillance is not simply to collect data for analysis, but to guide public health policy and action. In fact, surveillance has been defined as "information for action.

Multiple health problems confront the populations of the world. Certain problems present an immediate threat to health, whereas others are persistent, long-term problems with relatively stable incidence and prevalence among the populations they affect. Health problems also vary for different populations and settings, and an immediate threat among one population might be a chronic problem among another.(1,5,6)

Data disseminated by a public health surveillance system can be used for immediate public health action, program planning and evaluation and formulating research hypothesis. Public health surveillance system has been developed to address a range of public health needs. Additionally public health information system has been defined to include variety of data sources essential to public health action and is often used for surveillance.(6)

The purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively. Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and usefulness. These systems vary from simple system collecting data from a single source to electronic system that receive data from many sources in multiple formats to complex surveys. This system is useful if it contributes for, measure the burden of a disease (or other health-related event), including changes in related factors, the identification of populations at high risk, and the identification of new or emerging health concerns, monitor trends in the burden of a disease (or other health-related event), including the detection of epidemics (outbreaks) and pandemics; guide the planning, implementation, and evaluation of programs to prevent and control disease, injury, or adverse exposure; evaluate public policy; detect changes in health practices and the effects of these changes; prioritize the allocation of health resources; describe the clinical course of disease; and provide a basis for epidemiologic research.(7,8)

Ethiopia undergoes different strategies to have functioning and effective surveillance system. However, surveillance data for communicable diseases are neither reported nor analyzed on time.

For this reason, the opportunity to take action with an appropriate public health response and save lives is insignificant.

The WHO Regional Office for Africa suggests for communicable and non-communicable diseases and conditions or events as priorities for integrated disease surveillance in the African Region. The diseases are depending on different ways like: - Required internationally under IHR, Diseases with highly epidemic potential to cause serious public health impact due to their ability to spread rapidly internationally, Principal causes of morbidity and mortality in the African Region, Non-communicable priorities in the region and Intervention programs supported by WHO for prevention and control, eradication or elimination of the diseases. The list of priority diseases may vary from country to country depending on the local epidemiological situation, needs and health system. Countries are encouraged to keep the list to the minimum possible to ensure that adequate resources are available to carry out a response and the list is manageable by the system.(9)

The Federal Ministry of Health (FMOH) re-organized health care service delivery system into a three-tier system as PHCU from lowest which includes Health post, Health centers and Woreda Hospitals, the second is General Hospital and the third is specialized hospital. All the regional states, including Oromia Regional Health Bureau (ORHB), share the same health system organizational structure. The health center provides comprehensive primary health care services and backup to the health posts by accepting referral cases, while Woreda and general hospitals provide secondary health care. Health centers typically can provide inpatient services for up to two malaria patients, and they are equipped with injectable Artesunate for severe malaria treatment. Additionally Federal Ministry of Health launched a reform of the health sector system in to different core processes with the concept of Business Process Re-engineering (BPR) which is measured by Balance Score Card (BSC). PHEM is designed to ensure rapid detection of any public health threats, preparedness related to logistic and fund administration, and prompt response to and recovery from various public health emergencies. Following the reform, PHEM come out one of the strategic objective of the health sector and this helps the surveillance of priority diseases to be a dependable system as Public Health Emergency Management center. The new structure is extended down until to the woreda level in their capacities. Moreover, as member state of the World Health Organization (WHO), Ethiopia is on the implementing of the International Health Regulation (IHR) which was declared by member states in 2005. The

purpose of the IHR 2005 is to prevent, protect against, control and provide public health response to the international spread of disease in ways that are relevant and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade. These all are good opportunities to strengthen public health surveillance.(10,11)

The FMOH of Ethiopia identified 22 priority diseases which are epidemic prone, of international concern and diseases on eradication and elimination programs for surveillance activities depending on country's capacity to manage. These diseases are monitored by designated bodies through available means of communication like telephone, e-mail address and paper based reporting. These diseases are set to be reported as immediate and weekly reportable diseases depending on their effect on community and WHO concern. Malaria is one of the 22 priority diseases reported on the immediate and weekly bases. It is significant disease burdens to the public.

Globally Ninety one (91) countries reported indigenous malaria cases in 2016 with an Estimated of 216 million cases were occurred which indicate (WHO, 2017), an increase of 5 million cases over the previous year. In 2016, there were an estimated 445,000 deaths from malaria globally, compared to 446,000 estimated deaths in 2015.African Region account for about 90% of malaria cases and 91% of deaths worldwide.(12) In Ethiopia ¾ of the country's landmass is malarias and about 60% (63Million) of the total population is at risk of malaria infection. Altitude and climate (rainfall and temperature) are the most important determinants of malaria transmission in the country which indicates transmission of malaria is seasonal and largely unstable in character.(13) The major transmission of malaria follows the June – September rains and occurs between September - December while the minor transmission season occurs between Aprils – May following the February – March rains. The major malaria vector incriminated in Ethiopia is Anopheles arabinoses.(14)

The disease is widespread in the tropical and subtropical regions that exist in a broad band around the equator. This includes much of sub Saharan Africa, Asia, and Latin America. In 2016, there were around 216 million cases of malaria worldwide resulting in an estimated 731,000 deaths. Approximately 90% of both cases and deaths occurred in Africa. Rates of disease occurrences have decreased from 2000 to 2015 by 37%, but increased from 2014 during which were 198 million cases. Malaria is commonly associated with poverty and has a major negative effect on economic development. In Africa, it is estimated to result in losses of US$12

billion a year due to increased healthcare costs, lost ability to work, and negative effects on tourism.(15)

Ethiopia's fight against Malaria started more than half a century ago. Initially malaria control began as pilot control project in the 1950's and then it was launched as a national eradication campaign in the 60's followed by a control strategy in the 70's. In Ethiopia there is an estimated 3/4th of the land below 2000 meters is malarias with 2/3rd of the country's population were at risk. This makes malaria the main health problem in Ethiopia with an average of 5 million cases a year and 9.5 million cases per year between 2001 and 2005. The disease causes 70,000 deaths each year and accounts for 17% of outpatient visits to health institutions. It also accounts for 15% of admissions and 29% of inpatient deaths.(16)

From total cases of malaria Plasmodium falciparum and P. vivax are the two most dominant malaria parasites in Ethiopia. They are prevalent in all malaria endemic areas in the country with P. falciparum representing about 73.20 % of the total reported malaria cases where as P. malariae and P. ovale are rare and account for <1% of all confirmed malaria cases. (FMOH, HMIS, 2017)

The overall purpose of surveillance of this disease is to monitor the trend against the tolerance limits, and pick any deviation from the limit at the earliest point in time and have prompt response. Furthermore, as early warning system, it guides prevention and risk aversion actions like immunization, vector control and so on. For these purposes, each of the diseases has case definition and integrated diseases reporting formats defined by the FMOH and the WHO; and reporting is institutionalized into the health facilities and health offices**.**

The purpose of evaluating public health surveillance is to ensure that problems of public health importance are being monitored efficiently and effectively. Public health surveillance system should be evaluated periodically and the evaluation should include recommendations for improving quality efficiency and usefulness. The evaluation of public health surveillance system should involve an assessment of system attributes both qualitative and quantitative**.**(5)

Therefore this study was conducted to evaluate public health surveillance systems in North Shewa zone Oromia regional state to determine how well they operate the surveillance system to meet their goal as well to provide specific recommendation towards improving surveillance quality, efficiency and usefulness of the system.

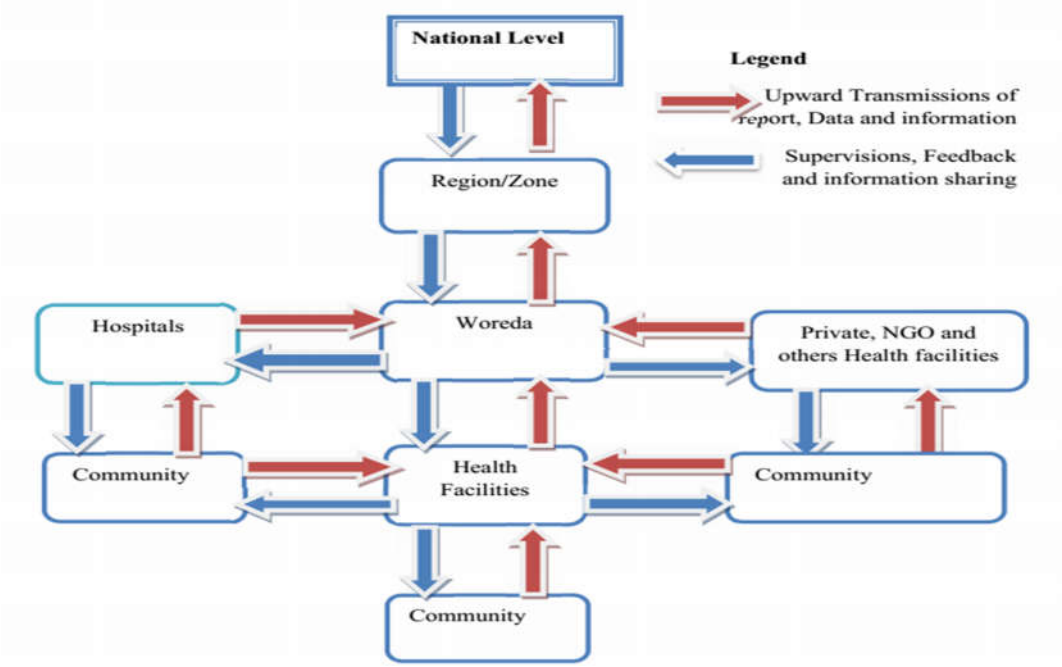

Figure 30: - Diagram illustrating the formal and informal flow of surveillance data and information throughout health system

3.2 Objectives

3.2.1 General objective

- ❖ To describe the surveillance system for malaria, measles and evaluate the key system attributes of North Shewa Zone, Oromia Region-September, 2018.

3.2.2 Specific objectives

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

3.3 Methods

3.3.1 Study area

We conducted surveillance system evaluation of selected priority disease in north shewa zone. The Zone Share boundaries with Amhara Regional state in Northern and Eastern part, FSSZ in South and West Shewa Zone in west. There were 13Rural Woreda and one Town Administration with a total of 267 rural kebeles and 24 urban kebeles. There were total populations of 1,594,647 with 50.1% were males and 89% of the total population lives in rural. There were a total four

governmental hospitals, 63 functional health centers, and 268 health posts serving the community.

This zone was selected for the reason that no surveillance system evaluation was conducted and relative low performance of surveillance activities seen during surveillance data analysis.

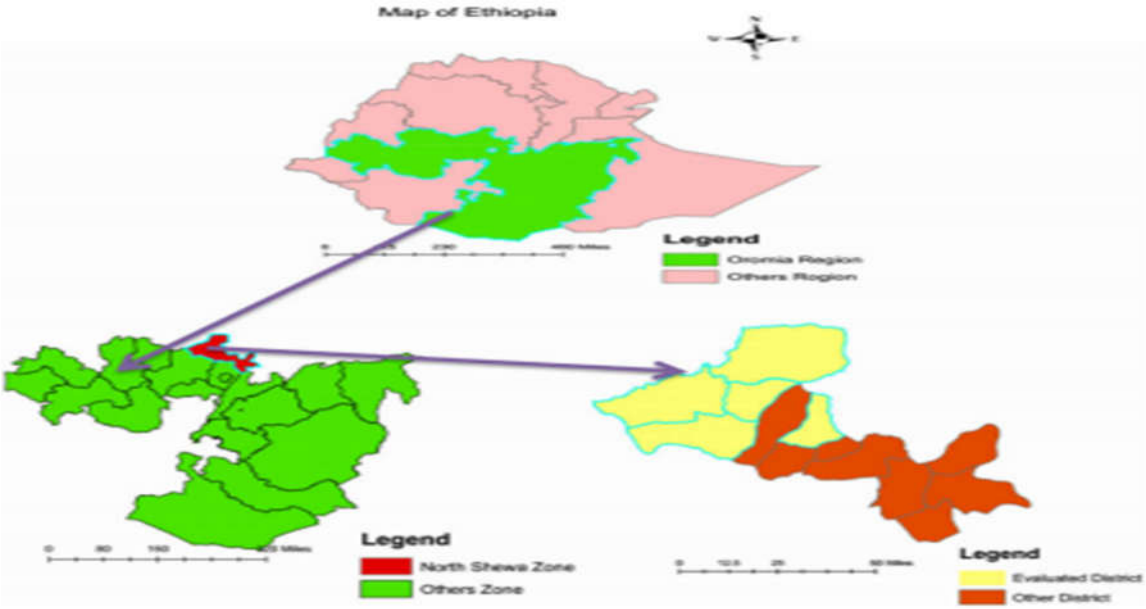

Figure 31: - Maps of assessed area for surveillance system evaluation in north shewa, oromia Region Ethiopia-September, 2018

3.3.2 Study design and Time period

Descriptive cross-sectional study design was conducted from September 6 - 25, 2018

3.3.3 Source Population

All Health Facilities and Health office in North Shewa Zone of Oromia Regional state

3.3.4 Study unit

The study subjects were the health facilities (Health Centers, and Health Posts), health offices (Woreda Health Offices, Zonal Health department, and Hospitals).

Table 11: - Name and types of Evaluated sites in North shewa Zone Oromia region Ethiopia-September, 2018 G.C.

Sr.no	Name of Site Evaluated	Types
1	**N/Shewa Zone**	**Health Office**
2	Fitche Hospital	General Hospital
3	D/G/Meskel Hospital	Woreda Hospital
4	**Dara Woreda**	**Health Office**
5	G/Meskel H/Center	Health Center
6	Bayonono H/Post	Health Post
7	**W/Jarso Woreda**	**Health Office**
8	Hose H/Center	Health Center
9	Fajii Ejersa H/Post	Health Post
10	**Kuyu Woreda**	**Health Office**
11	Darowulinco H/Center	Health Center
12	Daro tatesa H/Post	Health Post
13	**H/Abote Woreda**	**Health Office**
14	Ejere H/Center	Health Center
15	Ngeagabo H/Center	Health Post
16	**Degam Woreda**	**Health Office**
17	Kurkura H/Center	Health Center
18	Lelisa alidoro H/Post	Health Post

3.3.5 Sample Size

The sample size was calculated to represent Woreda health office and health facilities in the zone (35% of the Woreda health office) were included in the system evaluation. As a result a total of five health post, five health centers, five Woredas health office, two hospitals and zonal health department were included in the analysis. A total of (18) eighteen site were selected depending on their PHEM activities and accessibility of public transportation.

3.3.6 Sampling technique:

A convenience sampling method was used to select health office, health facilities, and Hospital. Selection of each study unit was performed as steps below.

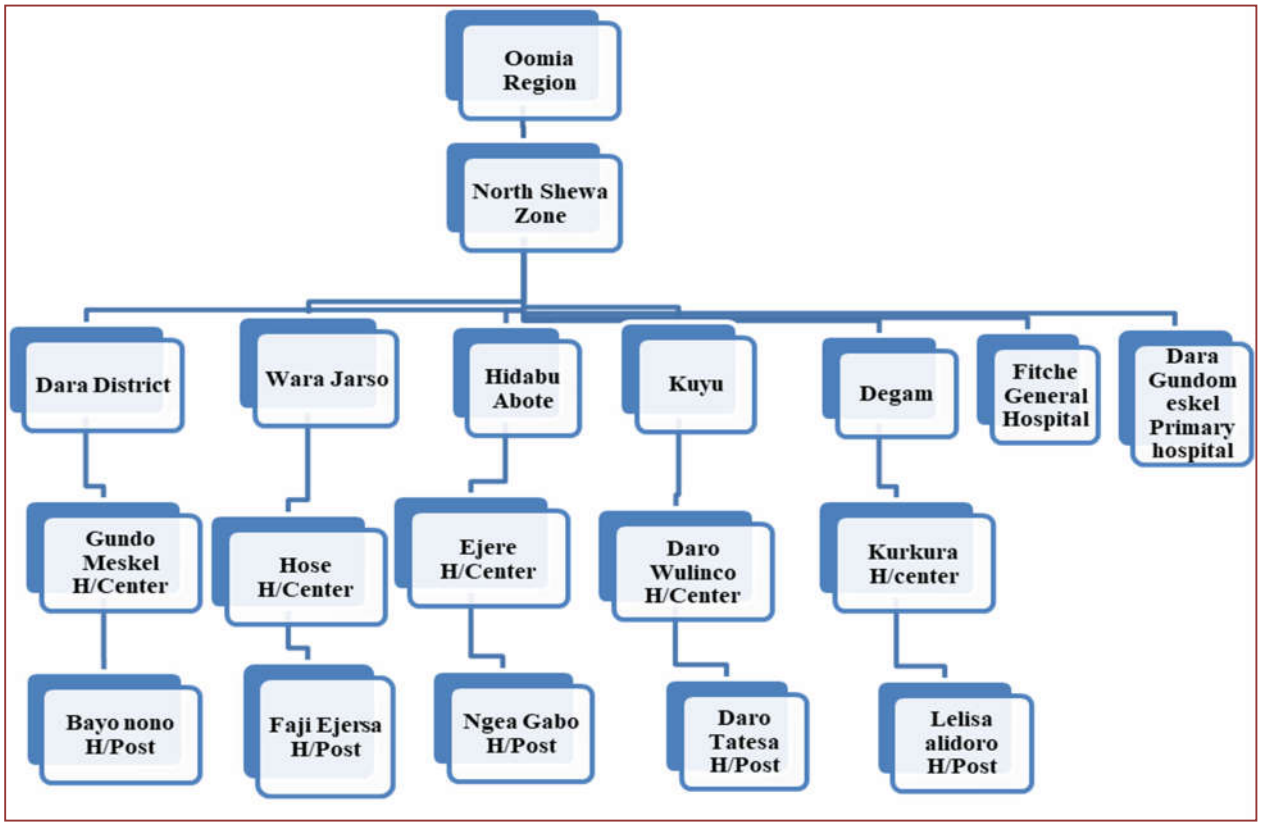

Figure 32: Diagram Shows ways of sample collection for system evaluation in North Shewa Zone Oromia Region Ethiopia-September, 2018

A. Ways of Zonal Selection

North Shewa zone was selected purposively based on the result of measles data analysis conducted in the zone, presence of outbreak, weakness of surveillance system and the absence of system evaluation performed before.

B. Ways of Woreda Selection

North Shewa Zone has 13 Woredas and one town administration. From total 13 Woredas and one town administration only five Woredas (Dara, Hidabu Abote, Wara jarso, Gira Jarso and Kuyu) were selected based on their surveillance activities performance and accessibility to transportation by using convenience sampling method.

C. Ways of health facilities Selection

There were 268 health posts, 63 functional health centers and four functional hospitals in the zone. From total reporting sites of PHEM to the next higher level; five health centers, five health post and two hospitals were included in the assessment. All Health facilities were selected purposively based on their accessibility and reporting system. Finally a total of 18 sites were assessed during the study period.

3.3.7 Data collection technique

We used CDC questionnaire (Annex 3) to interview participants and observation of different documents and tools of the surveillance was made. We reviewed zonal PHEM 2017 database for malaria and measles.

3.3.8 Data analysis:

We entered and analyzed data by using the Microsoft Office Excel and epi info version 7.

3.3.9 Data quality control

The obtained data were cross-checked at different levels such as regional health bureau, zone health department, Woreda health offices and health facilities with each other before summarizing at each level for its accuracy and consistency.

3.3.10 Data dissemination

Written report of both hard and soft copies were prepared and shared to all selected health facilities and woreda health office, zonal health departments, Oromia regional health bureau, and AAU CHS School of public health Ethiopia Field Epidemiology Training Program mentor and resident advisors.

3.3.11 Ethical Considerations:

Support letter was obtained from Oromia Regional Health Bureau for zone. Discussion was made about the purpose and method of the study with zonal health office head and PHEM Officers, and letters was written for selected Woredas and facilities.

Operational definitions

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

Public health surveillance: is a process of systematic data collection, analysis, interpretation and dissemination for action

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

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

Case/outbreak Confirmation: refers to the epidemiological and laboratory capacity for confirmation disease.

Reporting: Refers to the process by which surveillance data moves through the surveillance system from the point of generation to the next higher level,

Epidemic preparedness: Refers to the existing level of readiness for potential epidemics

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

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 ascertained, as well as the suitability of the form or medium through which the information can be accessed.

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.

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, new health-related events, changes in case definitions or technology, and variations in funding or reporting sources.

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

Acceptability: Acceptability reflects the willingness of persons and organizations to participate in the surveillance system.

Sensitivity: The sensitivity of a surveillance system can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease (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 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 is 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 the report of the event to the appropriate health agency. It reflects the speed between steps in a public health surveillance system

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

Stability: refers to the reliability (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.

3.4 Results

Meeting

Brief meeting was conducted with ORHB PHEM core processor team, Head of Zonal health Office, Zonal PHEM focal person, Woreda head and PHEM focal person, PHCU Director as well as Health extension workers at each levels of evaluation. The objective of the study and its significance, highlighted information was given during entry and feedback after assessment completed. Zonal health PHEM officer described that even though PHEM system has improved and became focus of even political leaders; there is no allocating budget in the entire zonal Woreda and town administration for emergency purpose. A total of 1,594,647 people under surveillance were found in the zone and have accepted 22 Ministry of Health priority diseases that listed and reported under surveillance.

Overview of Public Health Emergency Management (PHEM)

In the zonal level, the structures of PHEM have two structures on which two health professionals were assigned to perform PHEM activities. At the woreda level, there is only one structure as PHEM officer whereas at health facilities level even though there is structure as PHEM officer

the health centers assign one health workers as PHEM focal as additional duties to performs the PHEM activities in the facilities.

We assessed these different health structures in the zone, by starting from zonal health department up to health posts. The zone has 13 woredas and one town administration with a total of 268 health posts, 63 health centers, four hospitals, one NGO and 60 different levels of private clinics; a totally of about 395health facilities were expected to report in surveillance system. But from a total of 60 private facilities 43 of them included under the surveillance reports. Two hospitals, five woreda health office, five health centers and five health posts were assessed. We focused on presence of different updated guidelines, availability and usage of standard case definitions for selected diseases (Measles and Malaria), and presence of clinical registrations, capacity to collect sample and transportation, availability of surveillance form, means of reporting, ways of data analysis, occurrences of outbreak, presence of preparedness plan and their trends of response activities, different supervision conducted and feedback given, resource available for surveillance activities, training status of PHEM focal, total population under surveillance in the studied catchments and different attributes of surveillance system. During this surveillance system evaluation one immediate reportable (Measles) and one weekly reportable disease (malaria) were evaluated. Even though the surveillance system of both diseases evaluated diseases in all visited health facilities and health offices, were structurally exist its implementation of surveillance activities like early detection, investigation and response were very poor.

Table 12:- List of Priority Diseases under surveillance reported in North shewa Zone Oromia, 2018

Sr.No.	Name Of Diseases	Period of reporting
1	Dysentery	Weekly Reportable
2	Malaria	
3	Malnutrition	
4	Maternal Death	
5	Meningitis	
6	Relapsing Fever	
7	Typhoid Fever	
8	Epidemic Typhus	
9	Scabies	
10	Yellow Fever	Immediately Reportable
11	VHF	
12	Small pox	
13	SARS	
14	Rabies	
15	Pandemic Influenza	
16	Neonatal Tetanus	
17	Measles	
18	Dracunculiasis	
19	Cholera	
20	Avian Human Influenza	
21	Anthrax	
22	AFP	

Table 13:- Means and date of reporting of PHEM activities used in the North Shewa Zone, Oromia Ethiopia-September, 2018 G.C

Sr.No.	Reporting facility	Means of report	Reporting time
1	Health Post to Health Center	Phone call	Monday Afternoon
2	Health Center to Woreda Health Office	Phone call or Hard copy based on their distance	Monday Afternoon
3	Woreda Health Office to Zonal Health Department	Phone Call	Tuesday Afternoon
4	Zonal Health Department to Regional Health Bureau	Email	Wednesday Afternoon

Malaria

Oromia regional state was one of the regions that faces malaria outbreak at different times. As the ORHB PHEM report of 2018 G.C indicates out of 1,107,897 suspected cases 123,843 (11.2%) of them confirmed malaria cases. From confirmed cases 66.9% of them were Plasmodium Falciparum species. Only 0.33% of them were inpatient cases with case fatality rate of 0.72%. From total malaria cases reported in the region 70.7% of them were from zones administrations of the region. Even though there were high burdens of the P.Falcipurum as the region; there were high numbers of P.Vivax reported in the town administrations. As the report shows from total confirmed malaria cases from respective town 63.2% of them were Plasmodium Vivax species. West Guji was the leading zone followed by east Hararge by reporting in confirmed percentages of the malaria cases. **(Fig. 33 and 34)**

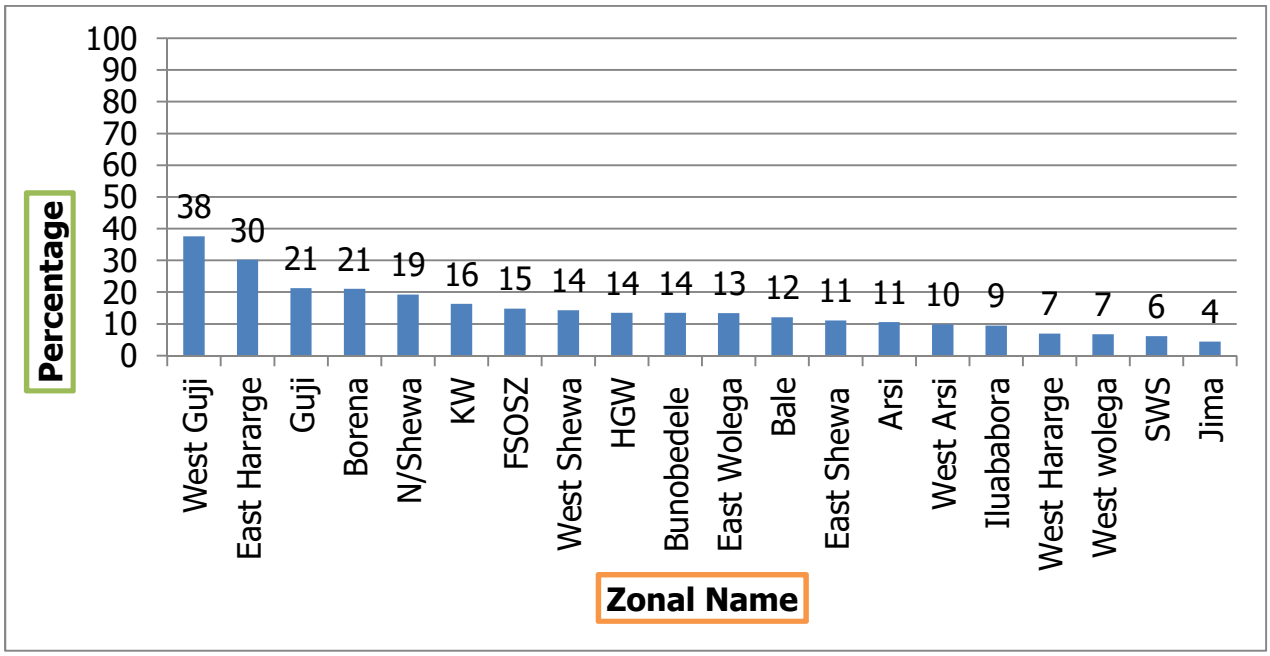

Figure 33: Percentages of confirmed Malaria cases reported from zones of Oromia Region Ethiopia-September, 2018 G.C.

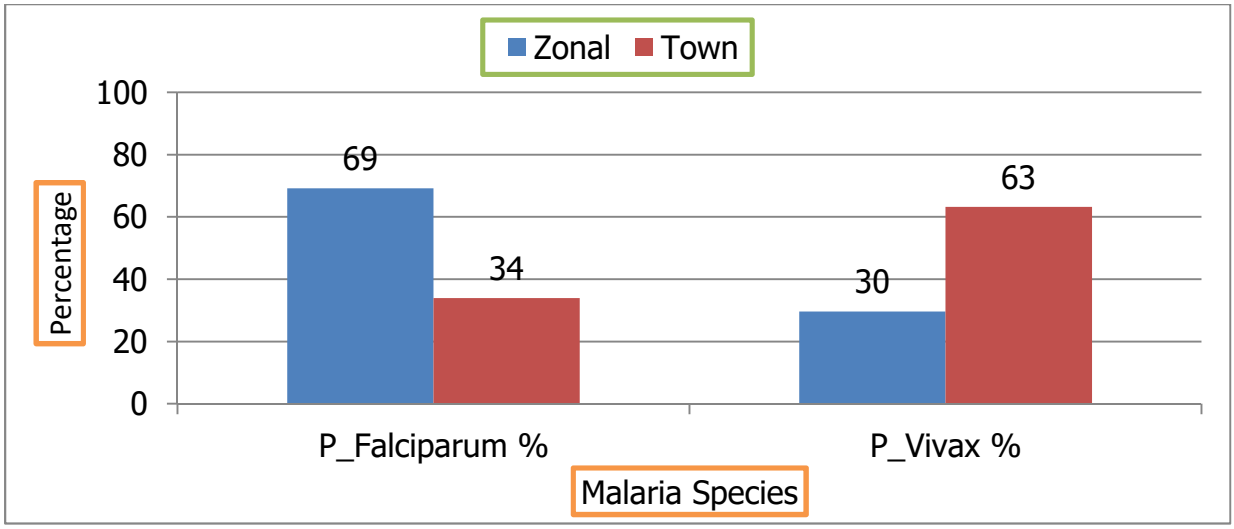

Figure 34: Distribution of malaria case by Species in Oromia region Ethiopia-September, 2018 G.C

Regionally, Plasmodium Vivax and Plasmodium falciparum comprise 40% and 60% of malaria infections respectively. The burden of malaria has been increasing due to a combination of large population movements, increasing large scale epidemics, mixed infections of Plasmodium vivax and P. falciparum, increasing parasite resistance to malaria drugs, vector resistance to insecticides, low coverage of malaria prevention services, and general poverty.

In North Shewa Zone, from 13 Woredas and one town administration only 71 % of the zone was malarias. From week 27-51(July-December 2017) a total of 8852 suspected out which 1808(20.4%) of them were confirmed malaria cases. From those total confirmed 1236(68%) were P.faliciparum. **(Fig. 35, 36, and Table 14)**

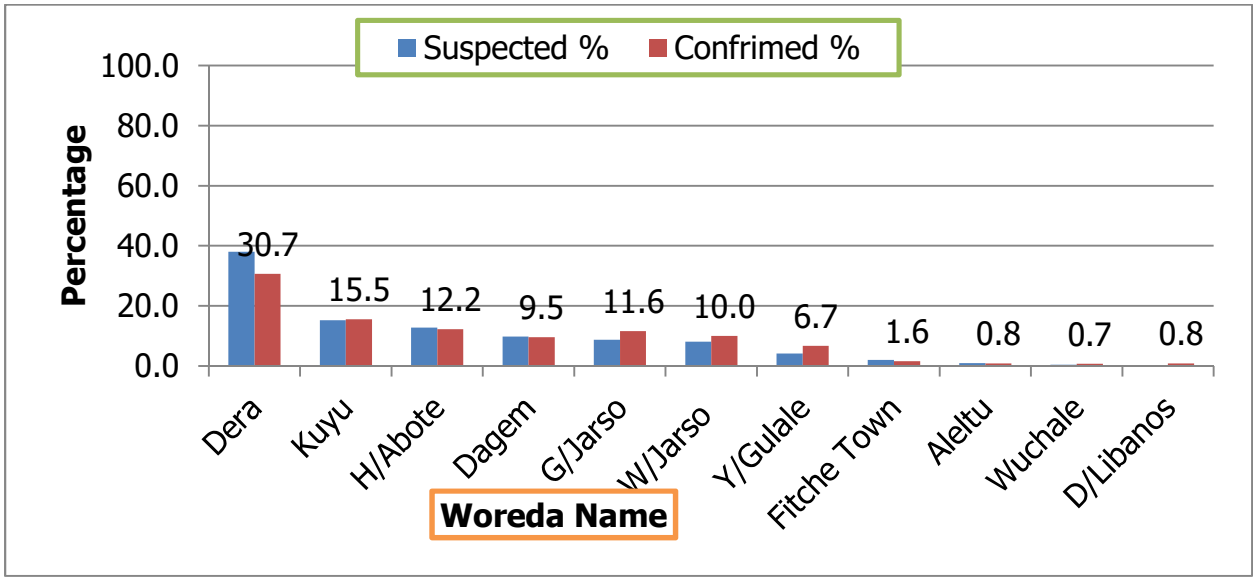

Figure 35: Proportion of malaria cases in woreda of north Shewa zone Oromia region Ethiopia-September, 2018

Table 14:- Distribution of malaria cases in different Woredas of North Shewa Zone oromia Region Ethiopia-September, 2018 G.C

Sr.No.	Woreda	suspected	Confirmed	SPR (%)
1	Dara	3364	555	17
2	Kuyu	1337	280	21
3	H/Abote	1131	220	19
4	Degam	857	172	20
5	G/Jarso	769	209	27
6	W/Jarso	715	180	25
7	Y/Gulale	372	121	33
8	F/Town	176	29	16
9	Aleltu	78	14	18
10	Wachale	34	13	38
11	D/Libanos	20	15	77
		8852	1808	20

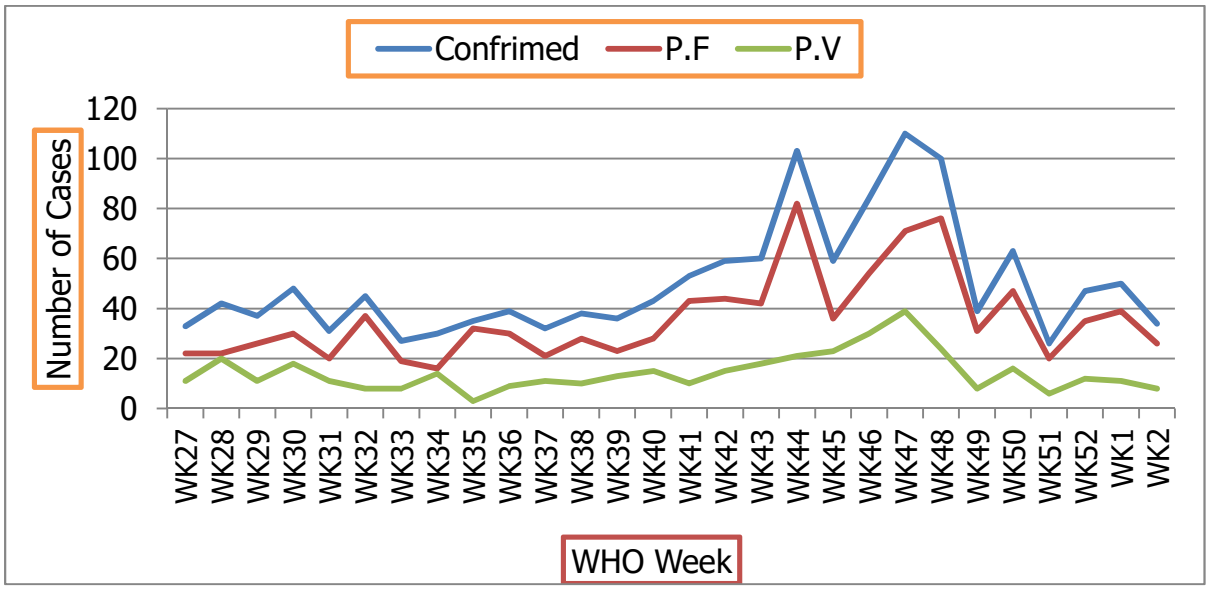

Figure: - 36 total number of confirmed malaria and Species by WHO Weeks in North Shewa Zone Oromia Region Ethiopia-September, 2018 G.C

Measles

Measles is a viral Vaccine preventable infectious disease caused by the genus Morbilli virus. It is a highly contagious respiratory viral disease characterized by fever, cough, coryza, conjunctivitis and generalized maculopapular erythematous rash. Most commonly the disease acquired by inhaling microscopic droplets that contain viral particles ("airborne" transmission). Sometimes, it can acquire by direct contact with body fluids such as nasal and throat secretions of infected patients.

Infection can result in serious complications such as blindness, encephalitis, and pneumonia. Before widespread vaccination in 1980, measles was responsible for an estimated 2.6 million deaths worldwide each year. Despite the availability of a safe and effective vaccine, measles remains one of the leading causes of death among young children around the world, according to the WHO.

As study conducted in Ethiopia at the end of 2009 and in the first 6 months of the year 2010, there were 425 laboratory-confirmed and 1,519 Epi-linked cases and a total of 848 laboratory confirmed and 2,401 Epi-linked cases of measles were reported respectively. A total of 60 outbreaks were confirmed in 2009 with 1,179 confirmed measles cases; while 93 outbreaks were confirmed in July 2010 with a total of 2,889 confirmed cases. A seasonal pattern occurrence of measles has been observed over the years, with increased number of measles cases from

December to February. Due to the low sub national Routine measles coverage and prevailing poor living conditions, measles outbreaks continue to occur frequently in different parts of the country, mostly in Oromia and SNNPR Regional states. From January to the end of July 2010, a total of 3,249 cases were reported.

As report of 2017 G.C indicates in Oromia regional health Bureau PHEM core processor a total of 699 Measles cases were reported out of which 577(82.5%) of them were from zonal departments. The overall case fatality rates in the region were 0.57%. Death was reported only from west shewa zone in 2018 which was only three in numbers. **(Fig.37)**

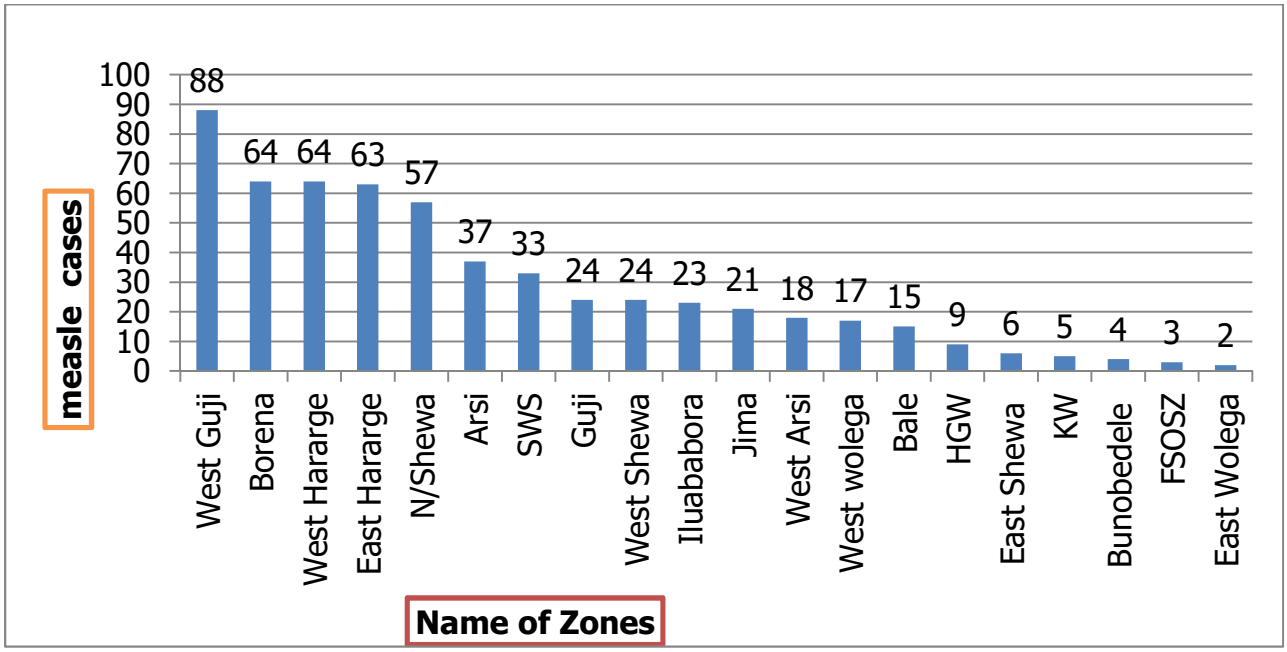

Figure 37: Number of measles cases reported from zones of Oromia Regional Ethiopia-September, 2018

In 2018 G.C there were a total of 46 measles cases were reported from 71% of the zonal Woredas. Kuyu woreda and Fitche Town was the leading Woreda in reporting the measles cases where as Dara, Kimbibit, and Y/Gulele reports only one case. There were high numbers of measles cases reported in Week 3, 14 and 18. **(Figure 38, and 39)**

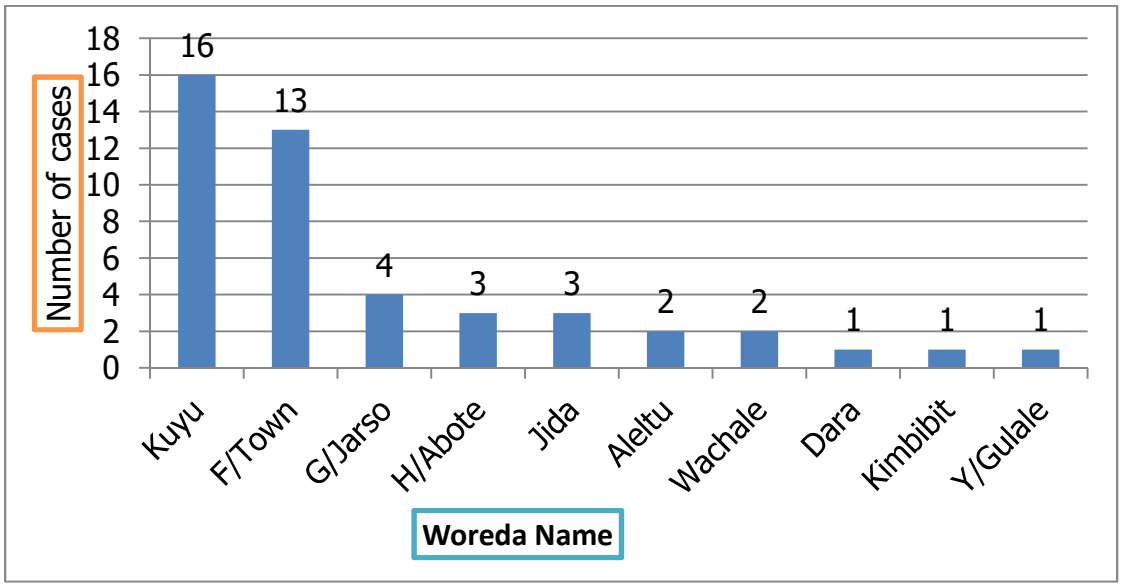

Figure 38 Total number of measles cases by Woreda in North Shewa Zone Oromia Region Ethiopia-September, 2018 G.C

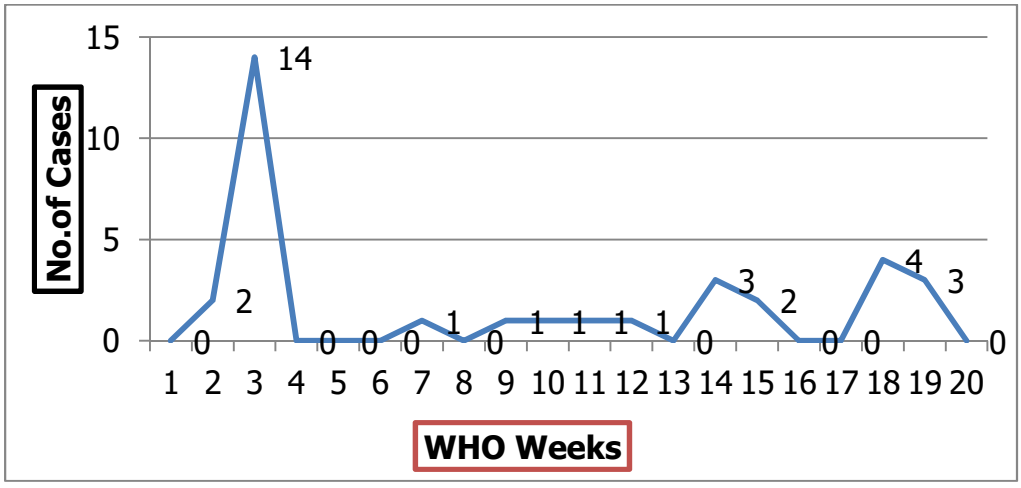

Figure 39:- Total number of measles cases by WHO Weeks in North Shewa Zone Oromia Region Ethiopia-September, 2018 G.C

According to the 2017 north shewa zonal PHEM reports 64% of the Woredas report completeness and timeliness were above the target (80%). Yaya Gulale, Kimbibit and Aleltu woreda were the top three Woredas that have high completeness and timeliness. Whereas Dara, Kuyu, and Degam were the list Woredas that have low completeness and timeliness. **(Fig. 40)**

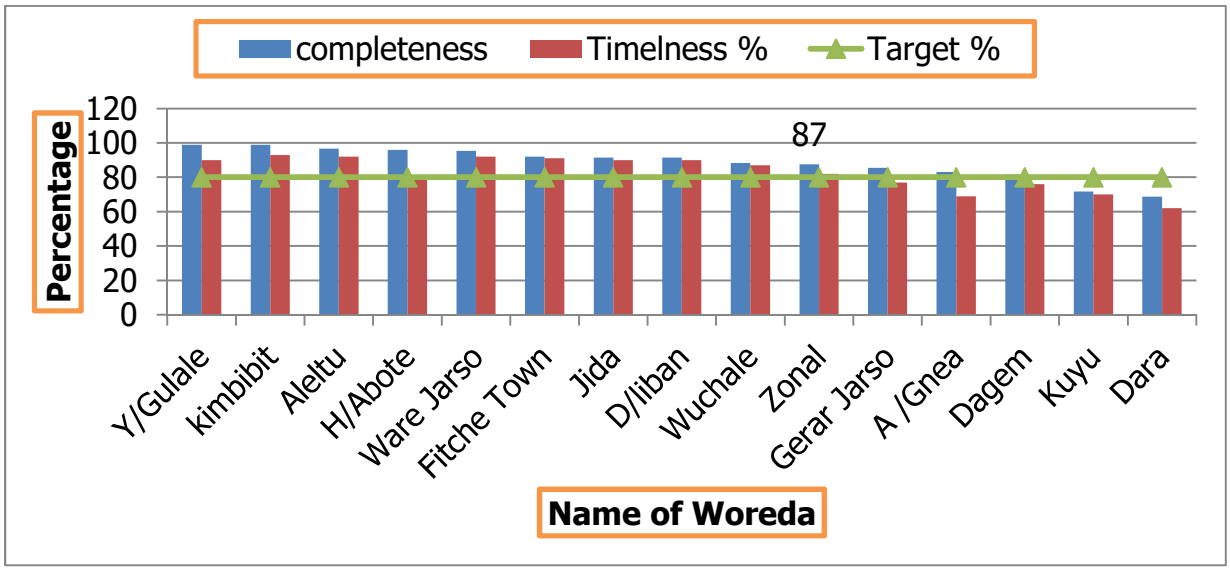

Figure: - 40 completeness and Timeliness of PHEM Report by Woreda in North Shewa Zone Oromia Region Ethiopia-September, 2018

Population under surveillance

In North shewa Zone 88.4% of the population lives in the rural areas of the zone. There were four Hospitals, 63 Health centers, 268 health posts, one NGO, and 60 different types of private health facilities that serve the zonal community. The overall health services coverage of the zone was 91.4%. In all assessed sites, the respondents agree that the surveillance system represent rural community and the community have good health seeking behavior**.** The health coverage of all the assessed Woredas were less than the total zonal health coverage except Hidabu Abote Woreda which was 100%

Table 15:- Total population of the assessed area under surveillance in North Shewa zone Oromia Region Ethiopia-September, 2018 G.C

Sr.No	Assessed areas	Total Population	Urban	Rural
1	Dara Woreda	244,159	12,547	231,160
2	Wera Jarso Woreda	191,392	16,594	174,643
3	Kuyu woreda	165,943	31,313	134,997
4	Hidabu Abote Woreda	112,358	10,077	102,200
5	Girar Jarso Woreda	90,115	0	90,115
6	Fitche General Hospital	1,320,083	151,754	1,168,329
7	Gundo Meskel Hospital	244,159	12,547	231,612
8	North shewa Zone	1,594,647	184,388	1,410,332

Table 16:- Total Number of health facilities in assessed woredas of North Shewa Zone Oromia region Ethiopia-September, 2018

Sr. No	Administrative (Woreda)	Total Population	Total Number of Health Facilities						Coverage%	Representation
			HPs	HCs	Hospital	NGO	Private Facilities	Total		
1	Dara	244159	33	7	1	0	7	48	69.6	Rural
2	Wera Jarso	191392	25	7	0	0	5	37	91.4	Rural
3	Kuyu	165943	23	7	1	0	4	35	87.4	Rural
4	H/Abote	112358	20	5	0	0	6	31	100	Rural
5	Girar Jarso	90115	17	3	0	0	0	20	88.8	Rural
6	Zonal	1594647	268	63	4		60	395	91.4	Rural

3.4.1 Operation of Surveillance System

Availability of PHEM Guide Line, Clinical Register, Presence and usage Standard case definition

PHEM Guide lines used in the facilities as a guidance of disease surveillance tasks. For this reasons all of the health facilities should have the guide lines for facilitating their works in similar manners. In the case of presence and usage of PHEM guide lines we conduct the assessment by observing the guide lines in the facilities. From the selected sites for analysis all health posts have no guide lines, whereas all health centers, Woredas and zonal health departments and 1(50%) of the hospital has guide line. Except one health post all the assessed sites have standard case definitions and posted it at visible sites such as outpatient department (OPD), inpatient department as well as in reporting departments. For Neonatal Tetanus (NNT), Measles, Acute Flaccid Paralysis (AFP), Maternal Death and Malaria standard case definition were posted in these assessed sites. 40%, 60% and 100 of the health centers, Woredas health office and zonal health department have surveillance report forms respectively, but all the assessed health posts and hospitals have no surveillance reports.

From a total of health facilities included in the assessment all health centers and hospitals have clinical registers, but all health posts have no any clinical registers. For this reasons all health posts reports their PHEM reports without registering.

Table 17: - Different variables assessed in the selected areas of North Shewa Zone Oromia Region Ethiopia-September, 2018

Sr.No.	Health Facilities	Frequency	Assessed Variables				
			Lines (%)	Standard case Definitio n (%)	Usage Standard case Definitio n (%)	nce form (%)	Clinical register (%)
1	H/Posts	5	0	80	80	0	0
2	H/Centers	5	100	100	100	40	100
3	WHoffice	5	100	100	100	60	
4	Hospitals	2	50	100	100	0	100
5	ZHD	1	100	100	100	100	

In case of the availability of different surveillance logistics and resources 76% of the assessed sites have electricity. Except zonal health department all the assessed sites had sent reports to the next level by using cell phone whereas ZHD uses email to send report for ORHB. Even though there is a cycles that given by ORHB for each health posts as a main logistics for community services only 2(40%) of the assessed health posts have cycles. From assessed Woredas only 3(60%) of them have motorcycles and Vehicles whereas only 2(40%) of the health centers have motorcycles, but none of the health centers have vehicles. From total 18 assessed sites 80% of them have enough stationary for performing surveillance activities. Even though there were no office telephone in all health posts and some health centers all of them uses hand mobile phone for reporting of surveillances activities in next higher level.

In both ZHD and Woredas Health offices there was no budget line for epidemic response purposes. Though, there is written emergency preparedness plan for an outbreak and RRT in both zonal and some Woredas health offices; there was no epidemic management meeting minutes. When an outbreak occurred the RRT communicates informally to responds for an outbreak. From five assessed health centers 3(60%) of the Woredas have prepared RRT for surveillance purposes.

Table 18:-Availability of different resource for PHEM surveillance at different level in in North Shewa Zone Oromia region Ethiopia-September, 2018

Sr. No.	Sites	Number	Electricity	cycle	Motorcycle	Vehicle	Stationary	Computer	Printer	Telephone	Fax	Mail	Education Material
1	ZHD	1	100			100	100	100	100	100	100	100	100
2	Hospital	2	100			100	100	50	50	100	0	0	100
4	Woreda	5	100		60	60	100	60	40	100	0	0	100
5	H/Center	5	80		40	0	80	0	20	100	0	0	100
6	H/Post	5	0	40			20	0	0	100	0	0	100
7	Total	18	76	40	50	65	80	42	42	100	20	20	100

Table 19:- Emergency preparedness for epidemic in different level of North Shewa Zone Oromia Region Ethiopia-September,2018

Sr.No.	Different Variables	Zone		Woredas		Total	
		No.	%	No.	%	No.	%
1	Written emergency preparedness plan for an outbreak	1	100	5	100	6	100
2	Availability of emergency stocks of drugs and supplies for emergency cases	1	100	4	80	5	83
3	Presence of budget line for epidemic response	0	0	0	0	0	0
4	Observed epidemic management meetings minutes	0	0	0	0	0	0
5	Presence of RRT	1	100	3	60	4	67

From data reviewed in the prior three months to study 85% of the expected reports were sent from the lower level to the next higher level and 77% of the reports sent by national expected timeliness.

Table 20:- Reporting rates of the health facilities in North Shewa Zone in 3 months (WHO week 11-22) period time (April to June), 2018 G.C

Sr.No.	Site Assessed	PHEM Weekly Reports in three months					
		Number	Expected	Reported	%	On Time	%
1	ZHD	1	12	12	100	12	100
2	WHoffice	5	60	49	82	44	73
3	Hospitals	2	24	24	100	22	92
4	H/Centers	5	60	53	88	46	77
5	H/Posts	5	60	46	77	43	72
6	Total	18	216	184	85	167	77

Capacity to collects, handles, tests, and transport samples

The capacity of the laboratory of the health facilities to collect, transport, and test sample malaria and measles were assessed. Hospital and health centers laboratories were able to test malaria by using microscopic examination and collect samples for measles for referral whereas at health posts level HEW can use RDT for the conformation of malaria and inform to the health centers to collect samples of Measles cases for confirmatory tests.

The region has three regional health research laboratories (Adama, Nekemte and Sheshamene) which were used in the outbreak investigation and confirmation at their level. The regional public health research laboratories were responsible for quality assurance of facility level laboratories in their respective zones. Additionally the regional laboratories refer viral samples like measles for confirmation to the central laboratory (EPHI). Among assessed health facility, all of them have no shortage of supply diagnosis in their facilities.

Data analysis

In all the assessed health offices and health facilities, there was no responsible person placed for data analysis and separated room for PHEM activities except ZHD. In all assessed health facilities instead of data analysis all health workers send PHEM reports by numbers. From assessed Woredas 2(40%) of them perform data analysis by time, place and persons. Additionally from two assessed hospitals one hospital conducted data analysis reports. Even though Zonal health departments analyze and follow the trends to compare the incidence rate for all PHEM reportable diseases but, does not establish an action threshold for malaria and measles.

Supervision

Only 17% of the assessed areas of the zone conduct supportive supervision to their reporting site. Among assessed health office and health facilities, none of them conducted supportive supervision for their respective reporting office or facilities as per guideline, but 3 (16.6%) of the Woredas conducted intermittently supportive supervision at least once in the last 6 months prior to assessment by integration with others program. Even though, zonal health departments did not conducted the supportive supervisions as per guideline due to resources scarcity in the zonal heath office; they conduct integrated supportive supervision with others programs as planned by the plan directorate of the office. As a result the ZHD conducts once for only five Woredas of the zone in the last six months.

Feedback

None of the assessed sites including zonal health department do not give any written feedback for their respective reporting sites. Zonal health department and 3(60%) of the Woreda health office give comprehensive feedback of all health activities for respective sites quarterly. None of the health centers give formal written feedback for their catchment health posts regularly to strength surveillance activities.

Training

At zone level all technical staffs working in PHEM and EPI coordinator were trained on PHEM surveillance system. Even though all North Shewa Zonal Woredas health offices PHEM officers and MCH coordinator had taken basic training on surveillance by the regional health bureau and partners, at the health facilities level, only one focal person assigned for surveillance was trained, and sometimes on site orientation was given to the technical staffs of the health facilities. Some Woredas and most health facilities of the zone had assigned new PHEM focal person due to high turnover of the health workers. As a result from the assessed hospital 1(50%) of them have trained focal person. 2(40%) and 4(80%) of the Woredas and health centers PHEM focal in the assessed sites did not trained respectively. In all assessed health posts no formal training given for HEWs on surveillance, but on site orientation given only on the ways of reporting.

Outbreak investigation

There were suspected anthrax, measles and AWD outbreak reported from three Woredas Yaya Gulale, Dara and Kuyu. Only measles outbreak in the Kuyu Woredas has been investigated by EFELTP of Jimma University students. Some of the respondents from assessed health office responded that even though there were different occurrences of an outbreak in their Woredas no bodies respond and conducted outbreak investigation.

Table 21: Findings of Assessed variables in Woredas and Health Facilities of North Shewa Zone Oromia Region Ethiopia, 2018 G.C

Assessed variables	Finding of assessed Variables		
	Zone Level	Woredas Level	HealthFacility Level (Hospital ,HC,HP)
Collect Sample	0	0	100%
Handle and test			100%
Transport	0	0	100%
Data analysis	100%	40%	0
Supervision	0	17%	0
Feedback	0	0	0
Training	100%	60%	29%
Outbreak investigation	0	0	0

Description of attributes of the surveillance system

Usefulness

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

In all (100%) of assessed health office and health facilities of the north shewa zonal administration all respondents have similar understanding of early detection of outbreak of diseases under surveillance as the main use of the surveillance system. It can also use to know timely number of cases and deaths in their Woredas. Additionally all the respondents believe that the current surveillance system can help to detect the outbreak of the priority disease earlier, estimate the magnitude of morbidity, mortality and factors related to those diseases and permit assessment of the effect of prevention and control programs of the system. Different government organizations have used surveillance data to make plan and decisions. The surveillance system

can helps the government organization to secure budget and drugs for surveillance activities that predict for outbreak occurrences and immediate managements of the occurred cases.

Simplicity

In all assessed health Woredas and health facilities as well as ZHD agreed that case definitions of measles and malaria were easy applicable for case detection by all level of the assesse sites. Additionally, they believe that community case definitions are easily understood at community level because malaria and measles are endemic to the assessed site of North shewa Zone. In all assessed sites, all asked health professionals (100%) were responded correctly for malaria and measles case definitions. All respondents at each level were familiar with reporting period and to whom they would send report PHEM. PHEM officers and focal persons at all levels of the assessed sites believe that additional data collection on cases were not time consuming. All respondents at ZHD and Woredas health office told that, the estimated time consumed to fill the reporting format of PHEM on morbidity and mortality of priority disease was 10-15 minutes, but all the health facilities estimated that it consumed more than 15 minutes to complete the reports. All the assessed site complain that results of measles samples were not returned on time, but malaria confirmation can be easily either by RDT in Health Posts and Microscopically in health centers and hospitals in their catchment facilities.

Flexibility

In all assessed site (100%) of the selected sites explain that the current reporting formats used for other newly occurring health event/diseases without much difficulty. All reporting sites said that the current reporting format contains additional spaces at the end for both weekly and immediately reportable diseases. It can accommodate newly occurring health events/disease to fill on it without any difficulty. Nationally Maternal Death Surveillance and Response (MDSR) were launched in May 2013; as a result in 2014 it has been integrated in to the existing public health emergency management (PHEM) system, and has been added as 21st national notifiable conditions within PHEM. On the other hands in 2017 scabies added as 22nd reportable diseases included in PHEM system of the country. All of the zonal and woreda levels respondents agreed that implementation of National PHEM guideline did not difficult with changes in existing procedure of case detection, reporting, and formats.

Data Quality

All respondents (100%) of the zonal, Woredas health offices, and health centers explain that the reporting formats of the priority disease was clear and easy to fill for all data collection of reporting to the next level; but in case of HEW (100%), since did not take necessary training on PHEM they were confused on some variables to understand and explains the difficulty to reports the cases. In all assessed sites all HEW reports the health related events by telephone as a result we cannot get the formats in the health posts. In 75% of observed sites (woreda and health facilities) except health posts reports have no blank responses to the variables in each of the reported forms. In 25% of the Woredas and health facilities variables like date of report sent or received, name of person received or sent and the expected number of health facilities to report while reporting to ZHD using weekly reporting formats was not correctly filled. Additionally, at health facility level (Health Posts, Health Centers and Hospitals) there were many commonly missed variables like vaccination status, date of onset, place of residence while reporting using line list during outbreak. Documentation copies of report in sequential manner were not retained at Woreda and health facility levels.

Acceptability

The acceptability of the entire reporting agent and all engaged in the surveillance system activities were assessed in the selected sites. The zonal health departments were actively and properly engaged to the surveillances systems. 4(80%) and 3(60%) of Woredas and Health centers of the assessed sites were actively and properly engaged to the surveillances systems respectively. Majority of the assessed health posts were not actively and continuously engaged by on time to the PHEM report systems. As majority of the respondents explain the main reasons for some health workers for not regularly participating in the surveillance activity was poor means of communication (problems in network availability), lack of feedback from higher level and no/delay in laboratory results from referral laboratory.

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 some false positives 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.

Positive Predictive Value: Predictive value positive (PVP) is the proportion of reported cases those actually have the health-related event under surveillance. In all assessed health facilities since malaria can be confirmed and the calculated PPV was 20%, but total number of individuals who are actually with the measles disease was not confirmed, therefore we cannot calculate the PVP for the measles.

Representativeness

The representativeness of the zonal surveillance system is related to the health service coverage, the reporting rate of the health facilities, and the health seeking behavior of the community. The health service coverage of the assessed Woredas was evaluated by health posts, health centers and hospitals. Thus, the health service converges of the assessed Woredas ranges from 69.6% to 100%. As a north shewa zone the health service coverage was 91.4%.The health seeking behavior of the assessed Woredas communities' was increasing after the health extension package programs applied in which 88.4% of the zonal population lives in rural part of the zone.

Timeliness and completeness

Timeliness on the PHEM was the time interval between the onset of health-related event to the reporting of the event to the public health agency by responsible persons for immediate control of action and prevention of further outbreaks in the community. As the timeliness of the zonal data assessed; from assessed Woredas 2(40%) of them i.e. Kuyu and Dara Woredas have lower national target. The zonal completeness and timeliness was 87% and 82% respectively which was higher than the national targets (80%). Out of assessed Woredas 3 (60%) of them have lower timeliness than the national target. The completeness of the visited woredas was 96%, 95%, 85%, 72% and 69% for Hidabu Abote, Wara Jarso, Girar Jarso, Kuyu and Dara respectively.

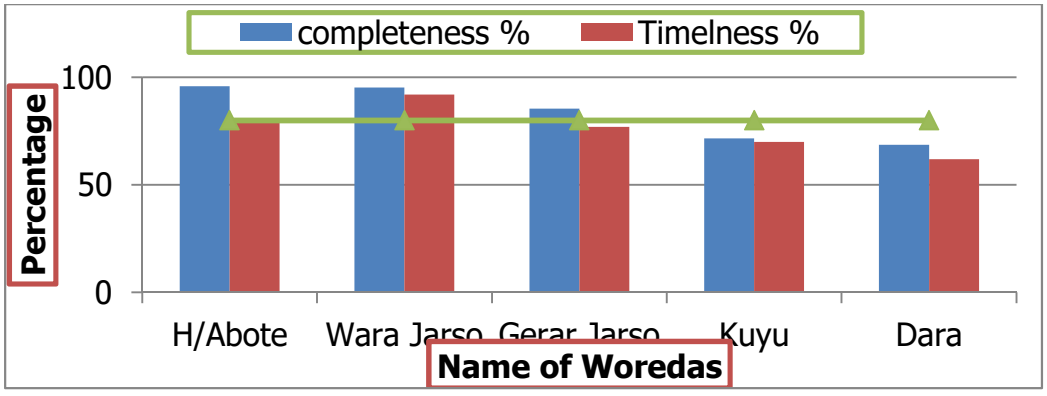

Figure 41:- Completeness and Timeliness reports of assessed Woreda of North Shewa Zone Oromia Region Ethiopia-September, 2018 G.C

Stability

Stability is reliability and availability of the public health surveillance system without interruption. Lack of dedicated resources might affect the stability of a public health surveillance system. As assessment conducted in zone, and Woredas availability of the PHEM structure at zonal levels helps the surveillance systems to be stable for disease and health condition in the region. But, lack of dedicated resources and absences of the PHEM structures in the health facilities affect the stability of a public health surveillance system. Except a few budget distributed for specific activities for zone and some woredas, there is no specific budget line/source for surveillance activities at all assessed level. As all (100%) of the respondents says shortage of budget and logistics is hindering supervision and capacity building activity at zonal and Woreda level.

Table 22: Key Surveillance Attributes Summery of North Shewa Zone Oromia Region, 2018 G.C.

Surveillance attributes	Zonal Level	Woredas and Health Facilities Level
Completeness	87%	83%
Timeliness	82%	76%
Useful ness	All believed the existing system can helps to secure budget and predict for outbreak and detection, perform trend analysis	All believed the existing system can helps to predict for outbreak and detection, but no one perform trend analysis of malaria and measles
Simplicity	Take 10-15 minutes	more than 15 minutes to fill t format
Acceptability	actively engaged to the surveillances systems	(70%) of Woredas and Health centers actively engaged to the system
Flexibility	Easy to use for new disease (100%)	Easy to use for new disease (100%)
Sensitivity	difficult to identify false negative and cannot calculate sensitivity	difficult to identify false negative and cannot calculate sensitivity
PPV	It can be calculated for malaria and shows 20%	Calculated from five woreda and shows 22%
Representative ness	Disease can be identified at community level and health facility l	Disease can be identified at community level and health facility level i.e do not believe in traditional healers
Stability	No interruption for reporting (100%)	Absence of PHEM structures in health facilities and turnover of health workers at Woredas affect the system i.e.(50%) not stable

Challenges of the Surveillance System

During the assessment of the surveillance system there were many challenges observed. In all assessed area there were low political commitments to strength the system, low attention of health workers at different levels (zonal, Woredas, Health centers, Hospitals and Health posts). In all Woreda PHEM officers were assigned as additional task on PHEM structure and no structure for PHEM activities in health facility level.

3.5 Discussion

In the system evaluation; we found that malaria and measles surveillance system was simple and flexible in its structure. We also identified that the structures did not have stability at woreda health office and health facilities levels.

The purpose of evaluating public health surveillance systems is to ensure the problems of public health importance are being monitored efficiently and effectively. Public health surveillance systems should be evaluated periodically, and the evaluation should be including recommendations for improving quality, efficiency, and usefulness. Evaluation of a public health surveillance system focuses on how well the system operates to meet its purpose and objectives.(1,2)

We tried to evaluate the surveillance system of the North Shewa zone to assess the health status of the community, establish public health priorities for diseases occurrences and to reduce the burden of disease effect in a community by making necessary public health decision and actions by describing the health system and measuring necessary attributes such as usefulness, simplicity, data quality, acceptability, representativeness, timeliness, completeness, and stability of the system for malaria, and measles. These Public health surveillance system evaluations was done by a team consisting of EFELTP of AAU ORHB Residents, zonal PHEM officer, Woredas PHEM officers, Health facilities focal person and HEW those working in the selected sites. It also includes head of all the assessed sites when necessarily needed.

In this system evaluation general overview of the PHEM, data analysis, outbreak investigation, epidemic preparedness, responses to outbreak, presences and usage of resources, budget allocation and utilization, supportive supervision, feedback, training as we as attributes were analyzed.

During entry for the system evaluation meeting and communication had conducted with all necessary head of assessed sites, PHEM officers and focal persons as well as stake holders for

making suitable environment in the evaluation process. At the exit we communicate with all mentioned above to set futures action plan for acting on the identified gaps. A total of 4 hospitals, 13 Woredas, one town administration, 63 health centers, 268 health posts, one NGO and 43 different levels of privates' health facilities have direct contribution in the health service coverage of the zone. More than 35% of the Woredas in the zonal administration were purposively included in the assessment.

From 22 priority diseases under surveillance as national level two diseases namely malaria and measles were included in the assessment purposively due to occurrences of malaria and measles outbreak even though not investigated and reported to the higher level for interventions. As data of 2017 were collected from north Shewa zonal health department 3(60%) of the Woredas' completeness were less than the national targets (80%). From a total population of 1,594,647 in north shewa zone under surveillance 88.4% of them lives in rural areas. The potential health service coverage of the zone was 91.4%.

A PHEM Guide line is a document used in the facilities as a guidance of disease surveillance task in surveillance system of the countries. PHEM Guide lines used in the facilities as a guidance of disease surveillance tasks. Zonal health department, all the visited Woredas, health centers, and 50% of the assessed hospital have national PHEM guide line. But, all health post that was included in the assessment did not have guide line. Except one health post, all the assessed sites have standard case definition posted at visible sites. Even though there is budget line for emergency preparedness at zonal and Woredas office; the main key for surveillance activities were budget, resource and logistics. All the assessed sites except zonal health office that uses mail; the rest sent their reports by telephone and sometimes hard copy. The laboratory of the assessed health centers and hospitals can collect and confirm samples of malaria cases by using microscopic examinations while for Measles cases they collect blood samples for confirmation to EPHI. As we understand from the assessment conducted though PHEM focal person was the responsible persons for data analysis only 40% of the Woredas conducted descriptive analysis of data. 17% of the visited sites were conducted supportive supervision for their respective reporting sites where as none of the assessed site give written feedback for their respective site.

Even though there were outbreaks like AWD, Measles, Suspected anthrax and malaria occurred in the zone as told by different Woredas PHEM officers only measles outbreak occurs in Kuyu Woreda had investigated by Jimma University EFELTP residents in 2017.

The simplicity of a surveillance system refers to both its structure and ease of operation of the surveillance systems as simple as possible while meeting their objectives. When thinking about simplicity it was better to think of the simplicity of a surveillance system from two perspectives: the design of the system and the size of the system. A case definition must be easy to apply and in which the person identifying the case will also be the one analyzing and using the information. In all assessed sites the agreed that case definition of the measles and malaria were easily applicable.

A flexible surveillance system can adapt to changing information needs or operating conditions with little additional cost in time, personnel, or allocated funds. Flexible systems can accommodate new diseases and health conditions, changes in case definitions, and reporting formats. (3,4) All reporting sites said that the current reporting format contains additional spaces at the end for both weekly and immediately reportable diseases as others specify. It can accommodate newly occurring health events/disease to fill on it without any difficulty.

Acceptability is the willingness of individuals and organizations to participate in the surveillance system. (5) All must consider the points of interaction between the system and its participants including persons with the condition and those reported cases. The acceptability of the entire reporting agent and all engaged in the surveillance system activities were assessed in the selected sites. The zonal health departments were actively and properly engaged to the surveillances systems. 4(80%) and 3(60%) of Woredas and Health centers of the assessed sites were actively and properly engaged to the surveillances systems respectively. Even though there are a total of 60 different levels of privates health facilities in the zone, only 43 of them included under surveillances reporting system. Almost all the private facilities found in the assessed Woredas did not send reports for their respective Woredas.

A surveillance system that was representative accurately describes the occurrence of a health event over time and its distribution in the population by place, person, and time. (8) It was assessed by comparing the characteristics of reported events to all such actual events. Based on characteristics of the population, Natural history of the condition, Prevailing medical practices, and multiple sources of data judgment of the representativeness of surveillance data is possible.

Data Quality of the surveillance system was influenced by the clarity of surveillance forms, the quality of training as well as supervision of persons who complete surveillance forms, and care exercised in data management. Examining of the percentage of unknown or blank responses to items on surveillance forms has direct contributions on the data quality. Assessing the reliability and validity of responses generalize findings from surveillance data to the population at large, the data from a surveillance system should reflect the population characteristics that are important to the goals and objectives of that system. These characteristics generally relate to time, place, and person. All respondents or PHEM focal persons of the zonal, Woredas health offices, and health centers explain that the reporting formats of the priority disease was clear and easy to fill for all data collection for reporting to the next level; but in case of health posts since HEW did not take necessary training on PHEM and not supervised regularly for their reporting priority disease HEW workers explain the difficulty to reports the cases.

Timeliness on the PHEM is the time interval between the onset of health-related event to the reporting of the event to the public health agency by responsible persons for immediate control of action and prevention of further outbreaks in the community. Timeliness reflects the speed or delay between steps in a surveillance system. The interval usually considered first was the amount of time between the onset of an adverse health event and the report of the event to the public health agency responsible for instituting control and prevention measures. Another aspect of timeliness is the time required for the identification of trends, outbreaks, or the effect of control measures. With acute diseases, the onset of symptoms is usually used. Sometimes the date of exposure is used. With chronic diseases, it may be more useful to look at elapsed time from diagnosis rather than to estimate an onset date. The timeliness of a surveillance system should be evaluated in terms of availability of information for disease control either for immediate control efforts or for long-term program planning. (9- 11) The completeness and timeliness of the north shewa zonal health department PHEM unit was 87% and 82% respectively which was relatively higher than the national targets (80%). Out of the 5 assessed Woredas 3 (60%) of them have lower timeliness than the national target.

3.6 Conclusion

According to the finding of this assessment, Periodic and continuous assessment of public health surveillance system is a key activity to identify strengths and weakness of the existing system. This will be effective if it was done in collaboration with all stakeholders. In north Shewa Zone the current surveillance system was not satisfactory and efforts should be added to improve the system especially on supportive supervision activities, timely feedback, data management completeness and timely reporting of events and analysis of prioritized diseases. Finally, the surveillance system of malaria and measles were useful to detect outbreaks, to assess risk factors of outbreaks, estimate magnitude of the morbidity and mortality of the disease in the community. On the other hand, it can help the zonal health department and assessed Woredas as an entry point for strengthening their surveillance system in the zone. Additionally any occurrences of outbreak should be reported immediately to the next higher level for further investigation and control before affecting the community. These surveillance systems are useful, simple, flexible and well accepted by all assessed sites.

3.7 Recommendation

The main goal of strengthening Malaria and Measles diseases reporting at all level of the health facilities and offices is to produce a good system that can guide mangers and expert for decision making. Therefore we would like to recommend the following actions for surveillance system strengthening in different levels as follows:-

3.7.1 ORHB

Training should be given for all health workers at different level and HEW on surveillance activities to improve active case search before the occurrences of outbreak in the community and to strength reporting system. Quality of the data that reported to the next level should be assessed at all levels. Programmatic, continues, and uniform problem solving supportive supervision with constructive feedback should be conducted.

3.7.2 Zonal Health Department

Programmatic, and continues, problem solving supportive supervision should be given for all reporting site. Constructive and problems solving feedback should be given for all Woredas. Outbreak investigation should be conducted to know risk factors to prevent community. Necessary reporting formats and logistics should be given for health facilities. Data analysis for prioritized diseases should be performed regularly. Quality of the data that reported to the next

level should be assessed. Data should be collected analyzed, interpreted, and used for decision making. Trend analysis and action threshold should be performed to know the trend of disease occurrences. All governments, NGOs and Private health facilities should be included under surveillance systems

3.7.3 Limitation

Absences of copy of report sent to the health center in health posts and some Private health facilities were not included in the PHEM reporting system and in this assessment. Shortage of transportation to evaluate additional health facilities

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CHAPTER 4: HEALTH PROFILE DESCRIPTION REPORT

4.1 Health Profile Description of Yaya Gulale Woreda, North Shewa Zone of Oromia Region

Abstract

Introduction: Health profile is a collection, summarizing, and discussing of health and health related indicators of a given community. We conducted Yaya Gulale Woreda a health profile description to summarize the health and health related indicators.

General Objective: To assess the health and health related profile of the Yaya Gulale Woreda in North Shewa zone of 2016/2017

Methods: WE reviewed secondary data by cross-sectional study in Yaya Gulale Woreda, North Shewa Zone on February, 2018. Prepared checklist was used to collect data from all public sectors. Data was compiled and analyzed using Microsoft Excel-2007.

Results: Yaya Gulale Woreda was established in 1944 G.C. The Woreda has 17 rural and two urban kebeles, with a population of 69,132(96.4%) and 2,549(3.6%) respectively. Estimated total population of the Woreda in 2018 was 71,681 of which 35,912(50.1%) males. The main incomes of the Woreda were agricultural products. Primary health care coverage was 100% with 4 Health Center and 17 Health Posts. Most of the immunization coverage of the woreda was less than 80%. Latrine Coverage and utilization of the Woreda was 80% and 85% respectively and from 17 rural kebeles three of them open defecation free. Non bloody Diarrhea and Pneumonia was the major leading causes of morbidity both in adults and pediatrics. Low TB detection rate and high lost to follow up was documented.

Conclusions: Non bloody Diarrhea and Pneumonia were leading cause of morbidity in both adult and pediatric; low TB detection rate and cure rate registered.

Recommendation: proper utilization of latrine, sanitation and hygiene practice should be encouraged to minimize the diarrheal diseases. Attention should be given to improve the health centers laboratory diagnostic capacity to increase TB detection rate and strict DOT should be performed for TB patients.

4.1 Introduction

Health profile is a collection, organizing and summarizing, presenting and discussing of health data and important health related indicators about a given community, available health resource community's perception on health and to describe health and others health related conditions in Woreda.(1) These description includes demographic, socio-economic, political, cultural and others aspect of a particular geographic areas of interest. It is also a process of gathering, analyzing and interpreting information from different, multiple and diverse sources in order to develop understanding of the health of a community. It is vital and basic for prioritizing health and health related problems of the community for planning and appropriate intervention. It is also an essential entry point for community based research for Stakeholders of health and health related issues. (1)

Health profile assessment includes both previously identified health concern and those newly identified as well as newly emerging issues. In general Problem Identification and Priority Setting for the community based on the: - Public health importance, Magnitude, Seriousness, Community concern, Feasibility of the problems and etc. Community health profile report includes:-Historical Aspects of the area, Geography and Climate condition of the area, Political and Administrative Organization, Population and population structures, Economy, educational status, transportation ways, telecommunication, power supply, Disaster Status in the area, Hygiene and sanitation status, Vital Statistics and Health Indicators, Status of Primary Health Care Components, Health Facilities coverage and human resource distribution , Top cause of morbidity and of mortality in the area as well as a narrative description of the given community, community strengths and challenges, from both the perspective of the health office and the broader community.(1)

This provides summary health information to support local authority members, officers and community partners to lead for health improvement .It also help to improve availability and accessibility for health and health related information in country. In general factual information that compiled as health profile used for decision and policy making and Conclusions made about the health status of the Woreda/area based on the findings as well as Action plan and recommendations on how to address the problems identified required resources and timeline of that area or country. (1)

Health profile assessment was conducted in different countries of the world. Ghana's ministry of health conducted human resource health profile assessments in 2009 by including different indicators that shows different activities with their performance, strength, weakness and challenges in the country. This Human Resource Health profile Provides a comprehensive picture of the Health Workforce situation; Presents the HRH policies and management situation to help in monitoring the HRH stock and trends; Provides basis for communication with and between policy-makers and stakeholders; Strengthens the HRH information system by establishing evidence for baselines and trends; and Facilitates information sharing and cross-country comparisons.(2)

Malawi conducted demographic and health survey in 2016 that analysis overview of the country situation and trends of priority health problems. The analysis of health profile constitutes institutional frameworks, major activities of the country health office, trends in the country response, main gaps and challenges. The document indicates the evidence-based health policymaking through a comprehensive analysis of the dynamics of the health situation and health system in the country.(3)

In Ethiopia the fourth Demographic survey conducted in 2016 to show up-to-date estimates of key demographic and health indicators. The EDHS provides a comprehensive overview of population, maternal, and child health activities, Communicable diseases situations, quality health services to provide valuable information on trends in key demographic and health indicators over time. The information collected to assist policymakers and programme managers in evaluating and designing programmes and strategies for improving the health status of the country's population. (4)

The main sources of data used for this document preparation are from all necessary government and non-government sectors in that Woreda like Woreda administration, Agriculture, Health, Educational, Water Resource, culture and tourism, energy office and Finance office. The document covers almost the data and activities of the period 2016/2017 GC. The indicators are carefully selected and included in the questionnaire to reflect important public health problems.

During Health profile assessment of the Woreda all health concern and newly emerging issues were assessed by using semi structured questionnaire to identify the gaps. Problems in the Woredas were identified and Priority was set in the Woreda for action. The performed Woreda health profile report includes:-Historical Aspects of the area Yaya Gulale , Geography and

Climate condition of the area, Political and Administrative Organization, Population and population structures, Economy, educational status, transportation ways, telecommunication, power supply, Hygiene and sanitation status, Major Health Indicators, Status of Primary Health Care Components, Health Facilities coverage and human resource distribution , Top cause of morbidity, community strengths, weakness and challenges in the Woredas were discussed in this document.

4.2 Objectives

4.2.1 General objective

- To assess health and health related profile of the Yaya Gulale Woreda in North Shewa zone of 2016/2017

4.2.2 Specific objectives

- To describe the demographic, and geographic profile of the Woreda
- To describe disease burden and others health related information.
- To assess human resources by professional
- To assess primary health care coverage of the Woreda
- To identify and prioritize problems.

4.3 Methodology

4.3.1 Study Area and Period

Health and health related profile assessment was conducted in Yaya Gulale Woreda of North Shewa from February 3 - March 23, 2018 G.C.

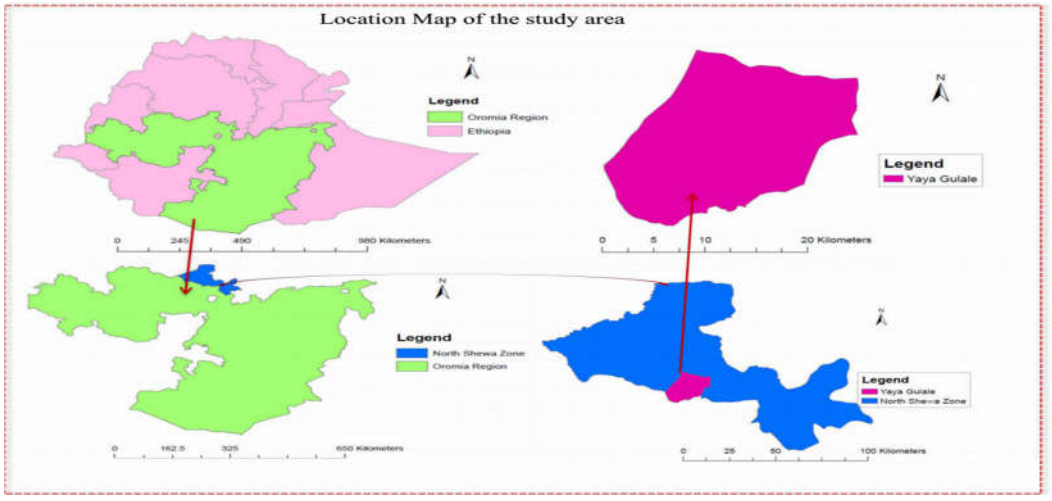


Figure 42: Map of Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia- September, 2018

4.3.2 Study Design

A descriptive cross-sectional study design with prepared questionnaire and observation was used.

4.3.3 Sample size and sampling technique

Yaya Gulale Woreda was selected by Purposive non-probability for health profile description and secondary data was used as a result no need of sample size determination. The Woreda was selected due to occurrences of different outbreaks at different period of time even though the performance of the health indicators Woreda was high. Because the study has conducted on already documented data from different offices to explain woreda's image for planning and prioritizing by gathering information from different concerned offices report of different sectors at woreda level. In these analysis seven sectors (namely: - Woreda administrative office, Health office, education office, water & energy office, Culture and tourism office, agricultural office, and finance and economic office) of the woreda and ten people participate.

4.3.4 Data collection methods

Health and health related data of 2016/2017 was collected from different sectors using prepared questionnaire by interviewing of focal person of each Woreda. Additionally the Data was collected by observation of each Woreda annual reports.

4.3.5 Data analysis procedures

Collected health and health related profiles of Woreda were organized and analyzed using Microsoft spread sheet and epi info version 7

4.3.6 Dissemination of the findings

Findings of the assessment were reported to Yaya Gulale Woreda, North Shewa Zone, and ORHB specifically Public Health Emergency Management directorate. The findings will also be presented at Addis Ababa University School of Public Health.

4.3.7 Supportive Letter

Even though the assessment was not involving individuals for data collection purpose did not need ethical clearance; Oromia Regional health Bureau PHEM Directorate approves the assessment and write official letter to North shewa zonal health department. Head department of the zone write an others official letters for different sectors of Yaya Gulale obtain required secondary data.

4.4 Results

4.4.1 Background of the Woreda

Yaya Gulale Woreda was one of the fourteen woreda of the North Shewa Zone of Oromia Region and located in the western part of Fitche zonal Town. As heard from historically the woreda has got the name Yaya Gulale from the two Clan called "Yaya" and "Gulale" who are ancestors of Tulama Oromo who lives in Finfinne before the migration to this woreda by the influence of government since 1878 G.C. The Woreda was established in 1944 G.C. The Woreda was governed by three governments:-Hailasillase regimen, Dergi Regimen and the current Government FDRE. From 1991-1992 G.C. the woreda was ruled by Defense force of transitional government without woreda administration. (5,6)

After the federal government had been established starting from 1996 to 2006 G.C the woreda was ruled by mixing with Debra Libanos Woreda administration. On September 2006 G.C depending on the questions of the woreda population; the woreda had separated as Yaya Gulale Woreda and form their reform of administration. It has many natural and manmade historical places that can attract tourists. These includes:- Kachama Mountain, Ali dera Mountain, Fital Mountain, Bollo Mountain, Mogor River, Jaitu waterfall , Ageri Tulu Cave. Additionally the Woreda consist raw materials of gun powder, glass and cement.(5,6)

4.4.2 Geography and climate conditions

Yaya Gulale Woreda is 26 kilometers away from Zonal town Fitche which located to 114 kilometer away to the northern direction of capital city, Addis Ababa. It share boundaries with six different other woredas such as Girar Jarso in the north, Sululta Woreda in the south, Degam Woreda in the north west, Debra Libanos in the East, Wachale Woreda in North east and Ade'aberga Woreda Of west shewa in South West. The altitude of the woreda's ranges 1500-2760 meters above sea level. The annual range of rainfall is found in between 800-1200 mm during the summer seasons. The climatic conditions of the Woreda constitute 28% High land, 41% mid land and 31% Desert.(5)

4.4.3 Ethnicity, Language and Religion

All of the woreda's population (100%) composed of Oromo Peoples and speakers of Afan Oromo languages. From total woreda population, 99% of them were Orthodox Christian followers, whereas 1% was Wakefata, Protestant and others.(5,6)

4.4.4 Administrative and political structure

The Woreda has seventeen rural kebeles and two towns which have their own administration and have 340 and 1714 health developmental army and one-five networks respectively under all kebeles. From the total 17 rural kebeles 4 of them in high land,6 mid land and the rest 7 are deserts. All the Woreda's administrative offices are found in the woreda's town. There are 32 offices and all of them ruled by head and vice head called 'cabine'. Since 2006 G.C. after separated from Debra Libanos woreda eight different woreda administrators manage the Woreda till 2017 G.C. (5)(6)

4.4.5 Socio-Demographic information

In 2016/2017 G.C. the Woreda has a total population of around 71681 from 14,934 house hold among 35912 males and 35769 are females. Male to female ratio of population is around 1:1. From the total woreda population, under one years old children constitutes 2308 (3.22%), under five 11756(16.4%), under fifteen years 34120(47.6%), above 65 years 3398(4.74%), women of child bearing age 15863 (22.13%), pregnant women 2652(3.7%), and non-pregnant women are 13333(18.6%). A total of 69132(96.4%) population lives in rural of the Woreda. In case of the ethnic composition almost all of the woreda populations are Oromo. Regarding religious distribution, most woreda's population is Orthodox followed by Wakefata, Protestant and others. (5)

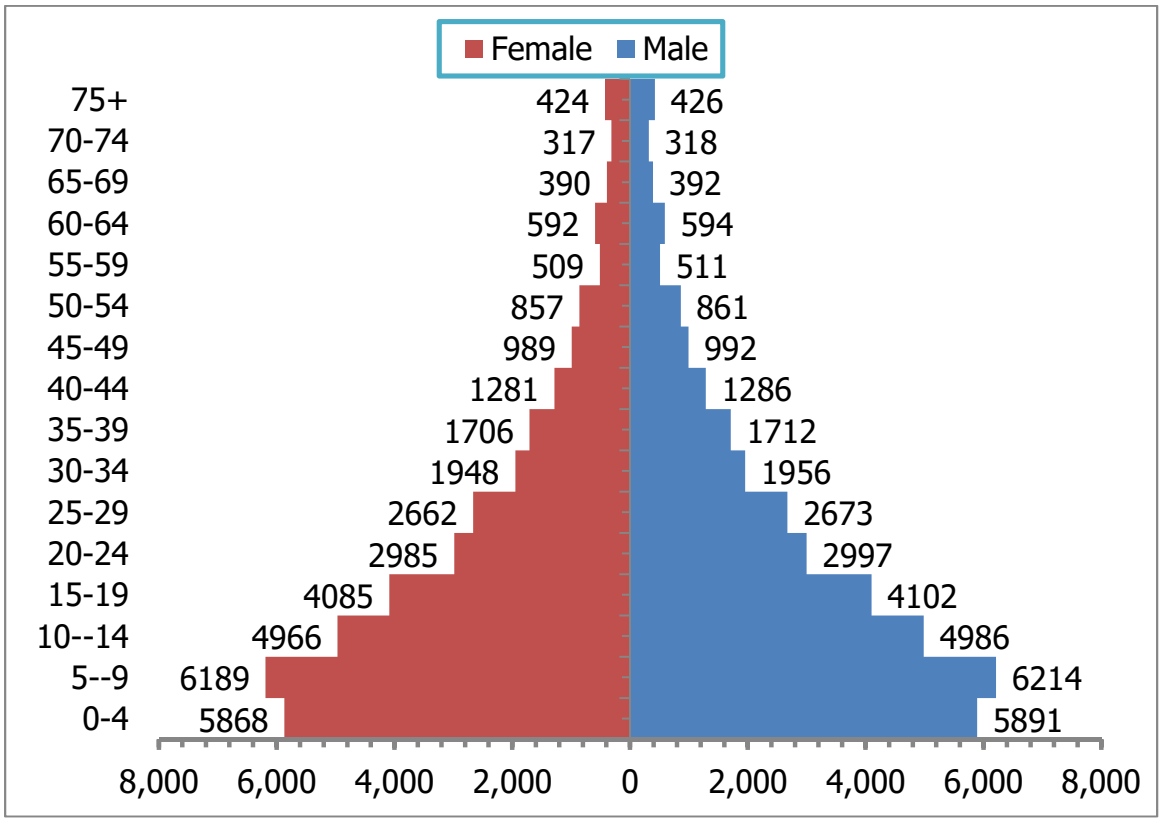


Figure 43: Population Pyramid of Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-September, 2018

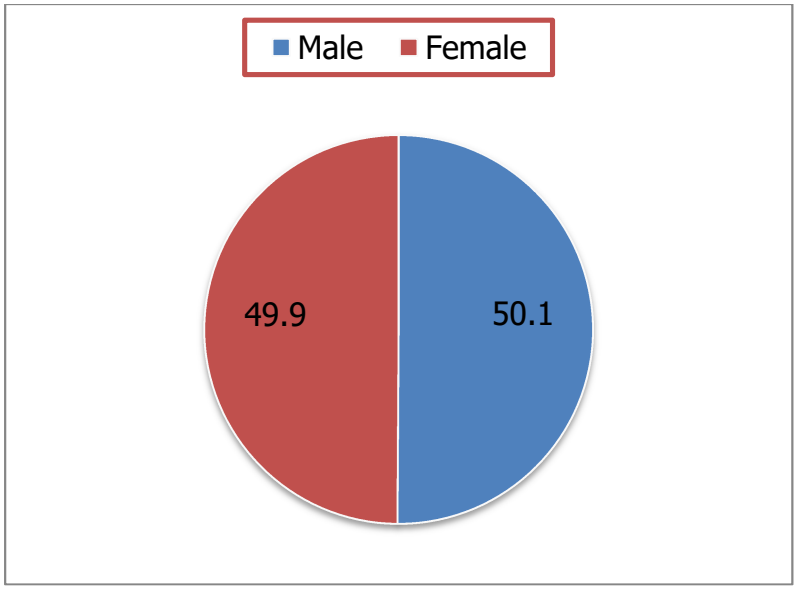


Figure 44: Population Distribution by Sex in Yaya Gulale woreda North Shewa Zone Oromia Region Ethiopia-September, 2018

Table 23: Estimated population by Kebeles in Yaya Gulale Woreda, North Shewa Zone Oromia Region Ethiopia-September, 2018

Sr.No.	Name of Kebele	Population		Total	Total Number of HH
		Male	Female		
1	Alidera	2234	2225	4459	929
2	Arere	834	830	1664	347
3	Dalatirimeti	2200	2191	4391	915
4	Dedetigi	2874	2862	5736	1195
5	Iludire	2676	2665	5341	1113
6	Dededuftu	1240	1236	2476	516
7	Gobolakatila	2487	2477	4964	1034
8	Kuchudangago	1659	1652	3311	690
9	Nonochamari	2047	2039	4086	851
10	Yasagodawarke	1848	1841	3689	769
11	Buyamakuat	2033	2024	4057	845
12	Godajaba	1945	1938	3883	809
13	Nge'asole	2071	2063	4134	861
14	Solegibe	1136	1132	2268	473
15	Nano	1115	1110	2225	464
16	Yasalami	2951	2939	5890	1227
17	Sadinbiyo	3286	3272	6558	1366
18	Fital 01	1277	1272	2549	531
Total		35912	35769	71681	14934

Table 24: Estimated population by some indicators in Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-September, 2018

Sr. No.	Name of Kebele	Total	Total HH	<1 year	2-5 year	< 5 year	<15 year	15-59 years	>65 year	Women (15-49 years)
1	Alidera	4459	929	144	478	731	2122	2118	211	987
2	Arere	1664	347	54	178	273	792	790	79	368
3	Dalatirimeti	4391	915	141	471	720	2090	2086	208	972
4	Dedetigi	5736	1195	185	615	941	2730	2725	272	1269
5	Iludire	5341	1113	172	573	876	2542	2537	253	1182
6	Dededuftu	2476	516	80	265	406	1179	1176	117	548
7	Gobolakatila	4964	1034	160	532	814	2363	2358	235	1099
8	Kuchudangago	3311	690	107	355	543	1576	1573	157	733
9	Nonochamari	4086	851	132	438	670	1945	1941	194	904
10	Yasagodawarke	3689	769	119	395	605	1756	1752	175	816
11	Buyamakuat	4057	845	131	435	665	1931	1927	192	898
12	Godajaba	3883	809	125	416	637	1848	1844	184	859
13	Nge'asole	4134	861	133	443	678	1968	1964	196	915
14	Solegibe	2268	473	73	243	372	1080	1077	108	502
15	Nano	2225	464	72	239	365	1059	1057	105	492
16	Yasalami	5890	1227	190	631	966	2804	2798	279	1303
17	Sadinbiyo	6558	1366	211	703	1076	3122	3115	311	1451
18	Fital 01	2549	531	82	273	418	1213	1211	121	564
Total		71681	14934	2308	7684	11756	34120	34048	3398	15863

4.4.6 Productivity and income

The main source of income in the woreda was agricultural products, that include farming land and animal products. The main agricultural crop in the woreda includes cereal which includes:- tef, wheat, Barley, pea, bean, maize, sorgum, linseed, vetch, chikpea and cash crop Onion and potatoes are cultivated two times per years in summer and winter by rain fall and irrigation respectively.32508(88.1%) of the land used for agriculture followed by 2821(7.6%) for diary. Since majority of the population in the woreda are farmers the average monthly income of individual was not known.(5,7)

4.4.7 Facility and infrastructure

Yaya Gulale Woreda has 67 kilometers all-weather kilometers road in the Woreda. From the total 82 kilometers road needed coverage of the roads in the Woreda is only 67(81.7%) accounts. Even though 3.4 million from government and 2.4 million birr from community participation are allocated for the road construction in 2017 in the Woreda there is budget shortages to increase road coverage's. . In 2017 from a total of 17 rural kebeles and two urban kebeles of the woreda, both of the urban kebeles have electric light and all weather road whereas only four of the rural kebeles have electric power and 14 of them have road (access to transportation). In general from the total of 19 kebeles 6(32%) have access to electric power and 14(74%) of them have accessibility to road. (7)

In case of telecommunication both urban kebeles of the woreda have supplied with wave satellite type of telecommunication and all rural kebeles do not have any functional satellite or wireless telecommunication service but all kebele administration uses mobile for communication in the woreda. (7)

4.4.8 Educational Status

In 2016/2017 G.C, there was only one non-governmental kindergartens and 39 first cycle primary schools (1-4), 31 second cycle primary schools (5-8),2 high school (9-10) and only one preparatory (11-12) school in the Woreda. There were no governmental and non-governmental colleges in the woreda. There are a total of 556 teachers in the woreda from which 199(35.8%) are females and 357(64.2%) are male. From the total teachers 1(0.2%) is TTI, 411(73.9%) are Diploma, 136(24.5%) are Degree holders and the rest 8(1.4%) are 2nd degree holders in the woreda. In case of sex and educational level no TTI Females, out of 411 Diploma teachers 168(40.9%) are Females and 411(59.1%) are males, whereas from total 136 Degree holders

31(22.8%) are females and 105(77.2%) are males. From 8 second degree holder all 8(1005) of them are males. (8)

The cumulative ratio of teachers to students is 1:24 whereas independently the teacher to student ratio is 1:20, 1:36, 1:17, 1:15 and 1:12 in KG, 1st cycle primary, 2nd cycle Primary, secondary and preparatory schools respectively. Educational coverage of the woreda was 81.4% in July, 2016 to June, 2017 G.C. As Evidence taken from woreda education office showed, From the total students registered for school in September, 2016 G.C, 103.(0.8%) students were dropout due to different reasons like, lack of support which result migration to other areas for seeking of works as labor. In case of infrastructures from the total of 74, only 11(15%) of them have water supply,24(32%) of them have functional toilet,8(11%) of them have electric powers,74(100%) of them have accessibility to mobile telecommunications and only 12(16%) of them have accessibility to transportations.(8)

Table 25:- Students and teachers distribution in schools of Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia, 2018 G.C.

Types Of Schools	No. of schools	Number of teachers			Number of Students		
		M	F	Total	M	F	Total
KG	1	2	2	4	41	40	81
1-4	39	124	97	221	4464	3570	8034
5-8	31	157	81	238	2331	1802	4133
9-10	2	51	17	68	569	445	1014
11-12	1	23	2	25	176	124	300
Total	74	357	199	556	7581	5981	13562

Table 26:-School age enrolled and drop out of students by kebele in Yaya Gulale Woreda, North Shewa Zone Oromia Region Ethiopia-Mar, 2018

Sr.No.	Name of Kebeles	Total School Age Children	Total enrolled to school	%	Drop Out	%
1	Fital 01	2227	1966	88	3	0.2
2	Alidera	842	681	81	10	1.5
3	Arere	376	291	77	5	1.7
4	Dalatirimeti	1086	924	85	4	0.4
5	Dedetigi	1190	1012	85	5	0.5
6	Iludire	693	556	80	6	1.1
7	Dededuftu	685	536	78	7	1.3
8	Gobolakatila	189	164	87	2	1.2
9	Kuchudangago	473	365	77	1	0.3
10	Nonochamari	573	458	80	9	2.0
11	Yasagodawarke	737	599	81	6	1.0
12	Buyamakuat	1520	1182	78	16	1.4
13	Godajaba	586	467	80	10	2.1
14	Nge'asole	646	532	82	3	0.6
15	Solegibe	531	416	78	4	1.0
16	Nano	416	322	77	5	1.6
17	Lami	1916	1490	78	1	0.1
18	Sadinbiyo	1192	965	81	6	0.6
Total		15878	12926	81	103	0.8

Table 27: Distribution of schools with facilities in Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-March, 2018

Types Of Schools	Total number	Water supply	%	Toilet	%	Electric	%	Telephone	%	Transportation	%
KG	1	1	100	1	100	1	100	1	100	1	100
1-4	39	0	0	7	18	0	0	39	100	0	0
5-8	31	7	23	13	42	4	13	31	100	8	26
9-10	2	2	100	2	100	2	100	2	100	2	100
11-12	1	1	100	1	100	1	100	1	100	1	100
Total	74	11	15	24	32	8	11	74	100	12	16

4.4.9 Drinking water supply

In rural part of 17 kebeles of Yaya Gulale Woreda from the total source of water 44% of them is protected spring and unprotected spring each separately,6% protected well,4% unprotected well and 2% stand pipe. All health posts and two rural of the health centers **(Toke and Sadin Biyo)** use water from the above listed sources. (9)

Table 28: Water sources Distribution in Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-March, 2017.

Sr.No	Types of water sources	Number	%
1	Protected spring	126	44
2	Un protected spring	129	44
3	Protected well	17	6
4	un protected well	11	4
5	Stand pipe	7	2
Total		**290**	100

4.4.10 Woreda Health system

4.4.10.1 Organization of Woreda health office

According to the newly revised health structures in all health sectors woreda health office structure was organized Health office head and Vice Head which include four owner processor and four cases Team which have eight technical and two supportive teams. These technical teams were CBHI Process owner, Health Service Quality Process Owner, Planning, M&E Process Owner, Communicable disease prevention & control Team, Family Health Team, Health Service Delivery & Facility Supportive Team, General Quality health Service Team and Ambulance Team.(7)

The two supportive teams at woreda health office level were secretary Team and HRM & Capacity Building Process Owner. From the total structure 51 needed in the woreda health office only 31 (21 technical and 10 supportive Staff) are working during this data collection. According to the newly revised structures of health centers the 'A' Type health centers have 68 from which structures and 'B' types have 51 structures. From 310 total structures in the woreda to health post only 137(44.2%) of the structures are occupied by staff. In case of health centers all are only less

than 30% of the structures are assigned and 31% and 70% are for woreda and Health post have structures respectively. (7)

Table 29: Human resource working under Yaya Gulale Woreda, North Shewa Zone Oromia Region Ethiopia-March, 2017

Name Facilities	HP Linked	Available Structure	No. Of Staff On Job	%
Woreda Health Office		51	31	61
Fital Health Center	6	68	26	38
Dalati Health Center	6	51	21	41
Toke Health Center	4	51	16	31
Sadin Biyo Health Center	3	51	13	25
Health Posts		38	30	79
Total		310	137	44.2

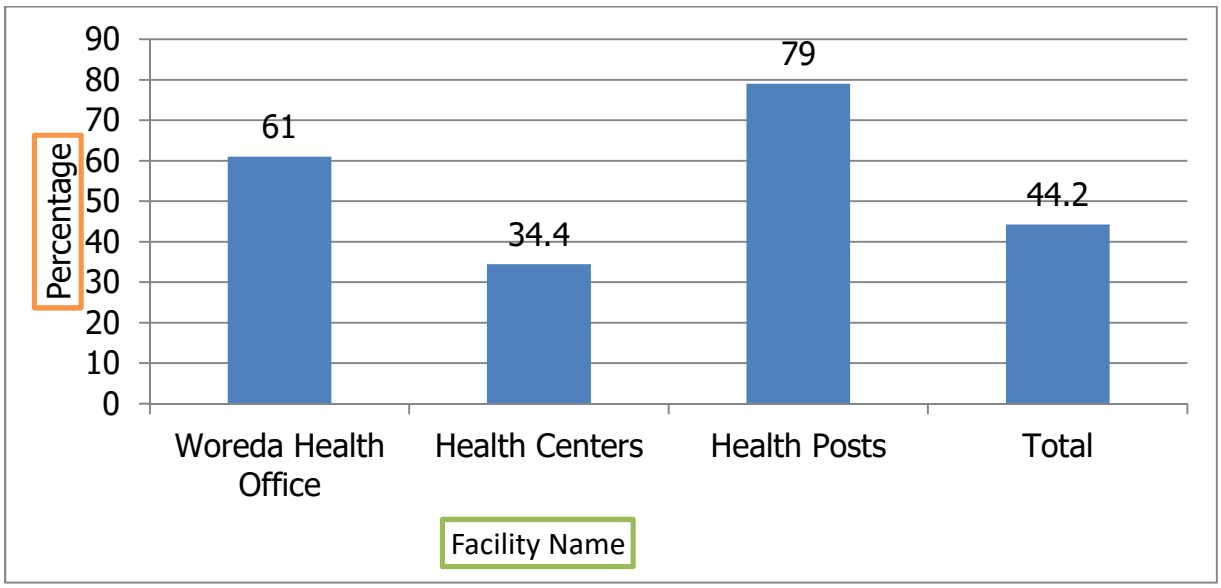


Figure 45:- Percentage of health workers available at different sites, in Yaya Gulale woreda North Shewa Zone oromia region Ethiopia-March, 2017

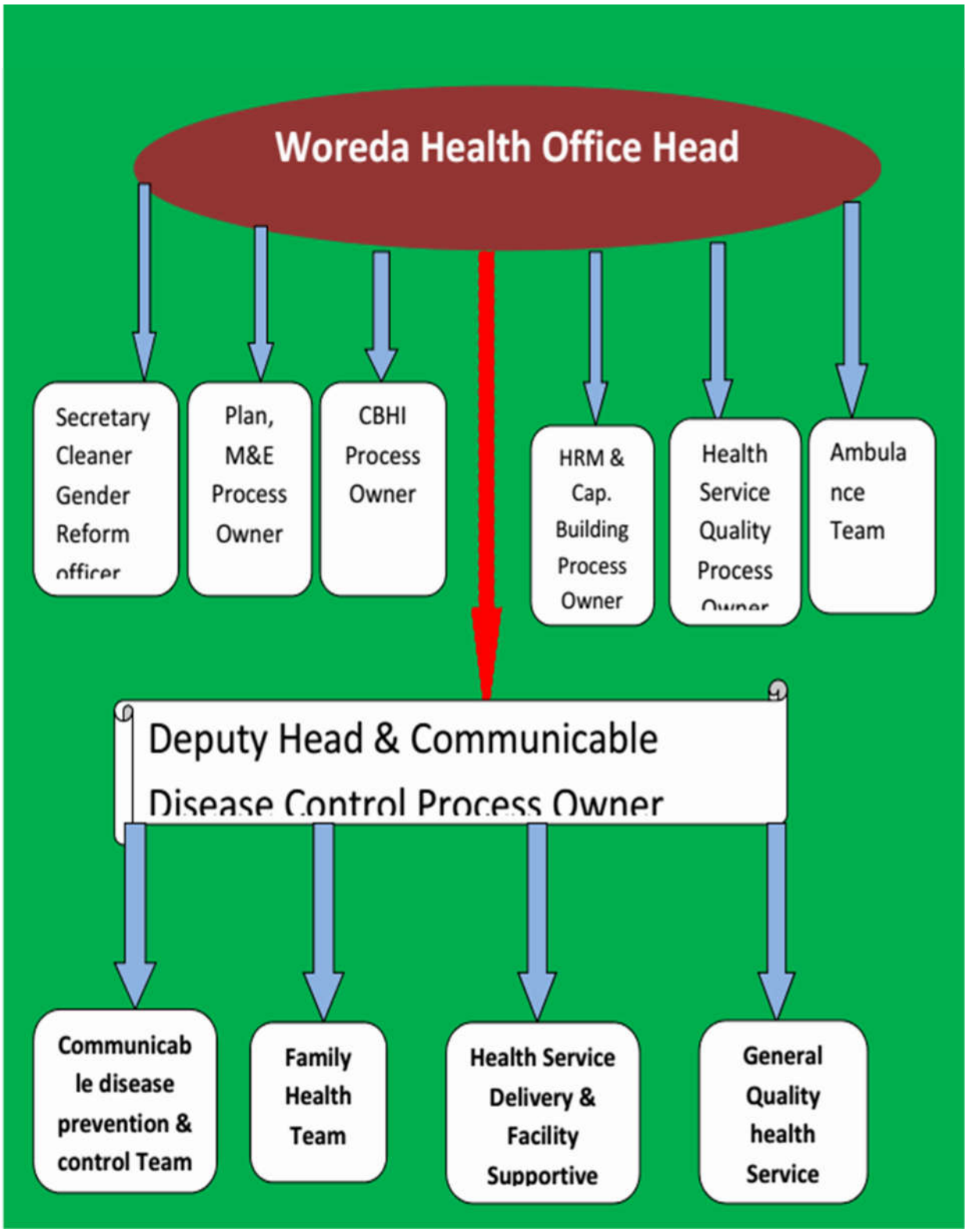


Figure 46: Organizational structure of the Yaya Gulale Woreda Health Office North Shewa Zone Oromia Region Ethiopia-March, 2017

4.4.10.2 Health Infrastructure

Regarding health centers, there are four functional health centers from which 1(Fital) is 'A' type and the rest three (Toke, Dalati and Sadinbiyo) were 'B' types. In case of health post, even though there are 17 rural kebeles and 2 urban kebeles all the rural kebeles have functional health posts whereas the two urban kebeles have no health posts. On the other hand Dalati urban kebeles get different services with rimeti kebeles as Dalatirimeti health posts Fital kebele uses Fital Health centers as posts. During the 2017 study period, the coverage of private clinic; only 3 primary clinic are functional. The Health service coverage of the woreda was 100% by Health Center and 89.5% by Health Posts. From the total four health centers only 2(50%) of them have functional and continuous water supply; all of the 17(100%) of the health post have no access to water supply. (7)

They used water from different site like river and spring and none of the health post had fixed telecommunication service. Only two health center **(Fital and Dalati HC)** had fixed wireless telephone. But all health post as well as health centers have access to mobile network. All of the health centers have functional toilet, access to transportation and electric supply; whereas only 1(5.9%) of the health posts has electric power, 17(100%) of them have functional toilet and 12(76%) of them are accessibility to all weather roads. (7)

Table 30: Distribution Of Health Facilities with their facilities in Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-March, 2017

Name of Health Facilities	Total number HF	Types of Facilities		Accessibility to									
		A	B	Water supply	%	Toilet	%	Electric	%	Telephone	%	Transportation	%
Health Center	4	1	3	2	50	4	100	4	100	4	100	4	100
Health Post	17			0	0	17	100	1	5.9	17	100	12	71
Total	21	1	3	2	10		0	5	24	21	100	16	76

4.4.10.3 Vital statistics and health indicators

Vital statistics and Health indicators are important to evaluate performances of health activities of each health facilities and to set strategic plan as needed. In Yaya Gulale woreda there are total populations of 71681 which have 14933 house hold. From these population 35769(49.9%0 are females and the rest 35912(50.1%) constitute males. 69132(96.4%) of the total population lives in rural part of the woreda whereas 2549(3.6%) of them lives in urban. From the total population 2308(3.22%), 11756(16.4%) and 34120(47.6%) of them represents under 1 years, under 5 years and under 15 years respectively. From the total in age of fertile age of women (15863) only 2652(3.7%) women have pregnancy. There were no recorded data of vital statistics such as Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR), Under Five Mortality Rate, Crude Birth Death, Crude Death Rate (CDR) and etc. (7)

Table 31: Population and vital statistics of Yaya Gulale Woreda North Shewa Zone Oromia Region 2017 G.C.

Sr.No.	Indicators	Number	Percentage	Remark
1	Total population	71681	100	
2	Total HH	14933	20.8	
3	Female	35769	49.9	
4	Male	35912	50.1	
5	Rural	69132	96.4	
6	Urban	2549	3.6	
7	Live Births (3.47%)	2487	3.47	
8	<1 years	2308	3.22	
9	<5 years	11756	16.40	
10	<15 years	34120	47.60	
11	15-49 ages Females	15863	22.13	
12	Pregnant Women	2652	3.70	
13	Infant Mortality Rate	No Data Available in the woreda		No data
14	Neonatal Mortality Rate			
15	<5 mortality rate			
16	Maternal mortality rate			
17	Crude Birth rate			
18	Crude Death rate			

4.4.10.4 Immunization coverage and maternal health service

Most of the immunization coverage of the woreda is less than 80%. The coverage of each antigens are:- BCG 68%,Measles 79%, Penta-1 76%,Penta-3 74%,PCV-1 76%, PCV-3

73%,fully 78% and PAB 75%. Almost all the coverage of antigens in Alidera kebele are greater than 95% where as in Nonochamari kebele all of the antigen coverage are less than 60%.In comparative of antigens majority of measles coverage by each kebeles are greater than all the others and constitute more than 75% and coverage of BCG is less than 75%.(7)

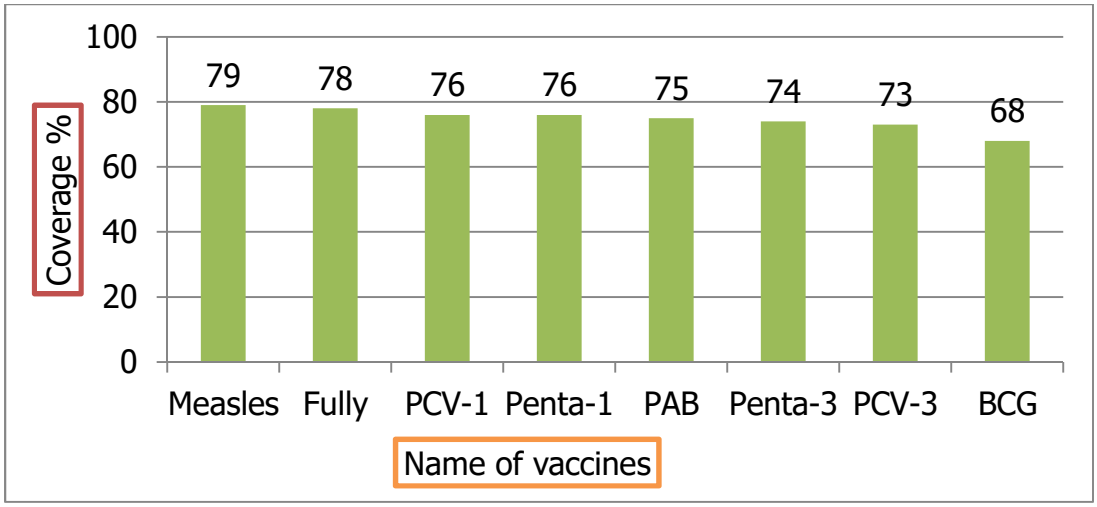
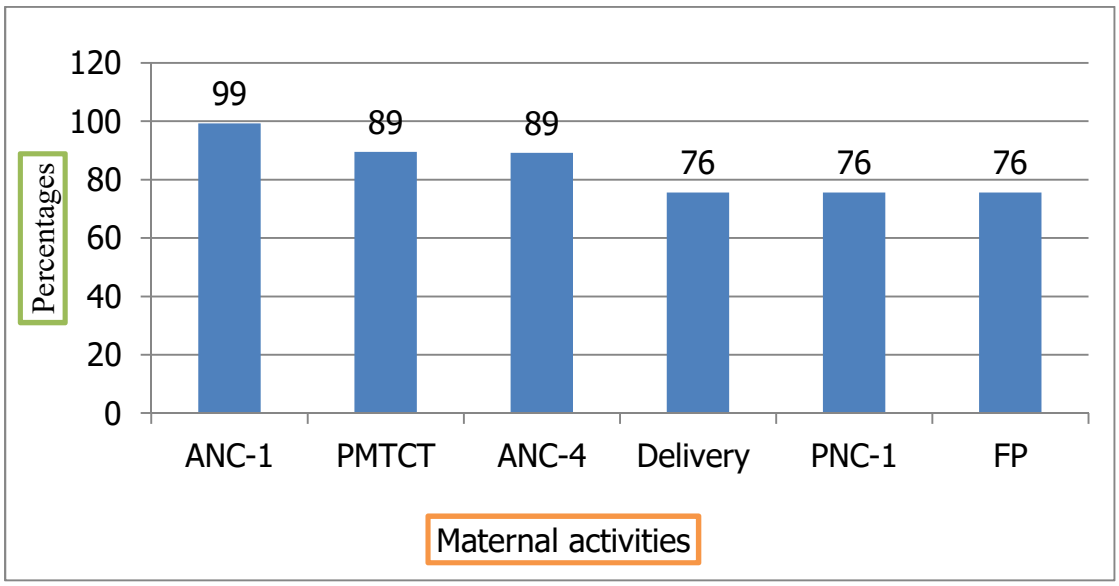


Figure 47: Vaccination coverage of children in Yaya Gulale Woreda, North Shewa Zone, Oromia, 2017

From total expected 2487 Ante-natal care services 2469(99%) ANC1 were given for pregnant women in the Woreda. Although there is 99% ANC1 Services given for the pregnant women; there is gaps on giving quality service and laboratory services on ANC like Syphilis test and Hemoglobin determination. The woreda planned to conducted skilled deliveries of 2487 from which 1876(76%) performance of deliveries attended in the health facility. 2225(89%) Percentage of pregnant and lactating women was tested for HIV and knows their status. Even if all delivery attended in health facilities got postnatal service its quality is not as recommended protocols (schedules) until 48 hours. (7)

Figure 48: Some health Component coverage in Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-March, 2017



4.4.10.5 Health education

Even though Health education was given at health centers by health workers and by HEW in the health posts as well as house to house on different community health problems such as Nutrition, personal & environmental hygiene, uses of Immunization (EPI) and communicable disease like malaria prevention & control, HIV/AIDS prevention & control but there is no complete report availed on total population participated and result seen. (7)

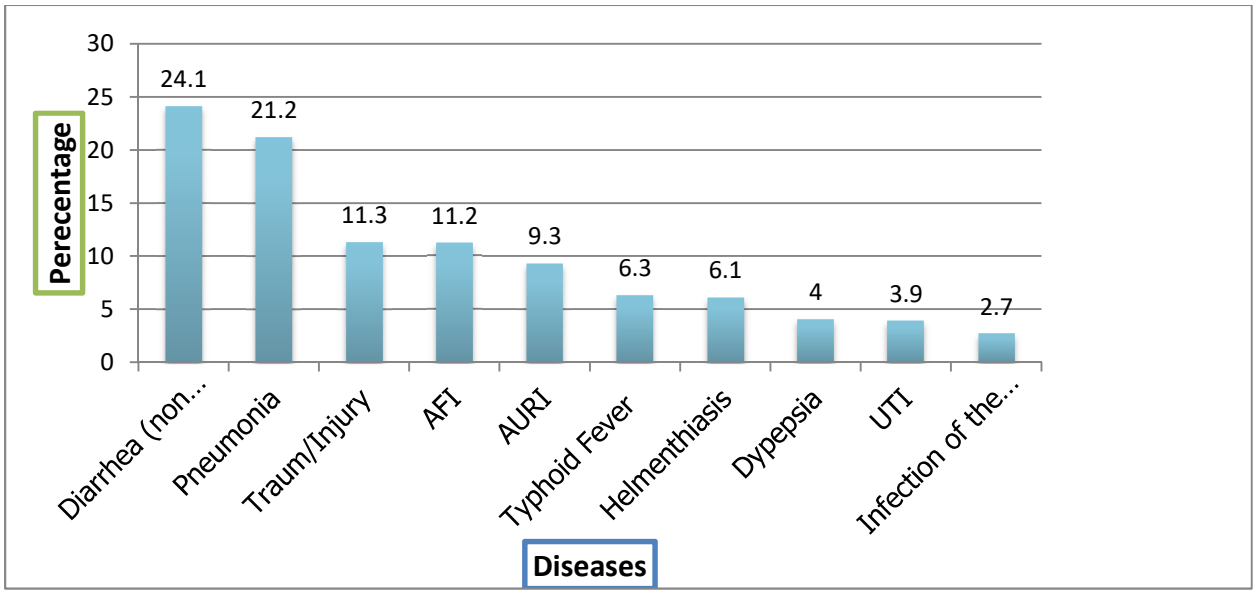
4.4.10.6 Latrine Coverage and Utilization

At the beginning and end of rain season there is an occurrence of AWD outbreak. As a result almost majority of the house hold have latrine and use it. Out of the total house hold 14934; Latrine coverage of the Woreda were 11947(80%) and from these house hold 85% of them utilize it. Out of 17 rural kebeles three of them are free from open defecation and the rest rural kebeles of the Woreda are on progress to Become open defecation free. (7)

4.4.10.7 Leading causes of Morbidity and Mortality

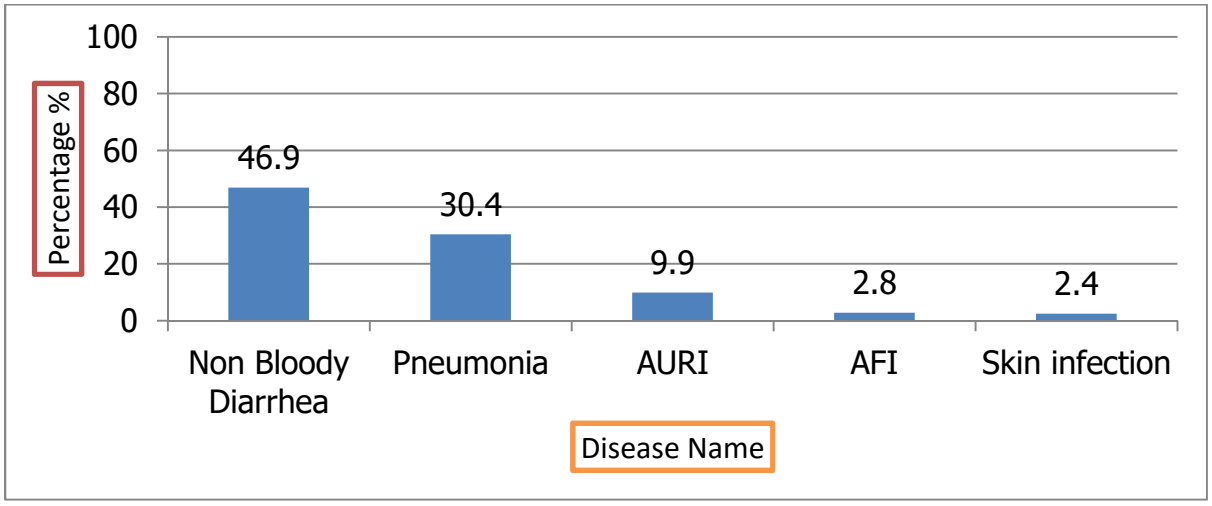
In adult population non bloody Diarrhea 3626(24.1%) cases were the major leading causes of morbidity followed by pneumonia 3195(21.2%), Trauma/injury 1708(11.3%), AFI 1679(11.2%) and the rest are less than 10% in Yaya Gulale Woreda. (7) (Fig.6)

Figure 49: Top ten causes of Adult Morbidity under Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-March, 2017



In under five years of population non bloody diarrhea 17745(46.9%) is the leading cases followed by Pneumonia 1151(30.4%), Acute Upper Respiratory infection 373(9.9%) and the rest constitute less than 10% of the total under five cases on morbidity in this woreda. No data found about causes of mortality in the Woreda. (7) **(Figure 51)**

Figure 50: Top five causes of Under Five years Morbidity in Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-March, 2017



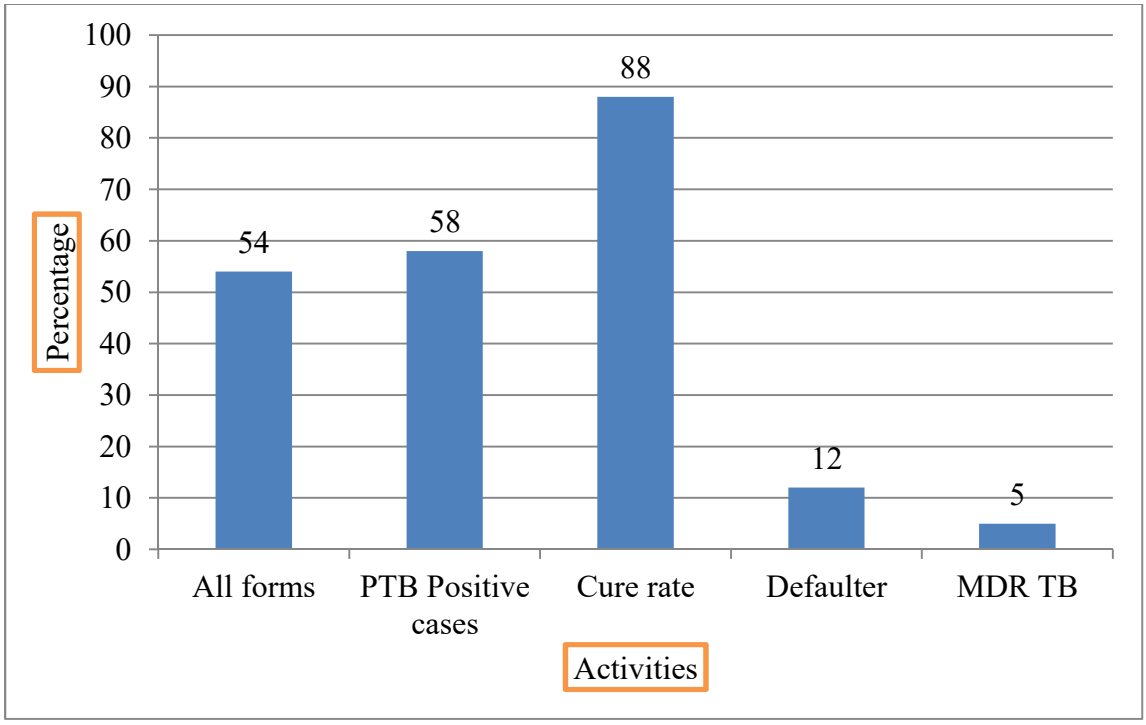
4.4.10.8 HIV/AIDS

As planed in second Health Sectors Transformation Plan the three 90's were planned to be achieved. From the total risk group population 90% of them should screened for HIV/AIDS, from total positive seen 90% of them should linked to ART and from those linked to ART 90% of the patient viral load should be suppressed to less than 1,000 copies. According to data collected from this Woreda from 7598 vulnerable population 5533(73%) of the population are screened for HIV/AIDS and 3 of them were positive. From 87 HIV/AIDS positive 86(99%) are linked to ART from which for 66(76%) viral load detection is performed. Out of the total linked to ART for 56(65%) of them viral load is suppressed (less than 1000 copies). For all cases of HIV/AIDS linked to ART; CD^{+} is performed for all 86(100%). (7)

4.4.10.9 Tuberculosis and Leprosy

All forms of TB detection rate in the Woreda were 87(54%). Total of 42(58%) PTB detected, cure rate of 37(88%), 5 PTB patient were lost and two (4.8%) of them develop MDR TB. Both of the MDR TB patients were linked to Fitche General Hospital TIC for treatment. No leprosy cases reported in the Woreda. (7)

Figure 51: TB Activities Performance in Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-March, 2017



4.4.10.10 immediately and weekly reportable diseases

There were fourteen immediately reportable and seven weekly reportable diseases under PHEM team using case based reporting format and line listing depending on the number of occurrence of cases in the Woreda. (7)

Table 32: Immediate and Weekly Reportable Disease under Yaya Gulale Woreda, North Shewa Zone Oromia Region, 2017

Sr.No	Immediately reportable	Sr.No	weekly reportable
1	Viral hemorrhagic fever (VHF)	1	Dysentery
2	Yellow fever	2	Malaria
3	Acute flaccid paralysis (polio)	3	Meningitis
4	Anthrax	4	Mal nutrition
5	Avian human Influenza (AHI)	5	Typhoid fever
6	Cholera	6	Epidemic Typhus
7	SARS	7	Relapsing fever
8	Guinea worm	8	Scabies
9	Measles,		
10	Neonatal tetanus (NNT),		
11	Human influenza (H1N1),		
12	Rabies,		
13	Small pox,		
14	Maternal Death		

2018 scabies also get concern and added as PHEM reportable diseases. As a result there is 22reportable diseases/condition under Ethiopian surveillance system. Completeness and timeliness of the diseases reported under surveillance of the Woreda in 2017 is 87 and 86 respectively. (7)

4.4.10.11 Malaria

Although there were 7 malarias kebeles in the Woreda; IRS chemical spray was performed only in four kebeles and 36,400 birr utilized for these purposes. Out of 15,141 at risk population for malaria from which 10599 are suspected cases of malaria from which only 87 cases were confirmed cases. A total of 211Kg (85%) bendocarben chemicals sprayed by which 11,776(99%) population were protected that covers a total unit structures of 4229(94%). Since ITNS do not distributed every years there are a total of 9500 ITNS distributed in 2016. (7)

4.4.10.12 Nutrition, food shortage and any other disaster

In Yaya Gulale Woreda there are 4 SC and 21 OTP sites in 2017. From a total of 10752 Children aged 6-59 months who should receive vitamin A supplementation 10182(97%) of them get vitamin A and 6730(98%) of Children aged 2-5 years get albendazole/mebendazole. From a total of expected 3062 underweight children aged <5 years only 600(20%) of them screened as under mal nutrition and out of 330 expected as SAM cases 129(39%) are identified and get treatment. From 127 admitted under the OTP program 125(98%) of them were cured and all (2) admitted under SC program are cured and discharged. No disaster had been reported in the Woreda in 2017. (7)

4.4.10.13 Health budget allocation

From a total budget 78,512,109 allocated in the Woreda 8,588,046(10.9%) Ethiopian birr allocated for health sector Salary, top up and others from the government and all budget allocated for health sector utilized. There were different NGOs supporting the Woreda by budget and technical. From ONE WASH a total of 248,947 Ethiopian birr allocated and 60,000 for Placenta pit construction in health center, 152,086 for latrine construction in Health Posts and 36,861 for capacity building and supportive supervision. The entire above allocated budget were utilized for the allocated programs. (7)

4.4.10.14 Human resource

Under Yaya Gulale Woreda there are a total of 141 workers in both GO and private clinics; out of 129 are government health system in Woreda Health office, Health Centers and Health Posts whereas 12 of them are working in private primary clinics. 63(45%) of the total staff are Technical staff, followed by 48(34%) supportive staff and 30(21%) of them are rural health extension workers. (7)

Figure 52: Human Resource Distribution by professions in Health sector of Yaya Gulale woreda North Shewa Zone Oromia Ethiopia-March, 2017

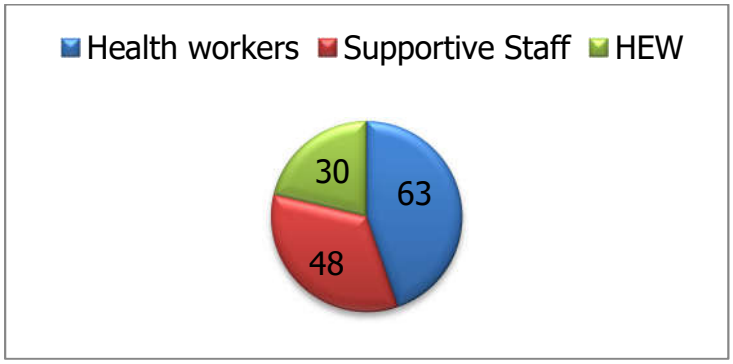


Table 33: Human resource by Profession in GO and Private under Yaya Gulale Woreda North Shewa Zone Oromia Region Ethiopia-March, 2017

Sr. No.	Category		Government	Non-Governmental	Total
1	Physicians		0	0	0
2	IESO		0	0	0
3	Health officers		6	0	6
4	Mid wifer	Degree	1	0	0
		Diploma	9	0	0
5	Nurses	BSc Nurse	3	1	4
		Diploma	30	5	35
6	Laboratory Professional	Degree	1	0	1
		Diploma	3	0	3
7	Pharmacy professional	Pharmacist	1	0	1
		Druggist	2	0	2
8	Environmental health Professional	Degree	0	0	0
		Diploma	1	0	1
9	HEWs	Urban	0	0	0
		Rural	30	0	30
10	Supportive Staff	Degree	3	0	3
		Diploma	24	0	24
		Others	15	6	21
Total			129	12	141

4.4.10.15 Essential drugs and other supplies

There is an agreement in between the Woreda and PFSA as a supplier of Drug and others medical products, but there are many problems in the system of supplying the Drug and different medical equipment. Biftu Adugna is also other supplier that supply drugs and others medical products for the Woreda. Even though there was an agreement between PFSA and the Woreda most of the Drugs and medical Supply were not available as the need of the Woreda. The Woreda Request 146 items of the supply from which they get only 63(42%) of the items that is result complain of the patient in their health facilities. There is constraint of essential drugs in the Woreda no laboratory supply obtained from the PFSA, all program drugs have short expire date less than three month long. Adult and child opportunistic infection drug and drug for Poisoned individuals were not supplied by this Organization. In general The Woreda reported that there

were shortage of essential drug, laboratory reagents and diagnostic kits inaccessible in the market to purchase. (7)

4.4.10.16 Potential Risk factors of Outbreak

Even though there were no compiled reports of an outbreak in the health office of the Woreda there were different suspected cases of disease like Anthrax, AWD and measles. Potential risks of an outbreak that identified in the Woreda were Open defecation (improper latrine utilization), low clean drinking water coverage for AWD.

4.5 Discussion

We showed that in Yaya Gulale Woreda Non bloody Diarrhea and Pneumonia were the top causes of morbidity both in adults and under five years. From total population of Yaya Gulale rural population 44% of them used protected spring water sources for drinking purposes which was higher than that of the country profile conducted by EDHS in which only 21% of the population uses protected spring water.(4)

From a total 14,934 households only 11,947(80%) of them have improved latrine and 85% of them utilize. The study conducted by EDHS shows that only 9% of the total house hold have improved latrine which was much lower than that of Yaya Gulale Woreda. Three out of the 17 rural kebeles were celebrated as Open field Defecation Free (ODF) kebeles. Even though there was high latrine coverage non bloody diarrhea was the top leading cause of morbidity both in adult and under-five which accounts 24% and 46.8% respectively; followed by pneumonia both among adult and under-five which accounts 21% and 30% respectively. Majority of the vaccination coverage of each antigen were less than 80% which was similar to the Ethiopian data assessed by EDHS in 2016.(2,4)

From a total 2487 expected pregnancy only 1876(76%) of them deliveries attended by health professionals or in health facilities. Although the coverage of ANC1 and PNC1 were 2469(99%) and 1879(76%) respectively there were only 50% of the pregnant women get Syphilis test and hemoglobin determination from laboratory services. This was higher than that conducted in Ethiopia by EDHS in which only 62% pregnant women get ANC1 Only 2225(89%) of the pregnant and lactating women was tested for HIV/AIDS and knows there status.(4)

According to data collected from this Woreda out of 7598 vulnerable population 5533(73%) of the population are screened for HIV/AIDS and 3 of them are positive. The study conducted by EDHS shows only 19% of the vulnerable groups were tested which is lower than Yaya Gulale

Woredas. From 87 HIV/AIDS positive known in the Woreda 86(99%) are linked to ART from which for 66(76%) viral load detection is performed. Out of the total linked to ART for 56(65%) of them viral load is suppressed (less than 1000 copies). For all cases of HIV/AIDS linked to ART; CD_4^+ is performed for all 86(100%). TB detection rate in the Woreda were 87(54%), total PTB positive detected 42(58%), cure rate of 37(88%), two (4.8%) MDR cases Detected in new PTB patient that follow their treatment in Fitche General Hospital TIC. This result was higher than study conducted by EPHI in 2014 that shows 2.3% nationally.(10) Even though there were seven malaric kebeles; Malaria was not major problems in the Woreda. From 127 admitted under the OTP program 125(98%) of them were cured and all admitted under SC program are cured and discharged. No disaster had been reported in the Woreda in 2017.

The Woreda Request 146 items of the supply from which they get and gets only 63(42%) of the items which result complain of the patient in their health facilities. There were constraint of essential drugs in the Woreda no laboratory supply obtained from the PFSA, all program drugs have short expire date less than three month long. Adult and child OI drugs and drug for Poisoned individuals were not supplied by PFSA. The Woreda reported that there were shortage of essential drug, laboratory reagents and diagnostic kits inaccessible in the market to purchase. The Woreda has three cars from which two of them were Ambulance and one is Pickup. All three of them were not serving the Woreda because of absence budget to services the car.

In general Vital statistics like total death, total births, fewer than one and under five deaths were not recorded in the Woreda. According to the Woreda Health Officials, the main problems of the Woreda were limited budget, shortage of medical supplies at PFSA, Shortage of water and power supply in the health centers, Health Post and shortage of human power.

4.6 Limitation

The main limitation identified in the woreda was Population of one urban kebeles were not known and included in the neighbor rural kebeles of the Woreda. Absence of mortality records, Delivery attended by HEW and TBA and reports in the Woreda Health office as well as incompleteness of some reports/data.

4.7 Conclusions

Non bloody Diarrhea and Pneumonia were the most leading cause of morbidity in both adult and pediatric OPD; From total expected pregnant women's those who got ANC services in health facilities accounts only 50% of them tested for syphilis. From expected total deliveries in the

Woreda only 76% of them registered in health facilities. Low TB detection rate and treatment success rate recorded in the Woreda with high percentage of MDR TB cases.

4.8 Recommendations

Proper utilization of latrine, sanitation and hygiene practice should be encouraged to minimize the diarrheal diseases. Facilitate supply for syphilis test to increase quality of ANC utilization. Institutional deliveries services have to be improved and encouraged to reduce maternal and neonatal death. Attention should be given to all health centers to increase TB detection rate, strictly follow DOT program to reduce defaulters and to immediately detect MDR TB suspect.

4.9 References

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CHAPTER 5: SCIENTIFIC MANUSCRIPTS FOR PEER REVIEWED JOURNALS

5.1 Manuscript of Measles Surveillance Data Analysis, North Shewa Zone, Oromia Region, 2018 G.C

Title: Five Years Measles Surveillance Data Analysis, North Shewa Zone, Oromia Region, Ethiopia, 2018.

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Abstract

Background: Measles is a Vaccine preventable viral infectious disease that characterized by fever, cough, coryza, and conjunctivitis. Five years measles data were analyzed to identify morbidity and mortality trends in North Shewa Zone, Oromia Region. There were numbers of measles cases reported every year of analysis. The study was conducted to analyze the magnitude and epidemiology of measles cases to understand its risks and propose recommendation.

Methods: We conducted retrospective cross sectional descriptive study from 2013-2017 by reviewing measles data line list and case based registration of North Shewa Zone Woredas, from March 10 -15, 2018. We analyze measles data by place, time and persons. We compare the results by different situation in between each Woreda of the zone.

Result: we identified a cases of 322 reported to North shewa Zonal PHEM department in between 2013-2017 G.C. From total cases 195(61%) of them were males. Out of reported cases 171(53%) of them belongs to less than or equal to four years age. A total of 165(57.1%) of them were laboratory confirmed. The incidences of the measles were 22cases/100,000 with two deaths (CFR of 0.6%). Measles vaccination coverage was increased from 42% to 91% in the 2013 to 2017 period and average measles vaccination coverage was 94% during five years in the Zone.

Conclusion and Recommendation:- Measles cases occur highly in children ages of less than five years. As a result strengthening of routine immunization and mass campaign need to target for all children less than five years of age with regular cold chain management of the vaccine.

5.1 Background

Measles is a viral disease and Vaccine preventable infectious disease caused by the genus Morbilli virus.(1) It is a contagious, serious respiratory viral disease characterized by fever, cough, coryza, conjunctivitis and generalized maculopapular erythematous rash. Commonly measles acquired by inhaling microscopic droplets that contain viral particles. Its sign and Symptoms appear about 9 to 11 days after initial infection. Infection can result in serious complications such as blindness, encephalitis, or severe respiratory infections such as pneumonia. Before widespread vaccination in 1980, measles was responsible for an estimated 2.6 million deaths worldwide each year*(2)*. The measles vaccine is widely available and is said to have decreased global rates of measles by over 75 percent. Despite the availability of a safe and effective vaccine, measles remains one of the leading causes of death among young children around the world.(3)

As study conducted in 1994 internationally female mortality in age groups of 0-44 was prevalent throughout the world. There was an excess of 3.0% in Europe, 6.2% in North America, 5.9% in Far-East Asia, 4.3% in Latin America and 20.9% in the Middle East. At age 0-4, the excess female mortality ranged from 1.7% to 21.3% in the five regions.(4) From age 5-14, the pattern of excess female mortality was very consistent throughout the world, including in South-East Asia and in the Islands. The excess ranged from 8.3 to 29.2%. At age 15-44, the pattern was less consistent, mostly because the number of cases and deaths were much smaller. The highest incidences occurred in 2008 and 2011. (3) The epidemiology of measles in 2008 was characterized by a high proportion (92%) of cases among U.S. residents who were unvaccinated or who had unknown vaccination status, a high proportion cases occurred in U.S. school-aged children whose parents have religious or philosophical objections to vaccination, and more spread from imported cases than other years.(4) As Analysis performed in South Africa, the averages of annual incidence rates from 1980 to 1989 were 52. Between 1980 and 1989 the numbers of notified deaths varied between I7l cases in l98l and 494 in 1983, averaging 303 deaths per annual. For the same period, case fatality rates based on notifications varied between 1.3% in 198l and 3.8% in 1989 with an overall rate of 2.2%.(3,5,6)

As study conducted in Ethiopia at the end of 2009 and in the first 6 months of the year

2010, there were 425 laboratory-confirmed and 1,519 Epidemiological-linked cases and a total of 848 laboratory confirmed and 2,401 Epidemiological -linked cases of measles were reported respectively.(7) A total of 60 outbreaks were confirmed in 2009 with 1,179 confirmed measles cases; while 93 outbreaks were confirmed in July 2010 with a total of 2,889 confirmed cases. A seasonal pattern occurrence of measles has been observed over the years, with increased number of measles cases from December to February. Due to the low sub national Routine measles coverage and prevailing poor living conditions, measles outbreaks continue to occur frequently in different parts of the country, mostly in Oromia and SNNPR Regional states. From January to the end of July 2010, a total of 3,249 cases were reported. As study conducted in Guji Zone's Woredas in Oromia regional state for three months' time; a total of 1059 suspected cases and two deaths were reported from 9 woredas affected by a measles outbreak with cumulative attack rate of 81/100,000 population was recorded. Of these, 821 (77.5%) cases were < 15 years of age. Although, all age groups were affected under five years were more affected 495 (48%) than any other age groups. An outbreak response immunization was organized at the 11th week of the epidemic, when the epidemic curve started to decline. Age groups of 6 months to14 years old were targeted for outbreak response immunization and the overall coverage was 97 % which range from 90 to 103% coverage. (8–10)

The assessment of morbidity and mortality of measles data and its trends from 2013 to 2017G.C were conducted in in North Shewa zone Oromia Regional state. Specifically the data was collected and analyzed to describe the measles cases in place and time, to demonstrate the five years trend of measles morbidity and mortality, to compare the burden of measles in different woredas within the zone, and to compare the immunization status and disease occurrence. Since the reports in North Shewa zone indicates there were measles outbreak occurrences due to un known reasons and also share boundary with Amhara regional state in a place measles out breaks happens different times.

5.2 Methods

We compiled HMIS and PHEM reports for surveillance data analysis of measles from 2013-2017 G.C. We reviewed information regarding of the suspected measles from different Woredas of North Shewa zonal administration of oromia regional state. We

perform retrospective descriptive cross-sectional study to collect secondary data of measles by using prepared questionnaires.

Five years data were organized and analyzed by using Epi info 7.1 and Microsoft Office Excel. The analysis was conducted from collected data quantitatively and qualitatively by using different graphs and tables in the result sections. Data was disseminated to different sites depending on the function where it was used. We defined a suspected case as any person with generalized maculo-papular rash and fever plus one of the following symptoms: cough or coryza or conjunctivitis, probable case with typical clinical features of the measles disease without laboratory confirmation, and confirmed case as suspected case which has appropriate laboratory results.

We included all Population of the North Shewa zone Woredas as study population. We analyze all suspected measles case that reported from registers on line list government and private health office in the respective Woredas and town administration. All Measles cases and deaths that reported from each Woredas during 2013 to 2017 that fulfill case definition were included in the analysis.

5.3 Result

The total numbers of measles cases reported from all Woredas and Town administration of north shewa zone in between 2013-2017 G.C were 322. Out of the reported cases 195(61%) of them were males. On the other hand 171(53%) of them were constitute less than or equal to four years age. It affects highly those less than or equal to four years age. From 322 reported measles cases, 165(57.1%) of them were laboratory confirmed, 109(37.7%) confirmed by epidemiological linkage, 4(1.4%) of cases were clinical compatible and 11(3.8%) were Suspected cases. The incidences of measles cases were similar in 2013 and 2014 which was 5.2 where as it was only 4.4 in 2015. As data of 2016 indicates the incidence was 5.4 due to the occurrences of the measles outbreak occurrence in different Woredas of the zone, but the incidence was decline to 2 in 2017 as a results of vaccination coverage and quality increases. As results seen from five years data analysis in all assessed years the incidences of measles cases were the highest in age group of less than four or equal to four years. **(**Figure 1, 2 and table 1)

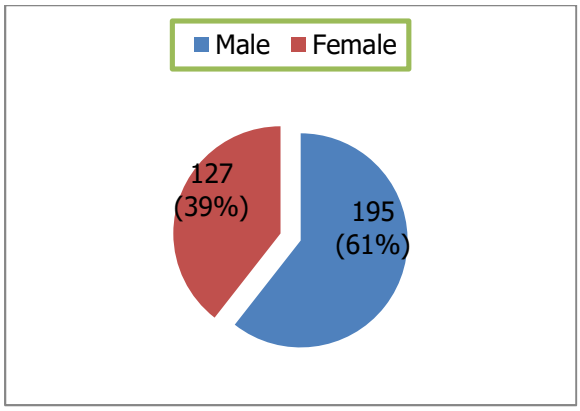

Figure 53:- Measles Distribution by sex in North Shewa Zone Oromia region Ethiopia 2013-2017 G.C

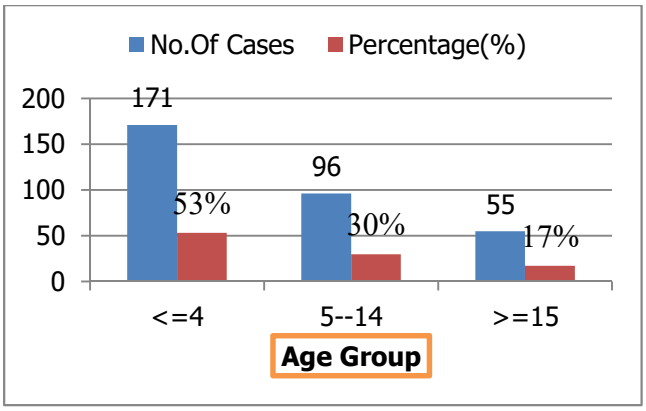

Figure 54:- Distribution of Measles cases by Age in North Shewa Zone, Oromia region, 2013-2017 G.C

Table 34: Distribution of Measles cases by Sex vs Age in North Shewa Zone, 2013-2017

Years	Age	Male Population	Male Incidence	Female Population	Female Incidence	Total Population	Incidences
	<4	114118	22	113663	13	227781	17.6
	5—14	216943	8	216077	4	433021	6
	>15	364564	1	363109	1	727673	0.8
2013		695625		692849	18	1388475	**5.2**
	<4	117323	18	116854	13	234177	15.4
	5—14	223035	6	222145	3	445180	6.3
	>15	374801	3	373305	2	748106	2.4
2014						1427463	**5.1**
	<4	120618	17	120136	11	240754	13.7
	5—14	229299	3	228384	4	457683	3.9
	>15	385328	2	383789	2	769117	1.8
2015						1467554	**4.4**
	<4	124003	23	123508	15	247511	19.4
	5—14	235734	6	234793	4	470528	4.9
	>15	396142	2	394561	1	790702	1.3
2016						1508741	**5.4**
	<4	127486	7	126977	4	254462	5.5
	5—14	242355	2	241388	2	483743	2.1
2017	>15	407268	1	405642	0.5	812910	0.9
						1,551,115	**2**

From a total of 322 measles cases (incidence of 22cases/100,000) and two deaths (CFR of 0.6%) were reported in all the Woredas of the analyzed zone. Only two deaths occur in Dera woreda (CFR of 3.4% in 2016) and no death reported in all Woreda in the period. The mean number of cases per year was 64 ranging from 31-81 cases reported. In Dera Woreda a total cases of 74(23%) followed by wachale Woreda 42(13%) and 3% cases occurs in Jida and Kimbibit Woredas independently. From 322 measles cases reported in the analysis period 73(22.7%) of them were reported in April followed by 44(13.7%) in May. There were declines of cases in the June, July and November. From 73 cases reported in April month 48(66%) of them were reported in April of 2016 in which outbreak occurred in different Woredas of the zone.

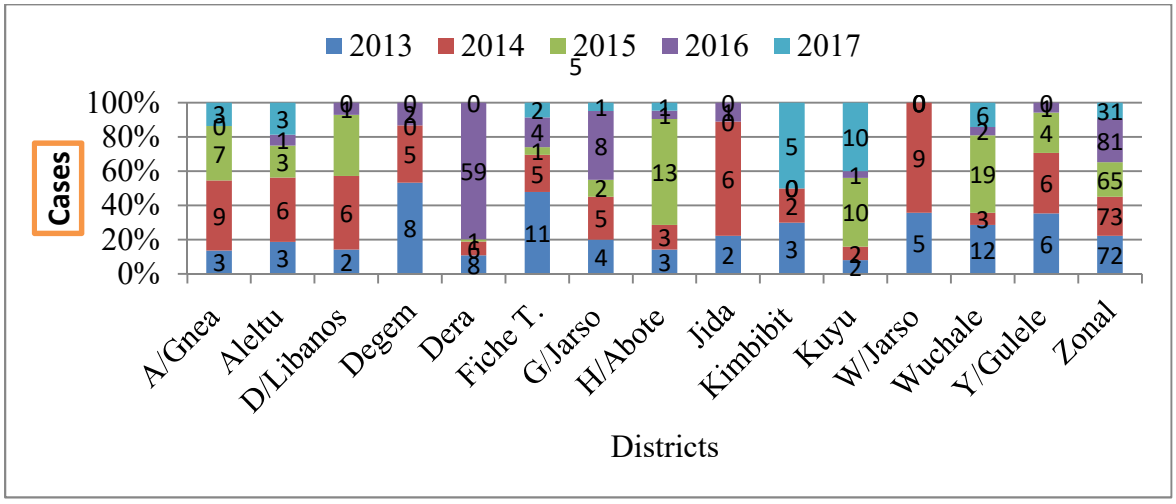

Figure 55:- Distributions of Measles cases by Woredas, North Shewa Zone, oromia from 2013-2017

The vaccination coverage's were rapidly increasing in the consecutive five years of analysis periods 42% to 91% as report indicates in the zone. Even though there were increments of the vaccination coverage in the five years; there were poor quality in accessing the targets children which indicated by outbreak occurrences in different Woredas in different periods.

5.4 Discussion

A seasonal occurrence and age specific distribution of measles cases were seen in all the Woredas of the zone. Additionally there were incremental of the measles vaccine in percentage coverage. From 322 reported measles cases to North shewa zone PHEM department in between 2013-2017 G.C 195(61%) of them were males and the ratio of male to females was 1.5:1 cases. This result was nearly similar with national measles surveillance data analysis conducted in Ethiopia from 2005 to 2009 and Italy, that show 51.9% and 53.1% of cases were male respectively. Additionally in January 2009, there was also an outbreak in Sidama zone/province with 236 reported suspected cases 49.6% were males in which males affected less than females.

From total cases 171(53%) of them were in age groups of less than or equal to 4 years age, 96(30%) of them were 5-14 years of age and the rest 55(17%) of them were in the age groups of greater than 15 years old, but in Italy the highest incidence was seen in the age group 15–19 years followed by the age group under one year. 62% of cases were aged 15–44 years which have age differences with North shewa zone. Additionally as study conducted in 1994 internationally female morbidity and mortality in age groups of 0-44 was prevalent throughout the world which is similar to north shewa analysis.

In 2013, total number of measles cases were 72(22%) with an incidence of 5.2/100,000 and the incidences among less than or equal to four years were 17.6/100,000. In 2014, total number of measles cases were 73(23%) with an incidence of 5.1/100,000 the incidences of among age less than or equal to four years were 15.4/100,000 with no death. In 2015, there were a decrement in occurrences of cases to 65(20%) with an incidence of 4.4/100,000 with no death. In 2016, since there were outbreak occurrences that result to a total 81(25%) with an incidences of 5.4/100,000 and increases in the incidences to 19.4/100,000 among less than or equal to 4 years of age with over all Case fatality rate of 2.5%. In 2017, there were radical decrement of cases to 31(10%) with incidences of 2.0/100,000. But, the

incidences were high as 5.5/100,000 in among less than or equal to four years age. This result was nearly similar with Borena Zone in which only two deaths occurs but incidences of higher than that of north Shewa Zone. The world wide the case fatality rate in 2001 to 2011 was less than 1/1000, 000 populations which is very low when compared to this findings. The case fatality rate were less than that of the country when compared to the expected case fatality rate of the Ethiopia which is in between 3% and 6% and highest in infants 6 to 11 months of age with malnourished infants at greatest risk.

All the Woreda of zone reports the cases with incidence varying from 7.9/100,000 to 59.4/100,000. The highest incidences were reported from Fitche Town (59.4/100,000) followed by followed by Wachale Woreda (34.6/100,000), but in Italy only twenty of 21 regions and autonomous provinces reported cases, with incidences varying from 0.2 per 100,000 population to 246.6 per 100,000 population which was very wide range. The highest incidence rates were reported from two very small regions in northern Italy which accounted for 31.8% of cases South Tyrol (population 507,657; incidence 246.6/100,000) and the neighboring autonomous provinces of Trento (population 529,457; incidence 98.2/100,000). Even though there were high in numbers the incidence in Italy when compared with north shewa zone; there were high incidences in north shewa when related with total population of the Woredas.

From total 322 measles cases reported in analysis period 73(22.7%) were reported in April months followed by 44(13.7%) in May month was different from study conducted as national in which increased number of measles cases reported from December to February.

Measles vaccination coverage was increased from 42% in 2013 to 90% in 2014, and increases by 5% and 2% in 2015 and 2016 respectively, but decrease from 97% in 2016 to 91% in 2017 and the cumulative measles vaccination coverage was 94% in five years which was less than that of Borena Zone which was 97%, but Which was similar with the national measles vaccine coverage increased from 42% in 2002 to 72.2% in 2008 and an increased number of reported cases was also observed from 2005 to 2008.

Measles case based and line list data's reports did not document and kept properly in the Woredas where outbreak occurs. Even though there were Outbreak occurrences in different Woredas; no body conducted the investigation and respond to the outbreak.

There was data discrepancy in between number of measles reported and samples sent for confirmation in 2013 which indicates sample sent to EPHI was higher than the total reported cases from the zone to regional health bureau. No documented data about measles samples referral and feedback result from national referral laboratory or EPHI in the zone.

5.5 Conclusion

The highest cases of measles occurs in children ages of less than five years which indicated low coverage MCV or compromised quality of immunization in the Zone, making public health problem of the zone. In general there was a weak system in data documentation as well as responses to outbreak. Blood samples sent to the referral laboratory without any informing of responsible office by health facilities workers and weak follow up of the feedback.

Since there were high proportions of Measles cases occurred in children of less than four years of age, maternal and child health department should strengthened routine and SIAs Measles vaccination with regular cold chain management in order to reach unvaccinated children in the zone. Additionally mass campaign need to target those less than or equal to four years. Regional health Bureau should conduct technical supportive supervisions PHEM activities performance and facilitate programmatic logistic and budget support for Zonal health departments. Measles case based data and line list data's reports should be documented and kept properly. Outbreak investigation must conduct during its occurrences for immediate responses for all stake holders and reports must be kept documented. All health workers referring samples to EPHI for confirmation must follow and accept the laboratory results of sent samples on time

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CHAPTER 6: ABSTRACTS FOR SCIENTIFIC PRESENTATION

6.1 Measles Outbreak investigation in Babile Woreda, East Hararge Zone, Oromia Region, Ethiopia-February, 2019

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Abstract

Introduction: Measles is a vaccine preventable and contagious outbreak-prone viral disease characterized by maculopapular rash. Globally, 128,170 suspected and 20,582 confirmed measles cases were reported in 2018. In Ethiopia, 547 confirmed measles cases were reported in the same year. We investigated measles outbreak to describe cases and determine potential risk factors.

Methods: We conducted measles outbreak investigation from November 24 – December 12, 2018 among internally displaced population and two rural kebeles of Babile Woreda. We used national standard case definition, described line list of cases and questionnaires. Unmatched case control study design was used with 1:2 cases to control ratio. We described the outbreak by descriptive epidemiology followed by unmatched case-control study. Epi Info version 7.2.0.1 and SPSS were used for bivariate and multivariate analysis.

Result: The Outbreak was started on October 28, 2018 reaching its peak on November 25, 2018 and controlled on December 5, 2018. We identified A total of 55 cases (Mean age 4.4 years; SD 5.08) and 31(56%) were males. All cases and 110 controls were recruited to investigation. The attack rate and case fatality rate were 56/100,000 and 7.3% respectively. Total of 50(90%) of them were unvaccinated against measles antigen. Forty (73%) reported in under 5 children with case fatality rate of 4(10%). Five blood samples were sent to Ethiopian public Health institute for confirmation and all of them were positive. Based on case control finding: we identified that Being unvaccinated against measles antigen AOR (8) 95% CI (0.05, 0.11) and Malnourished AOR (4.2) 95% CI (1.9-12) were significantly associated with the outbreak

Conclusion The outbreak was associated with unvaccination status and malnourished. There were high cases fatality rate in under five children; more than one third of the cases didn't receive measles containing vaccine (MCV1).

Recommendations: We recommend to the Woreda health office to enhance the routine vaccination coverage, improve earlier measles cases identification for management and early screening and treatment of malnourished children.

Key Words: Case control, Measles, Outbreak, Oromia, Risk factors

6.2 Measles Surveillance Data Analysis, North Shewa Zone, Oromia Region

Title: Five Years Measles Surveillance Data Analysis, North Shewa Zone, Oromia Region, Ethiopia, 2018.

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Abstract

Background: Measles is a Vaccine preventable viral infectious disease that characterized by fever, cough, coryza, and conjunctivitis. Five years measles data were analyzed to identify morbidity and mortality trends in North Shewa Zone, Oromia Region. There were numbers of measles cases reported every year of analysis. The study was conducted to analyze the magnitude and epidemiology of measles cases to understand its risks and propose recommendation.

Methods: We conducted retrospective cross sectional descriptive study from 2013-2017 by reviewing measles data line list and case based registration of North Shewa Zone Woredas, from March 10 -15, 2018. We analyze measles data by place, time and persons. We compare the results by different situation in between each Woreda of the zone.

Result: we identified a cases of 322 reported to North shewa Zonal PHEM department in between 2013-2017 G.C. From total cases 195(61%) of them were males. Out of reported cases 171(53%) of them belongs to less than or equal to four years age. A total of 165(57.1%) of them were laboratory confirmed. The incidences of the measles were 22cases/100,000 with two deaths (CFR of 0.6%). Measles vaccination coverage was increased from 42% to 91% in the 2013 to 2017 period and average measles vaccination coverage was 94% during five years in the Zone.

Conclusion and recommendation: Children under five years were highly affected by the outbreak. As a result strengthening of routine immunization and mass campaign need to target for all children less than five years of age with regular cold chain management of the vaccine.

CHAPTER 7: NARRATIVE SUMMARY OF DISASTER SITUATION, 2018

7.1 Disaster Management Report on Landslides in North Shewa Zone Oromia Region

7.1 Introduction

7.1.1 Background

Disasters were an event, typically occurring suddenly, that causes damage, ecological disruption, loss of human life, deterioration of health and health services, and which exceeds the capacity of the affected community on a scale sufficient to require outside assistance). It is an emergency of such severity and magnitude that the resultant combination of deaths, injuries, illness, and property damage cannot be effectively managed with routine procedures or resources. Disaster is further defined as an event in which a society or a community undergoes acute deprivation of food and other basic necessities due to natural and manmade calamities to such an extent that the normal function of the society or the community is disrupted and that it cannot subsist without outside intervention. Disasters are classified into different types based on the cause of the hazard as natural, human-induced and Complex.(1,2)

1. **Natural disasters** – ecological disruptions such as hydro meteorological or geophysical phenomena
2. **Technological or human induced** (i.e., of human origin) – result either directly or indirectly from human activities that disrupt the ecosystem or relate to technological activities of human origin
3. **Complex** –the combination of natural and human-induced hazards and other causes of vulnerability

Landslide is a types of natural disasters in which the movement of a mass of rock, debris, or earth down a slope due to gravity or other reasons. Due to land slide materials may move by falling, toppling, sliding, spreading, or flowing. It can results in fatalities, injuries, destruction of houses, infrastructures, as well as loss of productive land. Destructive lands slide are triggered by prolonged or heavy rain fall as well as other hazards like earthquakes, snowmelt, changes in water level, stream erosion, changes in ground water, flooding, volcanic eruption, different construction , and other human activities or by any combination of these factors. (3)

Landslides can move slowly, (millimeters per year) or can move quickly, as in the case with debris flows. Debris flows can travel down a hillside at speeds commonly, 30 – 50 miles per hour but sometimes can reach up to 200 miles per hour depending on the slope angle, water

content, volume of debris, and type of earth and debris in the flow. These flows are initiated by heavy periods of rainfall, and sometimes can happen as a result of short bursts of concentrated rainfall or other factors in susceptible areas. Burned areas charred by wildfires are particularly susceptible to debris flows, given certain soil characteristics and slope conditions.
In many parts of the world, landslides are a frequent natural hazard and a major threat to humans and the environment. According to the International Disaster Database of the Centre for Research on the Epidemiology of Disasters (CRED) (EM-DAT) 2, since 1900, 130,000 persons have lost their lives because of landslides and flash floods, and the economic losses amounted to over US$ 50 billion. In the period from 2000 to 2014, the corresponding figures were around 26,000 deaths and US$ 40 billion in losses.(3) The actual figures are, however, much higher. In the CRED-EM database, the losses due to earthquake-triggered landslides are attributed to earthquakes, and many landslide events with no casualties, but significant material losses are not reported. For example, 20-25% of the 87,000 casualties (69,000 confirmed killed and 18,000 missing) caused by the Sichuan (or Wenchuan) Earthquake of 12 May 2008 were the result of the landslides triggered by that event. Recent catastrophic landslides in Afghanistan, United States, the Philippines and India illustrate that landslides are still a major threat in developed as well as developing countries. The volume of soil and rock mobilized in a landslide can vary from a small individual boulder to millions, and in rare cases billions, of cubic meters. Generally, the potential destructiveness of a landslide is a function of the volume of the masses that are mobilized, and their velocity. But even a single boulder can cause several fatalities.(1,3)
Landslides in the United States occur in all 50 States. The primary regions of landslide occurrence and potential are the coastal and mountainous areas of California, Oregon, and Washington, the States comprising the intermountain west, and the mountainous and hilly regions of the Eastern United States. Alaska and Hawaii also experience all types of landslides. Landslides are a serious geologic hazard. It is estimated that in the United States they cause in excess of $1 billion in damages and from about 25 to 50 deaths each year. Globally, landslides cause billions of dollars in damages and thousands of deaths and injuries each year. (2,3)
In Africa many populations in countries throughout the continent have suffered different types of hazards, which have killed thousands and caused many injuries to others. The flood in Algeria in 2001 killed around 900 people and adversely affected approximately 45,000 populations. In eastern Africa in 2002, heavy rain brought floods and mudslides that forced people to evacuate

their homes in Tanzania, Uganda, Kenya, Burundi and Rwanda. In 2001, Ghana experienced torrential rain, which caused widespread floods in the capital city, Accra and more than 100,000 homes were destroyed.(4,5)

In southern Ethiopia heavy rain causes landslides which result in around 32 people death as reported by government communication office. Additionally the Government Communication Affairs Office (GCAO) said nine people died in the Gamo Gofa zone, with 17 injured.(2,5)

Reported flash flood incidences since the second week of April 2018 have left hundreds of thousands of people in need of immediate humanitarian support in Afar (Awsi), Oromia (Arsi, East Shewa, East and West Hararge zones) and Somali (7 zones) regions. Areas affected by recurring floods have been advocating for enhanced flood early warning, mitigation and preparedness mechanisms. (2,6)

In Somali region, more than 27,000 flood-affected households (165,000 persons) need urgent food, water, health services. Overflow of Genale and Wabi Shebelle rivers and related tributaries due to recent heavy rains in the region and the highlands of Oromia has affected more than 83 kebeles in 19 Woredas of Afder, Fafan, Liben, Nogob, Siti, Shebele and warder Zones. (2,5)

The flooding in Somali region has affected 43,887 households (263,322 people), of which, 25,238 households/151,428 people were displaced and also destroyed 12,911 hectares of farmland and damaged 76 health facilities, mostly health posts. 123 schools were affected, interrupting schooling which results in immediate need of supports.

Landslides caused by heavy rains on 26 May 2018 were killed 22 people in Tullu Gola kebele of Nansebu woreda in West Arsi zone, Oromia region. At least seven injured people were hospitalized. The landslide displaced 53 people (11 households), who require immediate food, shelter and non-food item support. [L]andslides caused by heavy rains on 27 May killed at least 23 people in Sidama zone and nine people in Gamo Gofa zone of the Southern Nations Nationalities and Peoples (SNNP) region. At least 23 people were injured...More than 50,000 households were displaced due to flooding nationwide in 2018. (2,7)

7.2 Objectives

7.2.1 General objective

❖ To assess the magnitude of the land slide and identify areas where emergency health and nutrition assistance needed to prevent from further damage,2018

7.2.2 Specific objectives

✓ To evaluate the magnitude of the land slide in each Woredas

✓ to determine the gap in the capacity of the health system in addressing anticipated risks

✓ To take public health action and prevent the community from further damages

✓ To recommend the Woreda and zonal administration regarding the disasters.

7.3 Methods

7.3.1 Study area

Purposively due to the occurrence of land slide during the summer period in the Woredas; the woreda was selected for the disaster managements. The selected Woredas accounts 365,985(23%) of zonal populations and 55(21%) kebeles.

Figure 56:- Administrative map of woredas for Disaster Managements, North Shewa Zone, Oromia Region, September 2018 G.C

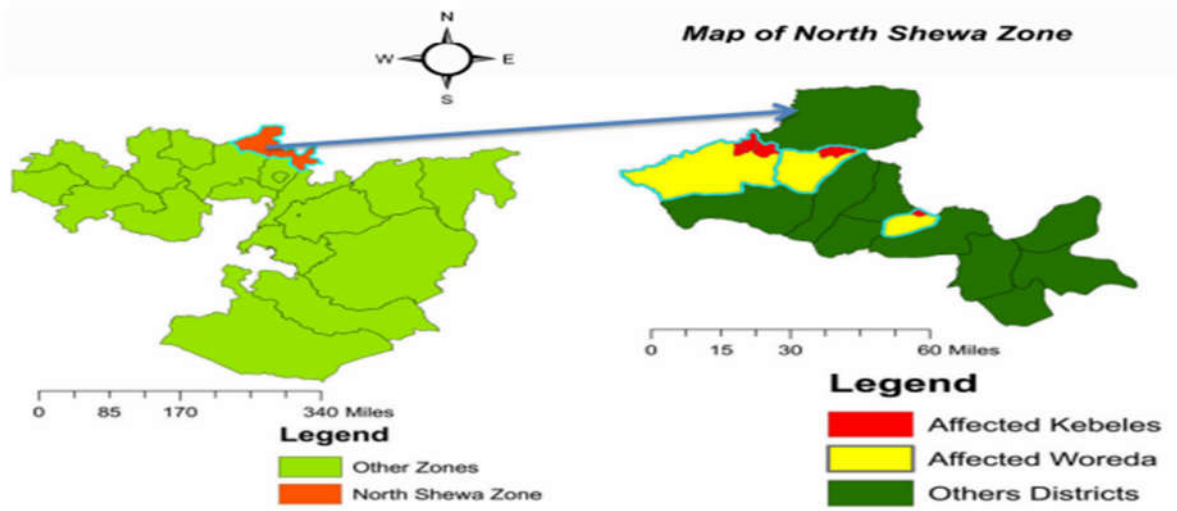

Figure 57:- Administrative map of woredas for Disaster Managements, North Shewa Zone, Oromia Region, September 2018 G.C

7.3.2 Study Design and Period

We conducted a cross-sectional descriptive study of affected Woredas of North Shewa Zone from 26/9-15/10/2018 G.C

7.3.3 Study Subjects

Communities of the affected Kebeles

7.3.4 Sample Size and Sampling technique:

Since the total house hold affected in the three Woredas of the zone were 199 by landslides: we collect information from all the house hold by making meeting with all the population.

7.3.5 Data collection technique

Data was collected by using prepared questionnaires and observing the affected sites with zonal emergency preparedness office as well as committee and the community representative to see the magnitudes of landslides. During this assessments seven government sectors (Education, Agricultures, Water minerals and energy, rural land, health, Zonal administration, Animal health,) participates to help the community.

7.3.6 Data analysis:

Collected data was entered and analyzed by using the Microsoft Office Excel

7.3.7 Data dissemination

Before, during and after the assessments of the landslides we communicate with all stake holders and officials with zonal, Woredas' and kebele administration. After the completion of the assessment written report of both hard and soft copies were prepared, presented and shared to all team members, sectors that participate on the assessments, as well as for zonal health departments, Oromia regional health bureau, and AAU CHS School of public health Ethiopia Field Epidemiology Training Program mentor and resident advisors.

7.4 Findings

Meeting

During assessment of land slide; we conducted a brief meeting with different stake holders Head of Zonal administration, Head of zonal and Woredas of all sectors included in the assessments, Community leaders, Local old man, religious leaders and different volunteers.

Over view of the landslides

The landslide occurs in different kebele's of five Woredas North Shewa zone of Wara jarso, Hidabu Abote, Debra Libanos, Kuyu and Aleltu. It occurs severely in three kebeles of Wara Jarso, One Kebele of Hidabu Abote and one Kebele of Debra Libanos. In all three Woredas the affected kebeles were located in the low land area that share boundaries with similar river called Jema which enters to Abay River. Populations living in these five kebeles were at risk of

landslide in the area. These landslides affect a total of 199 households and 955 populations in all the five listed kebeles. A total of 16,783 under 15 population and 1,129 above 65 populations were found in the five affected kebeles.

Table 35:- Lists of Woredas with their respective affected kebeles in North shewa zone, oromia, 2018 G.C

Sr. No	Name of Woreda	Name of Kebele	Total HH in kebele	Total Population	Affected HH	affected Population	<15 years	> 65 Years
1	Wara Jarso	Girmi Goba	989	4747	55	264	2260	152
		Dambaza Wale	1561	7493	15	72	3567	240
		Bistino Dara	1349	6475	15	72	3082	207
2	Hidabu Abote	Ade'a Nacho	1417	6802	25	120	3238	218
3	Debra Libanos	Addisalem	2029	9739	89	427	4636	312
Total		5	7345	35256	199	955	16783	1129

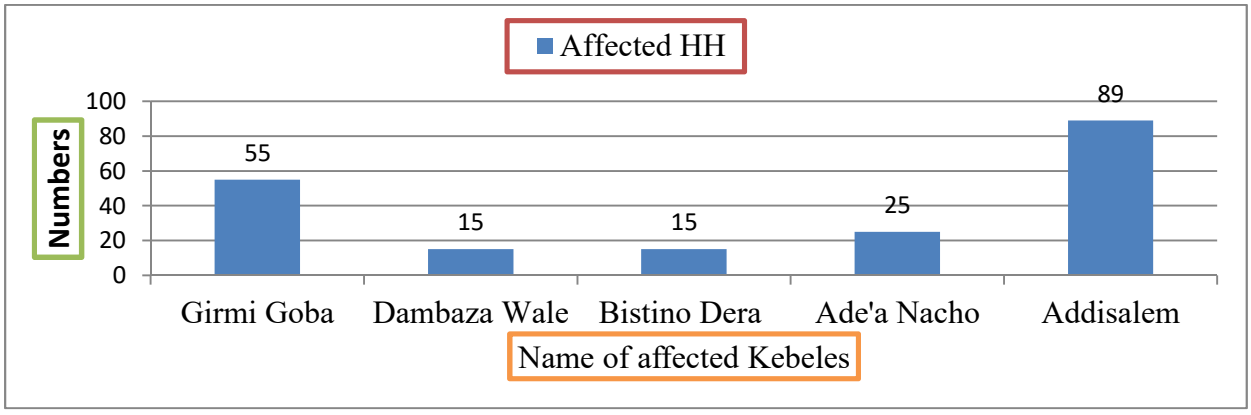

Figure 58:-Total affected Households by landslides in the Woredas of North Shewa zone, oromia, 2018 G.C

We identified a total of 140 hectare agricultural land with an estimated cereal of 2500 kg was destroyed in the affected three woreda. Additionally, a total of 65 cattle (Domestic animal) was affected. (Table 40)

Table 36: Total Agricultural land, Cereal and Cattle affected in three woreda of North Shewa Zone oromia region Ethiopia, 2018

Name of Woreda	Name of Kebele	Agriculture land affected in Hectare	Cereal by kg	Cattle
Wara Jarso	Girmi Goba	135	2025	70
	Dambaza Wale	125	1875	50
	Bistino Dera	114	1710	30
Hidabu Abote	Ade'a Nacho	50	890	42
Debra Libanos	Addisalem	140	2500	65

Table 37: Top five causes of morbidity by age group in the affected Woredas of North Shewa Zone Oromia Region from 26/9-06/10/2018 G.C.

S/No	Under 5 years	5 years and Above
1	Pneumonia	Malaria
2	Diarrheal disease	AFI
3	Helmenthiasis	Typhoid fever
4	Malaria	Trauma/injury
5	Acute febrile illness (AFI)	UTI

Major Epidemic prone diseases

In all assessed Woredas, No cases and death of measles were reported, but in all assessed Woreda malaria are endemic and a total of 434 malaria cases and zero deaths were reported. High numbers of malaria cases were reported from Hidabu Abote Woreda followed by Wera Jarso Woreda during observation period. A total of 6 Measles cases with zero death were reported from three Woredas and two of the Woredas sent blood samples for confirmation to EPHI and the result was negative for IgM.

Outbreaks

In all assessed Woredas there was no outbreak occurred.

Preparedness

As the Woreda health office supply chain system reviewed none of the Woredas have enough drugs and supply stocks on their stocks for any emergency responses. Specifically there were

Shortage of emergency drugs and medical supplies such as for measles complication, Nutrition, and malaria in all assessed Woredas as well as zonal level.

Regarding budget allocation for emergency rapid response, no line for budget allocation in health office for emergency responses, but all Woredas use another budget for the purpose of emergency cases. At zonal level and Woredas levels the emergency preparedness plan sectors coordinate all stake holders with respective health office to respond in the emergence cases. Emergency preparedness plan allocated 50,000 birr for the response of the land slide that happens in the three Woredas.

Table 38: Preparedness; by drugs and medical supplies for three affected Woredas in North Shewa Zone Oromia Region 2018 G.C.

Drugs and medical supplies	**Total requirement**	**Available**	**Gap**
Drugs			
Coartem	538 does	250 dose	288 dose
Artesunate (rectal)	100 does	0	100 does
Artesunate (Inj)	110	0	110 dose
Artemether IM	431	0	431dose
Quinine (PO)	6 tin	0	6tin
Quinine (IV)	2box	0	2 box
Chloroquine	7 box	0	7 box
Ceftriaxione	561 vial	0	561 vial
Doxcycline	83 Pk	0	83 Pk
Supplies			
RDT (Malaria)	32 box	10box	22 box
CTC Kit (AWD)	6	3	3
Medical supplies			
Syringe	6 carton	3	3 carton
PPE			
Clinical Delivery Assistance kit PART	7	0	7
A: Reusable Equipment			
Mgt. of Complications of Abortion kit	5	0	5

Malaria

All assessed Woredas malaria was an endemic Disease. A total of 18,715, 9739, and 6802 populations were identified as risk in Wera Jarso, Debra Libanos, and Hidabu Abote Respectively. In all assessed Woredas ITNs distribution was above 80% but, utilization was less than 75% and IRS coverage was above 90%. Malaria is the anticipated risk for epidemic to occur due to low utilization coverage of IRS.

Timeliness and Completeness

Timeliness and completeness of reports was one of the disease surveillance indicators used for early detection of disease and timely response. In all Woredas the completeness and timeliness were above the target (80%).

Risk factor

As assessment conducted in all the three Woredas of landslides shortage of water, food and shelter was risk factor for the occurrences of AWD, Malaria, Measles and Malnutrition. .

Table 39: Total Displaced population and Different cases reported in displaced kebeles, of North shewa Oromia, 2018 G.C.

Woreda	Total Population	Measles	Malaria	Malnutrition
Wera jarso	18,715	3	176	42
Hidabu Abote	6802	2	255	19
Debra Libanos	9739	1	3	8
Total	35,256	6	434	69

Measles

There was no ongoing suspected measles outbreak in all the assessed Woredas. Routine measles vaccination was conducted in all assessed Woredas and the coverage of all affected kebeles was more than 95%. In all assessed Woredas measles guideline was distributed to all health facility and health workers were trained on measles.

Malnutrition

Even though there were no high numbers malnutrition problem in all the assessed Woredas displaced population makes the situation favorable for the occurrences of malnutrition. All the health facilities in the assessed Woredas were ready for OTP and SC services. As a result a total of 15 SC and 55 OTP sites were identified for malnutrition purposes.

Table 40: Numbers of malnutrition report affected Woredas of North Shewa Zone oromia, 2018 G.C.

Woredas Name	Malnutrition	
	OTP	SC
Wera Jarso	25	7
Hidabu Abote	20	6
Debra Libanos	10	2
Total	55	15

7.4.1 Wara Jarso

It was one of the north Shewa zonal administration Woredas found in the northern parts of zone and share boundaries with Abbey revers a direction where landslides happens. It has a total population of 191,392 and was the second populated Woredas from north shewa zone next to Dara Woreda. It has 25 Health Posts, seven Health Centers, and five private clinics. Three kebels namely Girmi Goba, Dambaza Wale and Bisino Dera were the affected kebeles. The affected kebeles were located at latitude N $0^0$02'.02.494'', longitude E 038^0.9$^{'}$.380'' and altitude 2295m In all these kebeles a total of 85 and 408 households and population were total affected respectively by landslide. A total 374 hectares of agricultural land, 150 cattle's and an estimated 5610 Kg of cereals were affected. Even though the lands were highly affected there is no any death of either human or animals were not occurred. Immediately after the occurrences of the landslides all community those lives in these areas evacuated to the schools to prevent live loss.

Figure 59:- Land, House, and crops affected by landslides in Wara Jarso Kebeles North Shewa Zone, Oromia, 2018 G.C.

7.4.2 Hidabu Abote

It was one of the north Shewa zonal administration Woredas found in the north east parts of zone and share boundaries with Jema revers a direction where landslides happens. It has a total population of 112,358. It has 20 Health Posts, six Health Centers, and six private clinics. Even though there were many affected kebeles, only Ade'a Nacho kebele was highly affected. The affected kebele was located at latitude N10^{0}01.465', longitude E 038^{0}34.314',and altitude 1737M. In this kebele from a total of 1417 households 25 of them were affected and from 6802 total population 120 of them were displaced from their home. A total 50 hectares of agricultural land, 42 cattle's and an estimated 890 Kg of cereals were affected. Even though the lands were highly affected there is no any death of either human or animals in the kebele by the landslide. Immediately after the occurrences of the landslides all community those lives in these areas evacuated to the schools to prevent live loss.

7.4.3 Debra Libanos

It was one of the north Shewa zonal administration Woredas that share boundaries with Amhara Regional states in the eastern parts. It has a total population of 62,235 and 2029 households found. It has 10 Health Posts, two Health Centers, and three private clinics. Although there were two affected kebeles only Addisalem was highly affected. The affected kebeles were located at latitude N 09^{0}44.347' longitude E 038^{0}50.275' and altitude 2132M. In this kebele a total of 89 and 427 households and population were affected respectively by landslide. A total 140 hectares of agricultural land, 65 cattle's and an estimated 2500 Kg of cereals were affected. Even though the land was highly affected there is no any death of either human or animals. Immediately after the occurrences of the landslides all community those lives in these areas evacuated to the schools to prevent live loss.

7.5 Discussion

As the assessment results shows there were no NGOs responding to the land slides in all the three Woredas. Low attention given by all governmental and non-governmental organization for all the affected kebeles that indicated by not allocating budget for the emergency purposes. All the affected community stays in the school in each area.

The zonal emergence preparedness Response office was leading the land slide assessment responses a team composed of seven sectors and oromia regional health Bureau EFETP resident (Education, Agricultures, Water minerals and energy, rural land, health, Zonal administration,

and Animal health). The assessment was conducted from May 26 to June 15, 2018 G.C

We assessed five affected kebeles in three Woredas of the north shewa zone oromia regional state. In all the assessed Woredas including zonal level even though have multi-sectorial coordination forum has no schedule meeting. In assessed Zone and Woredas there were no epidemic preparedness plan and did not allocated budget for anticipated emergency. Anticipated diseases that have potential to cause outbreaks were measles, AWD and malaria. In the assessed Woredas ITNs distribution was above 80% but, utilization was less than 75% and IRS coverage was above 90%. Malaria is the anticipated risk for epidemic to occur due to low utilization of ITNs and low coverage of IRS. No Safe drinking water supply in all assessed kebeles and need attention.

As the community members told to the assessing team members there were different primary triggering factors of landslides such as:-River erosions, Weakening of rock and soil slope proprieties through water saturation by heavy rains, Stresses, strains and excess of pore pressures induced by the inertial forces during summer season, and Changes of the natural topography of land caused by human activity. After the assessments of these disasters communication and feedback had been given for zonal governor, all responsible political administrations' and different stake holders to give immediate helps for the community in case of health, education, food, shelters and others community needs.

7.6 Conclusion

Even though there were differences in occurred landslides in different kebeles of north shewa Woredas; all population must got immediate responses' from all stake holders and governments' officials starting from kebeles administration to oromia regional states. Since these all areas were highly affected that cannot used for futures for living of the farmers, do not serve as either agricultural lands or grass lands. Especially those Wara Jarso Woredas kebeles were highly affected followed by Hidabu Abote Woredas' kebele. Malaria and measles are the anticipated risk for epidemic to occur.

7.7 Recommendation

Since the community those displaced by these landslides were highly affected in different way; the situation needs great attentions by all concerned bodies. The Local government should facilitate the evacuation of the people from the area before any life lost. Additionally, it need long and short action plan to prevent any life lost

- Multi-sectorial preparedness and response planning should timely conducted
- Effective and efficient resource allocating, and mobilization, should be performed timely
- Joint and coordinated cloth follow up should Conducted at each level of governmental body for immediate interventions
- Appropriate budget should be allocated for identified emergency situations
- Strengthening the Multi sectorial PHEM coordination forum at all level
- Strengthening routine EPI for affected community to prevent measles outbreak
- Improving the water supply coverage and supplementary food
- Timely ITNs should be distributed for kebeles level and increase understanding of the community on utilization

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CHAPTER 8: PROTOCOL FOR EPIDEMIOLOGIC RESEARCH PROJECT

8.1 Prevalence of MDR-TB and Treatment Outcome among Tuberculosis Patients Attending at Fitche General Hospital Oromia, Ethiopia

Abstract

Background: MDR-TB is a types of drug-resistant TB in which *Mycobacterium tuberculosis* patients cannot treated by the two most potent antibiotics. There is only few study conducted on MDRTB prevalence in Ethiopia and no study conducted in the selected area. We will assess prevalence of MDR TB among TB patients in Fitche General Hospital from March to September, 2019.

Methods: We will conducted health facility based cross sectional study design. We will take study population all confirmed patients with Multidrug resistant Tuberculosis (MDR-TB) who ever enrolled in the Treatment Initiation Centers (TIC) from December 4, 2014 to end of December 2018. We calculated the sample size using a single population proportion formula and include 138 participants to the study. Calculated sample size will be selected by systematic random sampling method and secondary data will be collected from TB registration book in the hospital. Prepared check list will be used for data collection and pretest of the questionaries' will be done before applying to the main study subjects. Data will enter in to epi info version 7.1 software and analyses will be made. We will assess prevalence of MDR TB with demographic characteristics (age, sex, treatment outcome) using chi-squared ($x2$). We will calculate frequencies. Based on the result, the study will come up with feasible recommendations that could be utilized at all levels and finally analyzed data will present by tables, chart, and graphs. The project will cost estimated 60,337 Ethiopian birr.

Discussion: This study will increase knowledge on MDRTB prevalence in the Hospital. So it is important to study prevalence of MDR-TB and its treatment outcomes among tuberculosis patients to prevent not to transmit to others and situation of the disease in the area. Such study do not conducted before in the area; it would give new in sighted for the Hospital and organizations that are working on TB prevention and control. Additionally, the study can initiate further research for TB and MDR TB prevention and control.

Keywords: MDRTB, Cross sectional, Oromia

8.1 Introduction

8.1.1 Back ground of the study

MDR-TB is a types of drug-resistant TB in which *Mycobacterium tuberculosis* patients cannot treated by the two most potent antibiotics commonly used to cure TB, isoniazid and rifampicin. These drugs are used to treat all persons with TB disease. Most anti-TB medicines have been used for decades, and resistance to them is widespread. (1,2)

Rifampicin-resistant tuberculosis is caused by bacteria that do not respond to rifampicin, one of the most powerful anti-TB drugs. These patients require MDR-TB treatment. Patients with rifampicin-resistant or multidrug-resistant tuberculosis (MDR/RR-TB) require treatment with second-line treatment regimens, which are more complex than those used to treat patients without drug-resistant TB. When the individuals infected with resistant strains of *M.* tuberculosis are not treated appropriately, resistant strains will continue to spread in the community, increasing the epidemic of MDR TB.(1,3)

Multidrug-resistant tuberculosis (MDR-TB) has become an increasing threat to the global control of tuberculosis, as it complicates the management and control of the disease. Since the diagnosis of MDR TB remains a challenge for laboratory systems in developing countries like Ethiopia. Capacity to diagnose drug resistant tuberculosis is limited in most places even though it is highly needed. Only a few of the suspected MDR TB patients receive a laboratory test to confirm their disease. Adequate capacity to diagnose all cases of drug resistant tuberculosis is essential to make further progress in global tuberculosis care and control.(4)

The impact of MDR-TB is especially serious in low-economic country like Ethiopia, where health facilities, infrastructures, finances, and the skilled man power required for diagnosis and management are limited. Additionally, MDR TB highly affects illiterate, reproductive age, immune-compromised individuals, and low economic groups. It occurs due to human errors like improper management of drug supply, absences of treatment guide line, poor adherence, poor infection control practice, poor storage conditions, wrong dose or combination, poor management, lack of information, lack of monitoring treatment, inadequate implementation of DOTS strategy.(2,3)

The latest anti-TB drug resistance surveillance data show that 4.1% of new and 19% of previously treated TB cases in the world is estimated to have rifampicin- or multidrug-resistant tuberculosis (MDR/RR-TB).(1,5)

In 2016 An estimated 490,000 new MDR-TB cases and 110,000 rifampicin-resistant TB (RR-TB) cases emerged in 2016. MDR/RR-TB was responsible for an estimated 240,000 deaths in the same year.Most cases and deaths occurred in Asia. In spite of increased testing, the number of MDR/RR-TB cases detected in 2016 reached only 153 000. In 2016, 8 000 patients with extensively drug-resistant TB (XDR-TB) were reported worldwide. Around 123 countries have reported at least one XDR-TB case. About 6.2% of MDR-TB cases seen in 2016 had additional drug resistance, which means that they may have had extensively drug resistant TB (XDR TB).(1,6)

Data on drug resistance have now been collected and analyzed from 160 countries worldwide (from which 82% of the 194 WHO Member States), which collectively have more than 97% of the world's population and TB cases. This includes 90 countries with continuous surveillance systems based on routine diagnostic DST of TB patients, and 70 countries that rely on representative patient. Surveys conducted about every 5 years represent the most common approach to investigating the burden of drug resistance in resource-limited settings where routine DST is not accessible to all TB patients. Among the 40 countries with high burden of TB or MDR-TB, 37 now have had at least one direct measurement of resistance to rifampicin and other anti-TB drugs (Angola, Congo and Liberia have yet to undertake such surveys).(3,7)

Globally 30 countries concentrate about 90% of the disease burden of MDR/RR-TB. These countries are defined as the top 20 countries in terms of estimated numbers of incident MDR-TB and the top 10 by estimated MDR-TB incidence rate per population in 2014 (above a threshold of 1,000 estimated incident MDR-TB cases that year).(7)

Globally in 2016 around 490,000 people are estimated to have become ill with MDR-TB and a total estimated of 110,000 people had rifampicin resistant TB. As a general people estimated to have had MDR-TB or RR-TB in 2016 was 600,000. 47% of the cases were from India, China or the Russian Federation. MDR-TB accounts for about 4.1% of new TB cases. About 19% of previously treated TB cases were estimated to have either rifampicin or multi drug resistant TB.(8,9)

In 2014 and 2015 there were 9.7% and 9.5 cases off MDR-TB occurrences globally whereas there were only about 6.2% of MDR-TB cases in 2016. The death occurs from MDR-TB and RR-TB in 2015 and 2016 were similar and estimated to be approximately 240,000 deaths separately.(9,10)

Even though they did not diagnosed fully there were an estimated of 2 million undiagnosed drug resistant infection in children. It is considered by some people that this may be as high as 2 million children. Of the estimated 850,000 children that developed TB in 2014, 25,000 probably had MDR TB.(9)

South East Asia was the leading by constituting of 2,898,482 followed by Africa continent by MDR- TB cases that account around 1,303,483 cases in 2016. We estimated that 850 000 children developed tuberculosis in 2014; 58 000 with isoniazid-monoresistant tuberculosis, 25 000 with MDR tuberculosis, and 1200 with XDR tuberculosis. We estimate 67 million children are infected with *M tuberculosis*; 5 million with isoniazid monoresistance, 2 million with MDR, and 100 000 with XDR. Africa and Southeast Asia have the highest numbers of children with tuberculosis, but the WHO Eastern Mediterranean region, European region, and Western Pacific region also contribute substantially to the burden of drug-resistant tuberculosis because of their much higher proportions of resistance.(11)

A total of 129,689 patients were enrolled on MDR-TB treatment in 2016 (up from 125,629 cases in 2015). However, this represents only about 22% of the estimated total number of cases (600,000) in 2016. Ten countries accounted for about 75% of the gap between enrollment in treatment and the estimated number of cases. China and India accounted for about 39% of the total gap.(12)

In addition this total of 129,689 patients starting treatment was not even the total number of patients notified (153,119) in 2016. The numbers notified exceeded 90% in 14 high MDR-TB burden countries and the WHO European Region and the Region of the Americas. However it was much lower in the WHO African and Western Pacific Regions. Enrollments represented less than 60% of the number of notified cases in two high burden countries in 2016, China (50%) and South Africa (59%).

The latest data reported to WHO shows a treatment success rate for MDR-TB of only 54% for patients starting treatment in 2014. In 8% of patients the treatment failed, 16% died, 15% were lost to follow-up and 7% had no outcome information. This data is obtained by countries having groups of people (known as cohorts) who started treatment at a particular time and who are then followed for a number of years.

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Ethiopia was one of the 22 high-burden countries that account for about 80% of the world's TB cases. According to the Global TB report of 2013, there were an estimated cases of 230,000 (247 per 100,000 populations) incident cases of TB in Ethiopia in 2012. According to the same report the prevalence of TB was estimated to be 310,000 (224 per 100,000 populations). There were an estimated 16,000 deaths (18 per 100,000) due to TB, without HIV related deaths in Ethiopia during the same period.(14)

Cases of all forms of TB increased significantly in Ethiopia from just over 73,000 in 1991 (E.C) to a peak of just over 159,000 in 2003 E.C. The proportion of pulmonary TB cases detected is only 60-65% while that of extra-pulmonary TB cases is 35-40%.(14)

Among the pulmonary TB cases, the number of smear negative cases is more than the smear positive pulmonary TB cases. The national prevalence survey conducted in 2010/11 showed that smear positive cases accounted for only 43% of culture positive cases. This indicates the need for more sensitive and specific diagnostics for improving the diagnosis of smear negative TB cases.(15)

Ethiopia is one of the 27 high DR-TB burden countries globally and stands third among African countries with annual estimates of 2100 DR-TB cases among annually notified TB cases. The result of the second round National TB Drugs resistant survey conducted from 2011-14 showed MDR-TB prevalence of 2.3% and 17.8% among New and previously treated TB cases respectively. Cumulative prevalence of MDR TB was 10%. This showed significant increase in the level of Drug resistant TB cases from the previous survey warranting immense response.

It is also because once people are taking treatment they stop being infectious, and can no longer spread drug resistant TB to other people.(16)

8.1.2 Significance of the study

MDR-TB occurs due to different reason like improper management of drug supply, absences of treatment guide line, poor adherence, poor infection control practice, poor storage conditions, wrong dose or combination, poor management, lack of information, lack of monitoring treatment, inadequate implementation of DOTS strategy. Therefore, the extent and the magnitude of the problem would not well study in the country Ethiopia. So it is important to study the assessment of MDR-TB and its treatment outcomes among tuberculosis patients to manage patients not to be transmitting the disease to others, additionally the studies will also assess the situation in the study area and will give new information for the Hospital management and organizations those working on TB, decision maker, programmer, and the public in order to improve the treatment outcome of MDR-TB in the hospital and community.

The aim of this proposal was to analyze the prevalence of MDR-TB in the zonal Hospital that serves more than 1.5 million populations and in order to increases MDR-TB prevention and early intervention strategies. Fitche General Hospitals was selected purposively as it was diagnostic and treatment initiating centers for MDR-TB patients and perform Gen-xperts for sputum samples referred from different Treatment follow up site of the Oromia regional state.

8.1.3 Literature Review

8.1.3.1 Etiology

Tuberculosis is caused by Mycobacterium tuberculosis. It is rod-shaped, non-spore-forming and an acid fast aerobic bacillus. Causative agent can be diagnosed by different mechanisms like chest X-ray, and Sputum Examination (AFB Microscopic or Culture). During culture it takes more than two weeks to grow. Culturing and susceptibility testing of *M. tuberculosis* are usually undertaken in a Tuberculosis Reference Laboratory, mainly for surveillance purposes, to determine levels of drug resistance, and to manage treatment failures and relapses.

8.1.3.2 Epidemiology and transmission

Tuberculosis disease can affect either lung (pulmonary) or others body (extra pulmonary) in site of infection. Human infection occurs by inhalation of microorganism that released from diseased during coughing or sneezing. Additionally the disease can be acquired by ingestion of animal milk (Bovine TB). Globally, million children were orphaned as a result of parental deaths caused by TB. Ethiopia was among countries with high TB burden and ranked seventh in the world for TB burden and third in Africa. (16, 17)

8.1.3.3 Clinical Manifestation

Although TB is the most frequently associated with symptoms of having lung disease; it can also affect any organ of the body. The usual symptom of TB includes no specific like fever, chills, night sweats, cough, loss of appetite, weight loss, blood in sputum and others. After inhalation/exposure of the microorganisms it has an incubation period of more than two weeks. If active TB disease is in the lungs (Pulmonary TB), the symptoms may also include a bad cough, pain in the chest, and coughing up blood. If active TB is outside the lungs it is called extra pulmonary TB and has other symptoms, depending on the organs affected. (16)

8.1.3.4 Diagnosis

There are different ways of TB diagnosis. Mostly the diagnosis was performed by AFB sputum examination (Spot-Spot Sputum Examination). Sputum samples or others body fluids can be collected for the diagnosis of tuberculosis. Genxpert and culture can used to differentiate the microorganisms as ether drug resistant or not. (16)

8.1.4 Statement of the Problem

TB is a chronic infectious disease of human caused by *Mycobacterium tuberculosis*. Bovine TB is a disease caused by similar bacteria called *mycobacterium bovis* that mainly affects cattle but can also affect humans. It typically affects the lungs (pulmonary TB), but can also affect other sites (extra pulmonary TB). A bacterium transmits direct through airborne from infected person to health individuals. Relatively small proportion (5–10%) of the estimated 1.7 billion people infected with M. tuberculosis will develop TB disease during their lifetime. However, the probability of developing TB disease is much higher among people infected with HIV and also higher among people affected by risk factors such as under nutrition, diabetes, smoking and alcohol consumption. Overall, about 90% of cases occur among adults age group affecting country economy.

As the drug-susceptible mycobacterium tuberculosis are killed during treatment, the drug-resistant mutants organisms gradually become an increasing proportion of the disease burden, and results in emergence of drug resistant form of TB. Anti-tuberculosis drug resistance is a major public health problem that threatens the progress made in tuberculosis care and control worldwide. A treatment success rate of multidrug-resistant tuberculosis (MDR-TB) is a key issue that cannot be ignored.

8.2 Objective

8.2.1 General Objective

To assess the prevalence of MDR-TB and its Treatment outcome among tuberculosis patients attending at Fitche General Hospital from December,2014 to end of December,2018.

8.2.2 Specific Objectives

- To assesses the magnitude of MDR- TB among tuberculosis patients.
- The assesses treatment outcome of MDR-TB patient
- To determine the association between MDR-TB and its contributing factor.

8.3 Hypothesis

This study is a descriptive analysis and used to generate hypothesis followed by proofing the hypothesis. We hypothesized as first magnitude of MDR TB among TB patients were the same. Second level of treatment outcome among TB patients was the same in all TB patients. Thirdly, MDR TB and its contributing factors have no association.

8.4 Methodology

8.4.1 Study Area

The study will be conducted in North shewa Zone Fitche general Hospital, Oromia regional state, Ethiopia. North shewa zone is one of the twenty zones found in oromia regional state. There are 13 Woredas and one town administration with total population of 1,594,647 in north shewa zone administration. Fitche town is a North shewa Zonal town which is located in the northern parts of Oromia Regional state and 114 KM distance from capital city of Oromia region and Ethiopia Addis Ababa. Fitche general Hospital was established 1998 and located in Fitche town kebele 04. It was the only treatment initiating center of the MDR patients in the zone. It serves also Amhara regional state those sharing the border with oromia regional state north shewa zone. It starts with one MDR TB patient treatment in their first cohort under supervision of national TB control program and with support of the Heal TB. There are a total of 102 technical and 146 administrative staffs that includes internist, Gynecologist, Surgeon IEOS, radiologist, physicians, nurses, pharmacists and Pharmacy technician, laboratory technologist and laboratory technician.

8.4.2 Study Period

The study will be conducted by reviewing retrospective data from July 1 to 20, 2019.

8.4.3 Study design

Descriptive retrospective cross-sectional study design methods will be used.

8.4.4 Sample size

We calculated the sample size using a single population proportion formula supposing as taking prevalence from national PMDT guideline of p as 10%, 95% CI, margin of error 5%,

$$n = \frac{(Z\alpha/_2)^2 P(1-P)}{d^2}$$

$= (1.96)^2 0.1(1-0.1)/ (0.05)^2 = 138$ participants.

Where:

n = sample size calculated

$Z\alpha/_2$ = 1.96 (Z score at Level of confidence at 95% interval)

P = 0.1 (Prevalence of MDR TB)

d = 0.05 (Margin of error)

8.4.5 Sampling technique

The calculated sample size will be selected by systematic random sampling method.

8.4.6 Data Collection tools and procedure

Secondary data will be collected from TB registration book in the hospital.

8.4.7 Data Quality Assurance and management

The check list will be created from the medical registration book of MDR-TB and modified according to the study variable. Pretest of the questionaries' will be done before the study conducted before applying to the main study subjects to check the list quality.

8.4.8 Data processing and Analysis

After the data collection completed, Data will enter in to epi info version 7.1 software and analyses will be made. Based on the result, the study will come up with feasible recommendations that could be utilized at all levels and finally analyzed data will present by tables, chart, and graphs.

8.4.9 Source population

All patients who attended in Fitche general hospital for medical purpose from December 4, 2014 to end of December 2018 with recorded data

8.4.10 Study population

All confirmed patients with Multidrug resistant Tuberculosis (MDR-TB) who ever enrolled in the Treatment Initiation Centers (TIC) from December 4, 2014 to end of December 2018.

8.4.11 Inclusion& exclusion criteria

8.4.11.1 Inclusion criteria

TB Patients with cough and positive by genxpert and start treatment in Fitche Hospital.

8.4.11.2 Exclusion criteria

A patient with cough whose sputum is positive by genxpert and referred to others site for treatment and a patient with cough whose sputum is negative by genxpert.

8.4.12 Study variables

8.4.12.1 Dependent variable

MDR-TB Treatment outcome among tuberculosis patients (Died, Completed, cured, Lost to follow up, and treatment failure)

8.4.12.2 Independent variables

Age	Educational status
Sex	Residence
Religion	Lack of information
Marital status	Poor adherence

8.4.13 Data Quality Assurance and management

The check list will be created from the medical registration book of MDR-TB and modified according to the study variable. Pretest of the questionaries' will be done before the study conducted before applying to the main study subjects to check the list quality.

8.4.14 Data processing and Analysis

After the data collection completed, Data will enter in to epi info version 7.1 software and analyses will be made. Based on the result, the study will come up with feasible recommendations that could be utilized at all levels and finally analyzed data will present by tables, chart, and graphs.

8.4.15 Operation Definition

MDR-TB: - TB caused by drug resistance of at least INH and RF or mostly RF resistance considered as MDR-TB.

Treatment Failure: -Treatment was considered to be having failed if two or more of five cultures in the final 12 months of therapy are positive or if any one of the final three cultures is positive.

Default red: - MDR-TB patient whose treatment was interrupted for two or more consecutive months for any reason without medical approval.

Cured: - MDR-TB patient who completed treatment according to protocol and has at least five consecutive negative cultures result from samples collected at least 30 days apart in the final 12 months of treatments. If only one positive culture is reported during the time and there is no concomitant clinical evidence of deterioration, a patient may still be considered cured

Treatment completed: - MDR-TB patients who has completed treatment according to programmed protocol but does not meet the definition cured because of lack of bacteriological results (i.e. fewer they were performed is the final 12 months of treatment).

8.4.16 Plans for dissemination and utilization of results

The finding will be presented to Addis Ababa University College of health Science School of Public Health. Copies will be given to Oromia Regional Health Bureau, North Shewa Zonal Health Department, Fitche General Hospital and local administrative areas. The finding of this study will be disseminated through hard copy, softy copy and publication, so that it can be used as a source of information for possible planning and implementation of MDR TB treatment follow up and intervention. Additionally, information will be provided if necessary to other relevant bodies/partners.

8.4.17 Ethical consideration

Ethical Permission will be obtained from the research board and Ethics committee of Addis Ababa University, College of Health sciences to undertake the study. Official letter will be written from Addis Ababa University, College of Health sciences for co-operation will be given to Regional Health Bureau, Fitche General Hospital administration & respective Zone. Confidentiality of patient record chart and registration was keep.

The permission for using the information in the medical records of the patients for research purposes will be obtained from Fitche General Hospital.

8.5 Budget breakdown

Main costs for the project will be associated with human resources, transportation, and supplies costs. Totally an estimated 60,337 Ethiopian birr will be required for the entire project costs. (Table 45)

Table 41 : Costs associated with human resources, transportation, and supplies required for assessing Prevalence of MDR TB patients among TB patients attending at Fitche General Hospital, Oromia 2019.

S.N0	Type of materials	Unit of measurement	Quantity needed (A*)	Unit Price in birr(B*)	Total amount in birr (C*)
1	Computer Paper	Desta	5	180	900
2	Spiel	Packet	1	30	30
3	pen	Piece	3	5	15
4	For Printing	Number	1	400	400
5	Binder	Number	3	40	120
6	Pencil	Number	5	2	10
	Subtotal			657	1475
Sr.No	Cost specification	Unit Price	Number of participant	needed	Total amount
	Peridem	300	3	60 days	54,000
	For Fuel	18.62	1	100L	1862
	For Contingency				3000
	Sub Total				58,862
	Grand Total				60,337

8.6 Project implementation plan

We assumed that the project can be completed in a seven months period from proposal preparation to dissemination of its findings. Theoretically we decided from March to September, 2019 which would be conducted accordingly. (Table 46)

8.7 Time table

Table 42: Work Plan of MDR TB prevalence assessment in Fitche General Hospital Oromia Region Ethiopia, 2019

EXPECTED ACTIVITIES		Mar.	Apr.	May	June	July	Aug.	Sep.
1	Title Approval							
2	Preparation and submission of first draft proposal							
3	Submission of second draft							
4	Resource securing and obtaining ethical clearance							
5	Pretesting							
6	Data collection							
7	Entry and data cleaning							
8	Analysis							
9	Report writing							

8.8 **Result (dummy tables)**

We will analyze the data of the study in different categories. We presented the dummy tables of these results below

Table 43:- Socio-demographic characteristics of the patients at Fitche General Hospital Oromia Region, 2019

Variables	Frequency	Percent
Age of Patients		
< 15		
15 to 35		
31 to 45		
> 45		
Sex		
Male		
Female		
Residence (Woreda Name) _____		

Table 44: Distribution of MDR-TB treatment regimen at Fitche General Hospital Oromia, 2019

Sr.No	Variables	Frequency	Percent
1	Treatment Regimen		
2	Use of Second line drug		
3	MDR TB Contact		
4	X ray Results		
5	Genxpert Results		
6	Sputum Result		
7	Patient Co infection		
8	Types of TB		

Table 45: Distribution of MDR TB patient treatment outcome among MDR TB patient at Fitche General Hospital, 2019

Sr.No	Treatment Out Come	Frequency	Percent
1	Cured		
2	Completed		
3	Died		
4	Failed		
5	Defaulter		
6	Transfer out		
7	On treatment		

8.9 References

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CHAPTER 9: OTHER ADDITIONAL OUTPUT REPORTS

9.1 Training Report Given to Health Facilities, Woredas and Zones of Oromia Regional States PHEM Focal Persons and PHEM officers

9.1.1 Introduction

Training is the ways of teaching, or developing oneself or others, skill and knowledge that relate to specific need in the community. It has specific goals of improving one's capacity to improve his performance for the specific program. Additionally the basic training required for a professional to improve their capacity of performing activities by high completeness and timeliness. As a result we conducted training with collaboration of ORHB PHEM core process for zonal, woreda, and Health facilities to strength the PHEM activities of the region.

In Ethiopia the ability to detect problems and respond to health emergencies through proper surveillance system has been limited due to different reasons. As a result prevention and control of epidemics was weak and this was mostly due to lack of skilled human power.

Since starting from last year , the Oromia regional states has faced different political challenges with different boarders displacements of the population which results in the occurrences of different communicable diseases, conditions and events that resulted as a main problems of the region. For instance the lessons learned from the displaced population were building a strong surveillance system at all zonal, town, Woredas and health facilities level by involving community participation. The ability to detect problems and respond to health emergencies through un trained human power was limited to some zonal PHEM levels. Due to these reason prevention and control of different outbreaks was weak which was partly due to lack of skilled personnel on surveillance systems. Oromia regional health Bureau managements and PHEM core processor communicates with different partners for detecting, responding to, controlling and recovering from consequences of public health threats in order that health and economic impacts are minimized in the region due to different IDP. Hence, the basic level PHEM training for the Zonal, Woredas, Town and facilities PHEM focal persons was designed by ORHB PHEM core processor team for improving the detection of different conditions and outbreak for immediate action in the selected priority areas and where there is a high gap in implementing PHEM activities.

As analysis conducted at different time and place by different persons the surveillance systems of the reporting site to ORHB PHEM core processor were weak regardless of completeness,

timeliness, data collection, data analysis, recording, reporting diseases of epidemic in time, and inadequate data analysis especially at zonal, Woredas and health facilities level.

ORHB PHEM core process identifies areas of need for basic level PHEM training to conduct for the Peripheral level of the region. With the support of WHO the training was planned to be conducted in two sites at Adama town and Ambo town depending on the proximity of the areas for the trainers.

Therefore, we conduct the training in Adama Town for PHEM focal persons in order to achieve effective disease surveillance system, improve case management and strengthen the surveillance of priority diseases and others conditions in the IDP sites.

9.1.2 Objectives

9.1.2.1 General objective

- To strengthen PHEM focal persons on surveillance system of PHEM, and increase their abilities to detect conditions from IDP, to cascade for all health professionals in their catchments.

9.1.2.2 Specific objectives

- To strength surveillance systems of PHEM,
- To strength the surveillance of conditions in IDP.
- To improve the health workers' ability on case management of selected epidemic prone diseases
- To cascade the training for all health professionals in the facilities.

9.1.3 Methods and Resources

9.1.3.1 Methods

The training approach follows both an adult learning indicating that it is learner centered and lectures methods. All the participants share their experiences and challenges in the PHEM system for obtaining maximum benefit from the training.

9.1.3.2 Teaching Methods:

- Lecture with discussion by facilitators
- Exercises in group
- Recap methods of the Previous session
- Reading assignments (Individual reading)

9.1.3.3 Teaching Resources

- ✓ Some of the teaching resource used:- PHEM guideline, Specific reference materials/guidelines, Other reading materials, Group Work Exercises , PHEM data, PowerPoint slides, Video films, Pictures, Computer, Flipchart, Markers

9.1.3.4 Training component

- ✓ Power point presentation.
- ✓ Group Work Exercise
- ✓ Discussion and experience sharing.
- ✓ Question and answering.

9.1.3.5 Participant selection criteria

PHEM focal persons of different zones were selected depending on their performance on surveillance for basic level PHEM training to conduct.

9.1.3.6 Numbers of Trainers

- ➢ West Hararge Zone ---------- 29
- ➢ East Shewa Zone ----------25
- ➢ Total ---------- 54

9.1.3.7 Numbers of Trainee

- ✓ WHO ----------1
- ✓ ORHB staff ----------1
- ✓ EFETP Resident ----------1
- ✓ Zonal PHEM Focal ----------1
- ✓ Total ----------4

9.1.3.8 Duration of the training

The training was conducted from December 10-12/2018.

9.1.3.9 Venue:

Kuriftu Resort, Adama Town

9.1.4 Result

9.1.4.1 Trainees Profile

A total of four trainee and 54 trainers were participate on the training site. A total of 54 trainers were attending the training completely as they starts. From total participants attending the training 38(70.4%) of them were males. A total of 54 trainers from west Hararge and East Shewa were participated in this training program. From total participants 29(53.7%) of them

were from West Hararge zone. Out of 54 trainers 28(51.9%) were from Woreda health office followed by health centers 21(38.9%). The list participants were from zonal health Department and Hospitals which were 2(3.7%) and 3(5.6%) respectively. Before and after the training pre-test and post tests were given for all the trainers. The highest and lowest score in pre-tests were 66 and 30 whereas from post-tests 96 and 48 were the highest and lowest results respectively which indicate the training was effective for knowledge gap filling. The mean values of the pretest and post-tests results were 38 and 62 respectively. Only 11(20%) of the trainers scores more than 50% during pre-tests whereas 44(81.5%) of them were scores more than 50% during post-tests.

9.1.4.2 Training topics covered

- ✓ Introduction to PHEM
- ✓ Early Warning and Response
- ✓ Public Health Emergency and Response
- ✓ AFP Surveillance
- ✓ Measles Prevention, Control and Surveillance
- ✓ NNT Epidemiology and Surveillance
- ✓ AWD Epidemiology, Case Management and CTC Establishment
- ✓ Malaria Epidemiology, Prevention and Control
- ✓ Scabies Prevention and Control
- ✓ Meningitis Epidemiology and Surveillance
- ✓ Guinea Worm prevention, control and Control
- ✓ Public Health Emergency Response and Recovery
- ✓ Outbreak Investigation and Response

9.1.4.3 Trainer Profile

A total of four trainee and facilitators, One from WHO, Two from ORHB, (One ORHB staff and One EFETP resident) and one from West Arsi Zonal Health Department surveillance officers.

Table 46: PHEM Basic Level Training Schedule Adama Town December 10-12, 2018 G.C

Day	Topics	Time	Facilitators	Co-Facilitators
Day 1 (10/12/2018)	Registration	2:30-3:00	Birhanu	ORHB PHEM staff
	Opening Speech	3:00-3:10	Gemechu.	Birhanu
	Pre test	3:10-3:30	Deribe	Bokona
	Introduction to PHEM	3:30-3:40	Tarekegn	Dr.Najib
	Early Warning	4:00-4:30	Tarekegn	Dr. Najib
	Tea Break	4:20-4:50	Organizers	Organizers
	Public Health Emergency Preparedness	4:50-6:30	Dr.Najib	Zamadikun
	Lunch	6:30-8:00	Self	
	AFP Surveillance	8:00-9:30	Dr.Najib	Deribe
	Measles Prevention, Control and Surveillance	/9:30-10:00	Dr.Nejib	Deribe
	Tea break	10:00-1020	Organizers	Organizers
	Measles Prevention, Control and Surveillance	10:20-11:00	Dr.Nejib	Deribe
	NNT Epidemiology and Surveillance	11:00-11:30	Dr.Najib	Deribe
Day 2 (11/12/2018)	Recap of Day 1	2:30-3:00	Participant	Tarekegn
	AWD Epidemiology, Case Management and CTC	3:00-4:30	Deribe	Tarekegn
	Tea break	4:30-4:50	Organizers	Organizers
	Malaria Epidemiology, Prevention and Control	4:50-6:30	Deribe	Taregegn
	Lunch	6:30-8:00	Self	
	Scabies Prevention and Control	8:00-9:00	Zamadikun	Tarekegn
	Meningitis Epidemiology and Surveillance	9:00-10:00	Deribe	Tarekegn

	Tea break	10:00-10:20	Organizers	Organizers
	Guinea Worm prevention, control and Control	10:20-11:30	Tarekegn	Deribe
Day 3 (12/12/2018)	Recap of Day 2	.2:30-3:00	Participant	
	Measles Out Break Investigation	3:00-4:30	Tarekegn	Deribe
	Tea break	4:30-4:50	Organizers	Organizers
	Public Health Emergency Response and Recovery	4:50-6:30	Tarekegn	Deribe
	Lunch	6:30-8:00	Self	
	General Discussion	8:00-10:00	Participants	Birhanu
	Tea break	10:00-10:20	Organizers	
	Post test	10:20-10:50	Deribe	Zamadikun
	Closing Remarks	10:50-11:30	Gemechu	Birhanu

9.1.4.4 Discussion

The training was planned to improve the capacity of Public Health Emergency Management (PHEM) focal persons of the lower level based on the need of ORHB and zonal health Departments and will be cascaded to all health professionals accordingly. Participants were from all West Hararge Woredas and selected Health facilities of the zone and from all Woredas of East Shewa and selected health facilities depending on their PHEM activities. All the trainers from both zones attends the training attentively as well as ask any unclear question at any time to be clear with the training. The training was conducted by two way communication systems by asking questions and experience sharing of the senior PHEM focal person for the newly assigned. The trainees were evaluated both quantitatively and qualitatively through written per tests and discussion, question and answering as well as some practical exercises to assess and improve their performances. Before and after the training pre-test and post tests were given for all the trainees. The results seen from both tests evaluated quantitatively and which indicate the training was effective for knowledge gap filling of the participants' knowledge on the basic topics given during the training. At the end of each training days daily evaluation of the training was performed by the trainees. On all days of evaluation the trainees complain the time constraints or over load of the topics. Even though, the training was conducted within three days for all topics the time of training was not adequate for some discussions.

9.1.5 Limitation

The training days were inadequate to cover all the listed topics properly. At least the training for the listed topics needs 5-6 days.

9.1.6 Conclusion and recommendations

The training was conducted and completed with good discipline, and active participation of the participant as well as full attendance of all trainees without any absence. All the trainees were concerned and prepared well on the topics for recap of the previous days and share their experiences for the trainees. Based on the daily evaluation from the trainees we recommended that ORHB PHEM core processor and WHO had to allocate enough budget and time for training and to cascade the training for the other health professionals in the lower levels.

9.2 Weekly Bulletin of ORHB PHEM, 2019 G.C.

We prepared a total of ten (10) weekly bulletins during the residence in oromia regional health Bureau of first and second residences.

OROMIA REGIONAL HEALTH BUREAU, PUBLIC HEALTH EMERGENCY MANAGEMENT AND HEALTH RESEARCH DIRECTORATE
WEEKLY BULLETIN

Epidemiological WHO Week 08, 2019

Highlights of the Week

- *Regional surveillance report of both completeness and timeliness were 79%.*
- *SAM cases were increased by 120(8.2%) as compared to week 07.*
- scabies cases were decreased by 577(18%) as compared to week 07.
- *Confirmed malaria cases were decreased by 226(22.6%) as compared to Week 07.*

I. Introduction

This bulletin serves to summarize weekly surveillance data and performance of ORHB/PHEM on epidemic prone diseases and other public health emergencies. It comprises completeness, timeliness, trends of priority diseases and response activities. It also provides feedback on surveillance activities for WHO week 08, 2019 (Table 1).

Table 1: *Key Indicators/diseases/conditions Reported in week 08, February,2019*

Indicators	Wk. 08 Reported
Total suspected malaria Cases	16264
Confirmed malaria (PF+PV)	775
Sum of SAM	1579
Scabies Cases	2638
Completeness %	79
Timeliness %	79
Dog/Animal bite	66
Suspected Meningitides cases	16
Suspected Measles Cases	404
Maternal Death notification	7
Cholera/AWD Cases	0
Dracunculiasis Cases	0
Suspected Anthrax	1
Relapsing Fever	3
AFP Suspected cases	6
Dysentery Cases	1367
Typhoid fever Cases	7662
Epidemic Typhus Cases	2189

II. Weekly Surveillance Report

Regional surveillance report of both completeness and timeliness of government health facilities were 79%. Report completeness of Five Zones and two adminstrative towns was below target namely (Arsi, East Harage, Bale, Guji, and North Shewa zone) and Batu, and Burayu town where as two Zone and two towns (NamelyEast Wollega nad Westi guji and Modjo Town and Bishan Guracha) did not sent the report However all other the expected zones and towns was report timely.

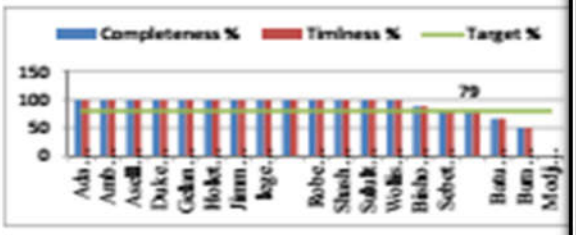

Figure 1: Report completeness and timeliness by Towns, Oromia as of WHO week 08, February,2019

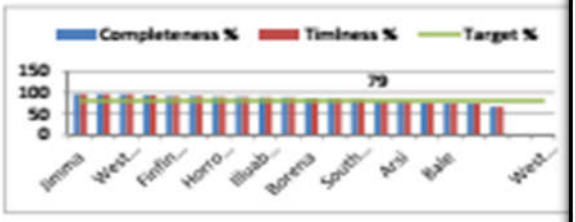

Figure 2: Report completeness and timeliness by Zones, Oromia as of WHO week 08 February,2019

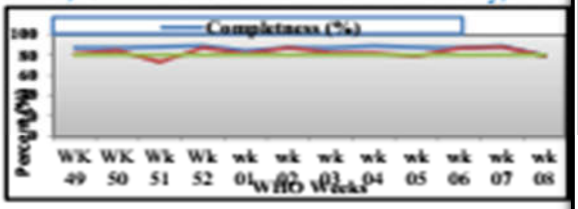

Figure 3: *Trends of Regional surveillance report completeness and timeliness of 12 consecutive weeks, (WHO weeks 49–08) February,2019*

III. Diseases or conditions

1. Malaria

1

In this week, 781 clinical and confirmed malaria cases were reported. Among the total clinical and confirmed malaria cases 775 (99.2%) of them were confirmed cases. Of the total confirmed cases, 516(66.6%) of them were plasmodium falciparum and 2 inpatient case and no death in this week. Confirmed malaria cases were decreased by 226(22.6%) as compared to Week 07. A total of 16,264 febrile cases were laboratory tested, yielding a positivity rate of 775(4.8%) this week.

The highest number of confirmed malaria cases were reported to region from zones and woredas as depicted in (Table -2)

Table 2: *Malaria Positivity rate by zones/ woredas of Oromia Region, week 08, February,2019*

Zone/Woreda name	RDT/Microscopy	PF+PV	SPR	% Reg/Zones
Region	16264	775	4.8	
W/Wollega	1834	124	7	16.0
Kondala	82	48	59	38.7
Mana Sibu	124	28	23	58.3
Guji	748	99	13	12.8
Shakiso T	188	23	12	2.3
Negele /T	170	19	11	8.3
East Shewa	2351	94	4	12.1
Fantale	354	33	9	35.1
Metehara T	302	23	8	69.7
K/Wollega	709	65	9	8.4
Gawo Kebe	60	19	32	29.2
Kake Hosp.	172	17	10	89.5
Anfilo	59	11	19	64.7
West Shoa	621	58	9	7.5
Nono	121	25	21	43.1

A trend of regional confirmed malaria cases of the last 11 consecutive weeks is indicated below *(Figure: 4)*.

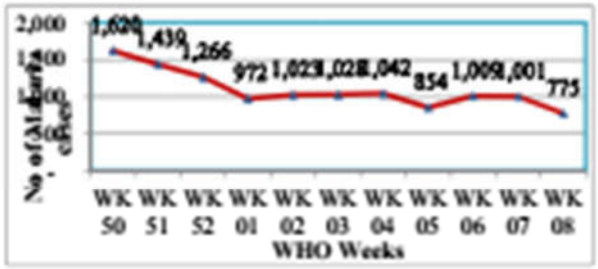

Figure 4: *Trends of confirmed malaria cases by week, Oromia Region, 50-08 Week, February,2019*

2. Dysentery

In this week, a total of 1367 dysentery caseswere reported to the region. There were 2 admitted dysentery cases in this week. Cases were decreased by 209(13.3%) as compared to week 07.The highest number of cases were reported from East Hararge 142(10.4%), Jimma 96(7.5%), East Shewa 89(6.5%) West Arsi 85(6.2%), West Hararge 83(6.1%) and West Shewa 81(5.9%).

Trends of dysentery cases for the last 12 consecutive weeks are shown below (Figure: 5)

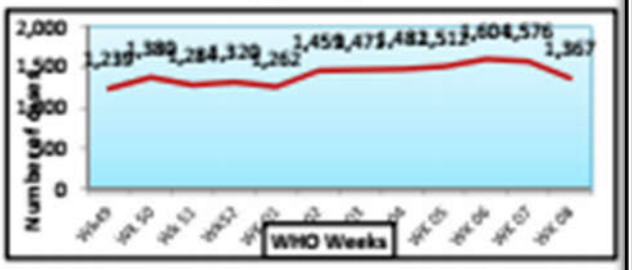

Figure 5: *Trends of Dysentery cases by weeks, OromiaRegion, 49 to 08 weeks, February,2019*

3. Measles

In this week, a total of 404 suspected measles cases were reported to the region. Suspected cases were reported from different districts and health facilities of Oromia Zones and Towns (Table 3).

Table 3: Distribution suspected Measles cases by districts and reporting health facilities of Oromia region in week 08, February,2019

Zone	Woreda	Cases	Total Cases	(%) from the region
Bale	Dawe Kach	17	190	47.03
	Ginir	87		
	Gololcha	38		
	Rayitu	13		
	Sawena	34		
	Sinana	1		

	Babile Town	17		
	Babile Woreda	19		
	Gola Oda	24		
East Hararge	Meyu Muluke	9		
	Midega	5	74	18.32
	Chiro Hospital	1		
	Daro Labu	35		
West Hararge	Gelemso Hospital	1	37	9.16
West Shewa	Cobi	2		
	Jaldu	31	33	8.17
Arsi	Amigna	19	19	4.70
Robe Town	Robe Town	13	13	3.22
Shashemene Town	Shashemene Town	9	9	2.23
West Wollega	Ghimbi Town	6	6	1.49
Batu Town	Batu Town	4	4	0.99
Jimma Town	Jimma Town	3	3	0.74
Asella Town	Asella Town	2	2	0.50
East Shewa	Ada'aa	2	2	0.50
Illuababora	Doreni	2	2	0.50
Nekemte Town	Nekemte Town	2	2	0.50
North Shewa	Jida	2	2	0.50
	Kersa Malima	1		
South west Shewa	Tulu Bolo Hosp.	1	2	0.50
Adama Town	Adama Town	1	1	0.25
Borena	Moyale Hospital	1	1	0.25
Jimma	Goma	1	1	0.25
Kellem Wollega	D/Dollo Hosp.	1	1	0.25

Trends of the past 14 consecutive weeks of suspected Measles cases were shown below (Figure:6).

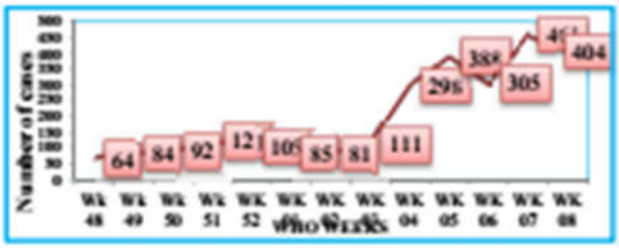

Figure 6: *Trends of suspected measles cases by time,Oromia Region, Week 48-08, February,2019*

4. Acute Flaccid Paralysis (AFP)

In this week, 6 AFP cases were reported to the region.Cases were reported from Gumay of Jima Zone (1), Wera Jarso of North Shewa Zone (2), Ghimbi Adv. Hospital (2) and Lalo Assabi of West Wollega (1).

5. Malnutrition

In this week 1,579 new severely acute malnutrition (SAM) cases were reported to the region. Of the total cases, 186(11'8%) of them were treated at stabilization center. SAM cases were increased by 120(8.2%) as compared to week 07.Most of the cases were reported from East Hararge 419(27%), followed by West Hararge 204(13%), West Arsi 191(12%), Bale 153(10%), Jimma 104(7%) and Arsi 90(6%) Zones. Among Woredas; Aseko 14(15.6%) and Shirka 10(11%) of Arsi; Berbere 24(15.7%) and Harena Buluk 23(15%) of Bale Zone, Girawa 67(16%), Bedeno 64 (15.3%) and Chinaksan 38 (9.1%) of East Hararge and Satama 15(14.4%), and Shabe 11(10.6%) of jimma Zone, and Shanan Dhungo 26(12.7%), Gemechis 22 (10.8%) and Chiro Rural 19(9.3%) of West Hararge Zone. **Note:** *Percentage of Malnutrition in the districts was calculated from their respective zones.*

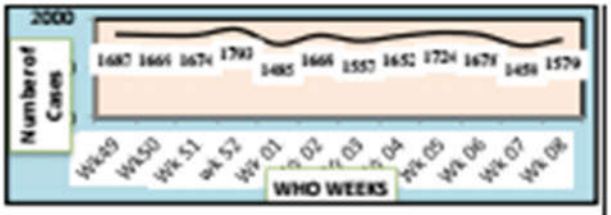

Figure 7: *Trends of regional SAM cases by time, Oromia Region, week 49 to week 08, February,2019*

6. Meningococcal Meningitis

In this week, 16 suspected meningococcal meningitis cases and no death were reported to the region. the case was decreased in this week by 13(44.8%). Cases were reported from Guji (5), Arsi (2),Jimma (2) and West Shewa (1).

7. Anthrax

In this week, only 1 cases of Anthrax was reported from West wollega Zone. .

8. Relapsing Fever

In this week, 3 suspected Relapsing Fever cases were reported to the region. These cases were reported from Metehara Town of East Shewa zone (1), Gelan Town (2).

9. Maternal deaths

In this week,7 suspected maternal deaths were notified. Cases were reported from Borena Zone (2), Jimma Zone (2), East Hararge Zone (1), South West Shewa (1), and West Hararge (1).

10. Acute Watery Diarrhea (AWD) Cases

In this week, no suspected Acute Watery Diarrhea (AWD) case reported to the region.

11. Guinea Worm (GW)

In this week, no suspected guinea worm case was reported to the region.

12. Scabies

Regionally, since the occurrence of Scabies outbreak a total of 189,528cases were reported to date of which 42,775 cases were reported in 2009 EFY while the rests were in the 2010 and 2011 EFY. Sixteen zones, Seven towns and 75 woredas were affected up to now. In this week 2638 scabies cases were reported to the region. scabies cases were decreased by 577(18%) as compared to week 07.

Table 4: *Scabies cases by Zones/Towns of Oromia Region, week 07, February,2019*

Zone Name	No. of cases	% from Region
Grand Total	2638	
East Shewa	1668	63.23
East Hararge	537	20.36
West Arsi	110	4.17
West Hararge	56	2.12
Arsi	51	1.93
H/G/Wollega	37	1.40
West Wollega	31	1.18
North Shoa	29	1.10
Bishoftu Town	25	0.95
West Shoa	25	0.95
Nekemte Town	16	0.61
Jimma	13	0.49
Jimma Town	7	0.27
Robe Town	7	0.27
S/West Shewa	7	0.27
FZOSZ	6	0.23
Bale	4	0.15
Batu Town	4	0.15
Kellem Wollega	3	0.11
lege Tafo town	2	0.08

13. Other cases

In this week, a total of 66 other cases reported to the region, were 59 Dog bites/Animal bites, 1suspected Rota virus cases, 2 pernatal death and 5 others cases.

IV. Response Activities

Based on weekly surveillance report, feed-back is often given to all zones and towns timely. Health and nutrition taskforce meeting is conducted with our partners every two weeks. Any rumors have been received, verified and risks have been communicated early and timely.

Contact us:

[redacted]

This bulletin is weekly Public Health Emergency Management and Health Research Directorate of Oromia Regional Health Bureau. It is prepared and disseminated on a weekly basis. Your comment & suggestion will plays a great role in improving our bulletin.

4

Declaration

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

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Date of submission: June 28, 2019

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

Advisors:

_____

Signature: _____ Date _____

Annexes

Appendix 1 : Questionnaire for Measles Outbreak Investigation in Babile District East Hararge Zone Oromia Region, Ethiopia, 2019 G.C

Instructions: (Fill the questionnaires accordingly by interview or observation)

1) Data collector information:
   Name: _____ Responsibility _____Phone number: _____
2) Date of Data collection: _____
3) Region_____Zone_____Woreda_____Kebele_____Got _____
   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

I. Socio-demographic information

1. Patient Name_____
2. How old are you? : _____months ____ years
   Sex: □ Male □ Female
3. What is your occupation?
   □ Farmer □ Merchant □ Housewife □ Government employed □ Pastoralist □Student
   □ Not applicable □ other _____
4. What is your ethnicity? □ Oromo □ Tigre □ Amhara □ Gurage □ other (specify) _____
5. What is your religion?: □ Orthodox □ Protestant □ Muslim □ other_____
6. What is your marital status?: □ Single □ Married □Widowed □ Divorced □ Not applicable
7. Have you ever attended school?: □ yes (go to question 8) □ No (go to question 9)
8. What is the highest level of education you have completed? (read answers): □KG □ Primary □ Secondary □ Collage/University □ Not applicable
9. Father's occupation: □ Farmer □ Merchant □ Government employed □ Student
   □ Pastoralist □ Other _____
10. Parents' of case/control's education:
    Mother: □ Illiterate □ Primary □ Secondary □Collage/University
    Father: □ Illiterate □ Primary □ Secondary □ Collage/University
11. What is the main material of the roof? RECORD OBSERVATION _____

12. 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

II. Knowledge Questions

1. What is measles? _____
2. How do you think measles is transmitted? 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?
   □ Vaccination, □ there is no prevention □ local healing □ other _____
4. Who do you think can be affected by measles? □ 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 □ To get help □ Other Specify _____
6. What is the routine age for a child to be vaccinated with measles vaccine?
   □3 month's □ 6 months □ 9 months □ don't know □Other _____
7. Do you think vaccination can prevent measles? □ Yes □No □ Don't know

III. Clinical presentations (for case ONLY)

1. What were the symptoms of measles? 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
2. What is the date when you first saw a rash on your body? : ____/_____/_____
3. Were you in your home when you first noticed your illness?
   □ Yes (skip to question 5) □ No (go to next question)
4. Where were you when the illness started? District; _____Kebele; _____
5. How long have you had a rash? _____days
6. Do you still have the rash? □ yes □ No

7. Did you visit health facility for this illness? □ Yes (date went to facility____/____/____)
   □ No (go to no. 13)
8. How long were you sick before visiting the health facility? _____ in days/hours
9. Admitted: □ Yes □ No, If yes, date admitted:___/___ /_____
10. Treatment given? □ yes □ No,
11. If yes □ ORS □ Antibiotics □ Vitamin A □ Supplementary food □ TTC ointment
    □ Anti pyretic □ other _____
12. Outcome: □Alive □ death
13. Did you have any of the following complications when you were sick with measles?
    Pneumonia: □ yes □ No Diarrhea: □ yes □ No Ear infection: □ yes □ No
    Convulsions □ yes □ No Change in vision: □ yes □ No Blindness: □ yes □ No
14. Did you travel four days prior to or four days after rash onset? □ Yes □ No
15. Where did you travel to? _____

IV. Risk factors

VACCINATION STATUS

1. Have you immunization card? □ Yes (go to question 3) □ No
2. Were you vaccinated again measles?: □ Yes □ No (go to question 6)
   □ don't know (go to question 25)
3. 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 _____
4. 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
5. Date last measles vaccine dose received? ___/____/_____ (GO TO QUESTION #22)
6. What is the main reason were you not vaccinated against measles? □ Clinic was too far
   □ Absent during vaccination campaign □ You didn't know time for vaccination
   □ You think the vaccine will hurt the child □ Someone told you not to go
   □You are scared of vaccines □ other, (specify) _____
7. Did you have contact with a person with measles symptoms the 2-3 weeks before onset of illness? □ yes □ No □ don't know
8. Is there other person with measles symptoms in your household? □ Yes □ No

9. Does the case have any symptoms of malnutrition? □yes, □ No.
10. If yes, on OTP:□ Yes, □ No

    Measure BMI: - Height _____Weight _____ MUAC _____
11. 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
12. How many windows and doors does your house have?

    □ two or more windows or doors □less than two windows or doors
13. How many sleeping rooms are there in your house? _____
14. How many people slept in your house during occurrence of disease? _____

Appendix 2 : Questionnaire for Measles Outbreak Investigation in Ginnir Woreda Bale Zone Oromia Region, Ethiopia, 2019 G.C.

Instructions: (Fill the questionnaires accordingly by interview or observation)

1. Data collector information:
   Name: _____ Responsibility _____Phone number: _____
2. Date of Data collection: _____
3. Region_____Zone_____Woreda_____Kebele_____Got _____
   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

I. Socio-demographic information

1. Patient Name_____
2. How old are you? : _____months ____ years
   Sex: □ Male □ Female
3. What is your occupation?
   □ Farmer □ Merchant □ Housewife □ Government employed □ Pastoralist □Student
   □ Not applicable □ other _____
4. What is your ethnicity? □ Oromo □ Tigre □ Amhara □ Gurage □ other (specify) _____
5. What is your religion?: □ Orthodox □ Protestant □ Muslim □ other_____
6. What is your marital status?: □ Single □ Married □Widowed □ Divorced □ Not applicable
7. Have you ever attended school?: □ yes (go to question 8) □ No (go to question 9)
8. What is the highest level of education you have completed? (read answers): □KG □ Primary □ Secondary □ Collage/University □ Not applicable
9. Father's occupation: □ Farmer □ Merchant □ Government employed □ Student
   □ Pastoralist □ Other _____
10. Parents' of case/control's education:
    Mother: □ Illiterate □ Primary □ Secondary □Collage/University
    Father: □ Illiterate □ Primary □ Secondary □ Collage/University
11. What is the main material of the roof? RECORD OBSERVATION _____

12. 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

II. Knowledge Questions

1. What is measles? _____
2. How do you think measles is transmitted? 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?
   □ Vaccination, □ there is no prevention □ local healing □ other _____
4. Who do you think can be affected by measles? □ 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 □ To get help □ Other Specify _____
6. What is the routine age for a child to be vaccinated with measles vaccine?
   □3 month's □ 6 months □ 9 months □ don't know □Other _____
7. Do you think vaccination can prevent measles? □ Yes □No □ Don't know

III. Clinical presentations (for case ONLY)

1. What were the symptoms of measles? 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
2. What is the date when you first saw a rash on your body? : ____/_____/_____
3. Were you in your home when you first noticed your illness?
   □ Yes (skip to question 5) □ No (go to next question)
4. Where were you when the illness started? District; _____Kebele; _____
5. How long have you had a rash? _____days
6. Do you still have the rash? □ yes □ No

7. Did you visit health facility for this illness? □ Yes (date went to facility____/____/____)
   □ No (go to no. 13)
8. How long were you sick before visiting the health facility? _____ in days/hours
9. Admitted: □ Yes □ No, If yes, date admitted:___/___ /_____
10. Treatment given? □ yes □ No,
11. If yes □ ORS □ Antibiotics □ Vitamin A □ Supplementary food □ TTC ointment
    □ Anti pyretic □ other _____
12. Outcome: □Alive □ death
13. Did you have any of the following complications when you were sick with measles?
    Pneumonia: □ yes □ No Diarrhea: □ yes □ No Ear infection: □ yes □ No
    Convulsions □ yes □ No Change in vision: □ yes □ No Blindness: □ yes □ No
14. Did you travel four days prior to or four days after rash onset? □ Yes □ No
15. Where did you travel to? _____

IV. Risk factors

VACCINATION STATUS

1. Have you immunization card? □ Yes (go to question 3) □ No
2. Were you vaccinated again measles?: □ Yes □ No (go to question 6)
   □ don't know (go to question 25)
3. 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 _____
4. 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
5. Date last measles vaccine dose received? ___/____/_____ (GO TO QUESTION #22)
6. What is the main reason were you not vaccinated against measles? □ Clinic was too far
   □ Absent during vaccination campaign □ You didn't know time for vaccination
   □ You think the vaccine will hurt the child □ Someone told you not to go
   □You are scared of vaccines □ other, (specify) _____
7. Did you have contact with a person with measles symptoms the 2-3 weeks before onset of illness? □ yes □ No □ don't know
8. Is there other person with measles symptoms in your household? □ Yes □ No

9. Does the case have any symptoms of malnutrition? □yes, □ No.
10. If yes, on OTP:□ Yes, □ No

    Measure BMI: - Height _____Weight _____ MUAC _____
11. 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
12. How many windows and doors does your house have?

    □ two or more windows or doors □less than two windows or doors
13. How many sleeping rooms are there in your house? _____
14. How many people slept in your house during occurrence of disease? _____

Appendix 3 : Questionnaires for Public Health Surveillance evaluation of malaria and Measles in North Shewa Zone Oromia Region, 2018 G.C

Regional and Zonal Level Questionnaire

Respondent_____
Interviewer: _____
Date_____

General

1. Is there a national updated Malaria and Measles guide line/manual for surveillance?

   A. Yes B. No C. Unknown

2. Do you have standard case definitions for the Country's priority diseases like AWD,

   AFP, malaria, RF, typhoid fever, Epidemic fever and measles? A. Yes B. No C. Unknown

3. If yes, Check the standard case definition for each

   Priority disease_____

4. Is the central level providing surveillance forms to the health facilities?

   A. Yes B. No C. Unknown

5. If yes, have you lacked appropriate surveillance forms (Line list, weekly reporting form, and epidemic reporting form, rumor investigation) at any time during the last 6 months?

   A. Yes B. No C. Unknown

6. What are the reporting health facilities for the surveillance system?
   a. a. Government health facilities
   b. Private health facilities
   c. NGO health facilities
   d. e. Others (specify) _____

6. Number of reports in the last quarter compared to expected number(Completeness)

   6.1. Weekly: ___/12 times the number of each districts(Timelness)

   6.2. Immediately**:** **-------**/times the number of districts

7. Was there any report of the immediately reportable diseases in the past 1 month?

   A. Yes B. No C. Unknown

8. 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

9. How do you report to the next high level?(Multiple responses are possible)

A. Mail
B. Fax
C. telephone
D. Paper based
E. another specify _____

I. Data Analysis

10. Does the Zonal level describes the data by age, sex, time and places: (case based, outbreaks, and sentinel)?

A. Yes B. No C. Unknown

If yes, Check Observed description of data by age and sex

11. Does the Zonal level Perform trend analysis? A. Yes B. No C. Unknown

12. **If yes,** List disease(s) for which line graph is observed

_____

13. Does the zone have an action threshold defined for AWD, Measles, AFP, and malaria?
A. Yes B. No C. Unknown

14. Who is responsible for the analysis of the collected data? _____

15. How often do you analyze the collected data?

A. Daily
B. Weekly
C. . Every 2 weeks
D. Monthly
E. Quarterly
F. As needed……..

16. Do you have an appropriate denominators establish the threshold?

A. Yes B. No C. Unknown

17. **If yes, observe** presence of demographic data (E.g. population by district and hard to reach groups)

18. . Do you give feedback for woredas

A. Yes B. No C. Unknown

19. If the answer is yes for Question 18, how often?

A. Daily

B. Every

C. Weekly

D. Monthly

E. Quarterly

II. Outbreak Investigation

20. Is there any outbreak in the zone in the last year?

A. Yes B. No C. Unknown

21. Percent of suspected outbreaks that were investigated in the past 6 months_____(# of suspected outbreak)_____(# of investigated) _____ (%)

22. List of diseases: _____.

23. Number of outbreaks investigated and in which risk factors were looked for: ___.

24. Number of outbreaks in which findings were used for action :(observe report) _____.

25. Number of districts that looked for risk factors [observe in reports]

26. Number of districts that used the data for action [observe in final report] _____

III. Epidemic preparedness (relevant for epidemic prone diseases

27. Dose the zone established epidemic management committee and have ?

A. Yes B. No C. Unknown

28. **If yes** for question 27 does the committee have plan for epidemic preparedness and response

A. Yes B. No C. Unknown

29. If yes, check, a written plan of epidemic preparedness and response

30. Has the region/zone experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? A. Yes B. No C. Unknown

31. Does the zone allocate budget for emergency preparedness? A. Yes B. No C. Unknown

32. If yes How many birr (Observe)?

33. Doses the standard case management protocol for AWD, Malaria, AFP (polio), measles and others exists in all health facilities? A. Yes B. No C. Unknown

34. Does the region/zone have a rapid response team for epidemic? A. Yes B. No C. Unknown

35. If **yes, Obs**. minutes (or report) of meetings of RRT

IV. Response to epidemics

36. Does the epidemic respond within 48 hours of notification from lower level? A. Yes B. No C. Unknown

37. **If yes, Obs** (from written reports with trend and intervention)

38. Dose a report is regularly produced to disseminate surveillance data from the zone? A. Yes B. No C. Unknown

39. **If, yes Obs:** the presence of a report of **s**urveillance data

40. How many feedback reports has the zone level produced in the last year? _____

41. How many supervisory visits have you made in last 6month? _____

42. If no, what is a reason for not making all required supervisory visits?

_____

_____

43. Have you received any post-basic training in epidemic management? Yes/No

44. ***If yes,*** specify when, where, how long, by whom? _____

45. How many of your subordinate staffs trained in surveillance? _____(___%)

V. Resources

46. Do you have the following resources for data management

a) Computer & Printer Yes/No

b) Photocopier Yes/No

c) Data manager Yes/No

d) Statistical package Yes/No

e) Others(specify)_____

47. Communications availability

a) Telephone service Yes/No

b) Fax yes/No

c) Radio call Yes/No

d) Internet Yes/No

e) Others (Specify) _____

VI. Budget for surveillance

48. Is there a budget line for surveillance in at zone? A. Yes B. No C. Unknown

49. ***If yes***, is it sufficient Yes/No

50. If No, what option did you use at zonal level? _____

Or how could surveillance is improved? _____

_____.

51. What opportunities are there for integration of surveillance activities and Functions (Core activities, training, supervision, guidelines, resources etc.)?

a._____

b._____

c. _____

Questionnaire for Attribute

A. Usefulness:

52. Total population under surveillance in the zone by District _____

53. How many cases and deaths reported in the zone last year?

Malaria cases _____Deaths _____

AWD cases _____Deaths _____

Measles cases _____Deaths _____

Others (Specify) cases_____ Deaths _____

54. Does the surveillance system help?

a) To detect outbreaks of the priority diseases early? A. Yes B. No C. un known

b) To estimate the magnitude of morbidity, mortality and factors related to these diseases? A. Yes B. No C. un known

c) Permit assessment of the effect of prevention and control programs? A. Yes B. No C. un known

d) To Observe (confirm): interventions and diseases trends analyzed

A. Available

B. Not available

B. Simplicity:

55. Is the case definition of malaria and measles known by all level health professionals?
A. Yes B. No C. un known

56. Do you feel that additional data collected on a case are time consuming? A. Yes B. No C. un known

57. How long it takes to fill the format?

a) <5 minute
b) 10-15minuts
c) >15 minutes
d) Un known

58. How long does it take to have laboratory confirmation of Malaria and measles after sample collection?

a) <5 minute
b) 10-15minuts
c) >15 minutes
d) Un known

C. Flexibility:

59. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

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

61. **If yes, how?**_____

D. Data Quality:

62. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

63. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

64. If, **observe (**Review) the last months report of these diseases

65. Average number of ***unknown or blank responses*** to variables in each of the reported forms _____

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

E. Acceptability:

67. Do you think all the reporting agents accept and well engaged to the Surveillance activities? Yes/No

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

69. **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:

70. What is the health service coverage of the district/ **zone**/ region? _____%

71. Do you think, the populations under surveillance have good health seeking behavior for these diseases? A. Yes B. No C. Unknown

72. Who do you think is well represented by the surveillance data? urban / rural and what is the reason?

G. Timeliness:

73. What proportion of districts reports in acceptable time? (By Zone and Woreda)

Report in time ____

Late Report_____

Percentage _____

H. Stability

74. Was the new health structuring affect the procedures and activities of the surveillance of the diseases? Yes/No

75. Was there lack of resources that interrupt the surveillance system? Yes/No

District (Woreda) Questionnaire

District Name _____
Respondent Name _____ Responsibility _____
Date _____
Interviewer name _____

General Information

1. Is there a national PHEM 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 laboratory?
A. Yes B. No C. Unknown

   If No, Reason _____

3. Does the district have guidelines Or SOP for specimen collection, handling and transportation to the next level? A. Yes B. No C. Unknown

4. Have you faced lack of forms recommended for the country at any time during the last 6 months? A. Yes B. No C. Unknown

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 weekly reports sent on time: ____/12 times to higher level **(Tuesday)**

8. Number of immediately reports submitted on time: _____/ times the number of health facilities (**within 30minutes of events)**

9. Number of immediately reports sent on time: _____/ to higher level (**within 60 minutes of events)**

10. How do you report Weekly or immediately to the next level?

- **a)** Mail
- **b)** Telephone
- **c)** Fax
- **d)** Paper

e) Electronic

f) Other(specify) _____

11. How can reporting system improved?

_____

_____.

12. Did you analysis PHEM data? Yes/No

a) If yes, is data describe by person for any case based, outbreaks or sentinel? Yes/No
If yes, observe description of data by age and sex

b) Is description of data by place (locality, village, work site etc)? Yes / No
If yes, observe. Description of data by Place.

c) Is the description of data by time? Yes/ No

If yes, **observe** observed description of data by time?

13. Is there a trend analysis for the following disease?

a) Malaria Yes/ No

b) AWD Yes/No

c) Measles Yes/No

d) Polio Yes/No

If yes, **Obs**. line graph of cases by time

14. Do you have an action threshold for any of the country priority diseases? Yes/ No
If yes, what is it? _____cases _____% increase _____rate
(Observe for 2 priority diseases)_____

15. Did you have appropriate denominators? A. Yes B. No C. Un Known
If yes, observe, demographic data at site (E.g. total population by village, <5 yrs, ---)

16. Who is responsible for PHEM data analysis? _____

17. How often do you analyze the PHEM data?
a. Daily b. Weekly c. Every 2 weeks
d. Monthly e. Quarterly f. As needed……..

I. Outbreak investigation

18. Is there any Outbreak or suspected in the district in the past year 6 months?
A. Yes B. No C. Un Known
If yes, number investigated_____ (Observe reports and take copies if possible)

II. Epidemic preparedness

19. Dose the district have epidemic preparedness plan? A. Yes B. No C. Un Known

If, yes, (**observe)** a written plan of epidemic preparedness and response.

20. Has the district had emergency stocks of drugs and supplies at all times in past one Year? A. Yes B. No C. Un Known

If yes, Obs, Observed the stocks of drugs and supplies at time of assessment

21. Has the district experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? A. Yes B. No C. Un Known

22. Is there a budget line or access of funds for epidemic response?
A. Yes B. No C. Un Known

23. Does the district have a rapid response team for epidemics? A. Yes B. No C. Un Known

If yes, **Obs** Observed minutes (or report) of meetings of epidemic management

24. Did epidemic response team evaluate their preparedness and response activities during the past year? A. Yes B. No C. Un Known

25. **If yes,** (observe written report to confirm)

III. Responses

26. Has the district implemented prevention and control measures based on local data for at least one reportable disease or syndrome? A. Yes B. No C. Un Known

27. Present of epidemic that responded by districts within 48 hours of notification of most recently reported outbreak?_____

IV. Feedback

28. How many feedback written reports has the district produced in the last year?
_____ **observe** the presence of a written report that is regularly produced to **disseminate**.

V. Supervision

29. Did you supervise the health facilities in the last 6 month? Yes/No

30. **If yes**, how many times have you been supervised in the last 6 months? _____

(Observe supervision report)

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

VI. Training

32. Have you trained on PHEM disease surveillance? Yes/No

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

33. What percent of your staffs in the district trained on PHEM surveillance?____%

VII. Resources

34. Have you Logistics Available

a) Bicycles Yes/No

b) Motor cycles Yes/No

c) Vehicles Yes/No

d) Stationery Yes/No

e) Computer & Printer Yes/No

f) Others(specify) _____

35. Communication available

a) Telephone service Yes/No

b) Fax Yes/No

c) Mail Yes/No

d) Computers that have modems Yes/No

36. 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

VIII. Surveillance

40. Is there PHEM focal person in the district epidemic management committee? Yes/ No

41. Are you satisfied with the current surveillance system? Yes /No

42. ***If no***, why? _____.

Attributes

A. Usefulness

43. Total population of the district under surveillance_____

44. How many cases and deaths reported in the district from the following disease past 6 month ?.

    a) AWD cases _____Deaths _____

    b) Malaria cases _____Deaths _____

    c) Measles cases _____Deaths _____

    d) Others(Specify) Case ____Death _____

45. 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:

46. Do you feel that data collections on a case report form are time consuming? Yes/No

47. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 min

C. Flexibility:

48. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

49. 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, Yes/**:** Review the last month's 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

54. **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?

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) Others(specify) _____.

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
59. If yes, how did you manage it?_____
60. 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_____Responsibility _____

Date _____

Interviewer: _____

General Information

1. Is there PHEM national Guide line or manual at this site? A. Yes B. No C. Un Known
2. **If yes, check ;** for the existence **PHEM** national guide line or manual

3. Is there a clinical register in health facilities? A. Yes B. No C. Un Known

4. If yes, **observe** the existence of a clinical register

5. Is there the health facilities correctly register cases during the previous 30 days? Yes/No

6. If yes, **Observe**; the clinical register

7. Do you have a standard case definition for: (each priority disease)
    a) AWD, Yes/No
    b) AFP (polio) Yes/No
    c) Measles Yes/No
    d) Malaria Yes/No

If yes, check the standard case definition for: (each priority disease)

8. Does a health facility use standardized case definitions for the country's priority diseases**?** Yes/ No
9. **I**f yes, check; the respondent correctly diagnosing one of the country's priority diseases using a standard case definition (Interview about of these)

10. Does the health facility 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
11. 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

12. Does the health facility have the capacity to handle and transport sample to testing facility?
    a) sputum Y N N/A
    b) Stool Y N N/A
    c) Blood Y N N/A
    d) CSF Y N N/A

13. **If yes, check** separate presence of cold chain and presence of sample transport materials for all samples at health facility.

14. Have you lacked appropriate surveillance forms at any time during the last 6 months?
    a. Yes b. No c. N/A
    If yes, what is the reason? _____

15. 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. Measles Yes No N/A
    b. Malaria Yes No N/A
    c. AFP (polio) Yes No N/A
    d. AWD Yes No N/A

16. Number of reports in the last 3 months compared to expected number
    Weekly: _____ /12 times the number of health post sites
    Immediately: _____/--- times the number of health post sites

17. On time (use national guideline)
    Number of weekly reports submitted on time:-_____ /12 times the number of sites
    Number of immediately reports submitted on time: ___/-- times the number of sites

18. How do you report?
    a. Telephone b. Fax c. Mail d. Paper e. Electronic f. other (specify) ____

19. How can reporting be improved? Your suggestion

20. Do you analyze data by person, place and time (outbreaks, sentinel) Yes/ No N/A
    If yes, Obs data

21. Is there trend analysis Performed? Yes No N/A
    If yes, Obs line graph of cases by time

22. 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

23. Who is responsible for data analysis? _____

24. How often do you analyze the collected data?
    a) Daily b) Weekly c) Every 2 weeks d) Monthly e) Quarterly
    f) As needed……..

25. Presence of demographic data at site (E.g. population <5 yr., population by village, total

Population) Yes / No

Epidemic preparedness

26. Is there standard case management protocol for epidemic prone diseases at health facilities? Yes/No N/A

27. If yes, Obs the existence of a written case management protocol for 2 epidemic prone disease

Epidemic response

28. 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

29. Have you received feedback report in the last year from higher level? Yes/No

30. If yes, how many feedback reports has the health facility received in the last year? ___

Obs; at least 1 feedback received

31. Have you conduct meeting with community in the last 6 month? Yes No N/A

32. If yes, how often? a) Weekly b)every two weeks c) monthly d) quarterly e) as needed

Supervision

33. Did you supervise health posts in the last 6months? Yes No N/A

34. 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

35. Did you get any supportive supervision from higher level in the last 6 months? Yes No N/A

If yes, Obs; supervision feed back or any evidence for appropriate review of surveillance

Training

36. Have you trained in disease surveillance and epidemic management? Yes No N/A

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

37. Number of Staffs trained in disease surveillance and epidemic management_____.

Resources

38. Do you have the following Logistics

a) Electricity Yes/No
b) Bicycles Yes/No
c) Motor cycles Yes/No
d) Vehicles Yes/No

39. For data management

a) Stationery Yes/No
b) Calculator Yes/No
c) Computer Yes/No
d) Software Yes/No
e) Printer Yes/No

40. Communications available

a) Telephone service Yes/No
b) Fax Yes/No
c) Mail Yes/No
d) Computers Yes/No

41. Information education and communication materials

a) Posters Yes/No
b) Megaphone Yes/No
c) TV Yes/No

42. Hygiene and sanitation materials

a) Spray pump Yes/No
b) Disinfectant Yes/No

43. List Personal Protection materials (PPE) available in health facility

Attributes

A. Usefulness

44. Total population of the district under surveillance_____

45. How many cases and deaths reported in the district from the following disease past 6 month?

a. AWD cases _____Deaths _____
b. Malaria cases _____Deaths _____
c. Measles cases _____Deaths _____

46. 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

47. Do you feel that data collections on a case report form are time consuming? Yes/No

48. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

C. Flexibility

49. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

50. 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

51. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, **Obs:** Review the last months report of these diseases

52. . Average number of ***unknown or blank responses*** to variables in each of the reported forms _____
53. % of reports which are complete(with no blank or Unknown responses) from the total report

E. Acceptability

54. Do you think all the reporting agents accept and well engaged to the surveillance activities?
55. **If yes**, how many are active participants (of the expected to)? _____

56. **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

F. Representativeness

57. What is the health service coverage of the district? _____%
58. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes/ No
59. Who do you think is well represented by the surveillance data? urban / rural

G. Timeliness

60. What proportion of health facilities reports in acceptable time? ----------%

H. Stability

61. . Was there lack of resources that interrupt the surveillance system? Yes/No
If yes, how did you manage it?___
What do you suggest to overcome such problems?_____.

Health Post Level Questionnaire

Identifiers

District_____

Name of health Post_____

Respondent Name _____

Date _____

Interviewer Name _____

General Information

1. Is there PHEM national Guide line or manual at this site? Yes No NA

   If yes, Obs PHEM national guide line or manual:
2. Is the Health Post have a clinical register? Yes No N/A
3. Is a case correctly registered in the health post? Yes No N/A

   If No, state the reason; _____

   If yes, observe; 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) AWD Yes No N/A
   b) AFP (polio) Yes No N/A
   c) Measles, Yes No N/A
   d) 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. Does the health post reported accurately cases from the registry into the summary report for 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) Measles Yes No N/A
   b) Malaria Yes No N/A
   c) AFP (polio) Yes No N/A
   d) AWD Yes No N/A
8. Number of reports in the last 3 months compared to expected number

   Weekly: _____/12 times the number of sites

   Immediately: _____/-- times the number of sites
9. On time (use national deadlines)

   Number of weekly reports submitted on time:-_ /12 times health post.

   Number of immediately reports submitted on time: ___/-- times from health post .

10. How do you report?

a) Mail b) Fax c) Telephone d) Papers e) Electronic f) Other(Specify)_____

11. How can reporting be improved?

Suggest_____

12. Describe data by person, place & time (outbreaks, sentinel) Yes/ No NA

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 observe; 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 6 month? 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? _____

Observe; supervision report or feedback 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. Do you have 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 Yes No N/A
d) Printer Yes No N/A

e) Others(Specify) 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 Protective 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) AWD cases _____Deaths _____

b) Malaria cases _____Deaths _____

c) Measles cases _____Deaths _____

d) Others 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 diseases? 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, **Observe:** Review the last months report of these diseases

40. Average number of ***unknown or blank responses*** to variables in each of the reported forms _____

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?

Appendix 4 Data collection tools for health profile assessment in Yaya Gulale District, North Shewa Zone, Oromia Region, Ethiopia, 2018 G.C

1 Historical Aspects of the area

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

Location ____Distance from Zone _____Distance from Capital City (AA) _____

Altitude

Maximum_____ Minimum_____

Annual rain fall_____

Climatic zones: - High land ___ mid land ___ Low Land ___

Ethnic composition ____Language composition _____Religion composition _____

3 Political and Administrative Organization

No of kebeles_____ urban ____ rural ____

List their names with their total population (Male and Female) _____

District boundary _____

4 Population and population structures

Total_____ <5 years_____< 15 years____ >64 years_____

Male _____ urban_____

Female_____ rural_____, Literacy status___

Under 1yrs_____

5 Drinking water Sources

Protected spring _____

Un Protected spring _____

Protected well _____

Unprotected well _____

Stand pipe _____

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

Main source of the economy_____ Main crops _____ Average income/months _____

7 Educational Facilities (Transport, Telecommunication, Power supply, …)

Total number of Schools

Primary Schools accessible to water __Telephone ____Electric ____ Transportation ____ Toilets

Secondary School __accessible to water _Telephone ___Electric ___Transportation __ Toilets

Preparatory school accessible to water ___Telephone ____ Electric __Transportation ___ Toilets

TVET __accessible to water __Telephone __Electric ____ Transportation ____ Toilet

University ___accessible to water ____ Telephone ___Electric ____ Transportation ____ Toilets

Total School Age Children (target) _____Total enrolled to school _____

Dropout in the previous year _____If there is school dropout, Why _____

8 Disaster Status in the area

Was there any disaster in the district in the last one year? _____

9 Vital Statistics and Health Indicators

Infant Mortality Rate_____ Maternal Mortality Rate_____

Child Mortality Rate_____ Contraceptive Prevalence rate_____

Crude Birth Rate_____

Crude Death Rate_____

10 Immunization Coverage;

Measles___

Penta _____

Fully Immunization _____

11 Health staff population:

Physicians' _____ Health officers_____

Nurses____ Clinical ____ BSc Nurse _____

Medical lab_____ Pharmacy___, Environmental health ___

Mid wifery _____BSC_____ Diploma ____

Health Education and Promotion _____

Supportive Staffs ____ Degree____

Diploma____ Certificate _____

Health extension workers ____Others`_____

12 Health Facility

12.1 Government Facilities:-

Health facility (Hospital, HC and HP) centers have access to

Hospital accessible to water ____ Telephone ____ Electric ____ Transportation ____Toilets

Health institution to pop ratio

Hospital to Pop ____ HC to Pop. _____ HP to Pop._____

Health Center accessible to water ____

Telephone ____ Electric ____

Transportation __Toilets

Health Post accessible to water ____

Telephone ____ Electric ____

Transportation ____ Toilet

12.1 Private facilities:-

Primary Clinics ____

Medium Clinics ____

Specialty Clinics ___

RDV __

Drug Store ___

Pharmacy _____

Others ____

13 Health service coverage

Top and leading causes Mortality:-____Admission_____

Health budget allocation_____ Top and leading causes of Mortality___

14 Community Health Services;

Status of services provided by community health workers namely:

TBAs____ CHWs___ HEWs___ Other____

15 Health Care Components

MCH/FP.

ANC1 Plan ____Performance ___

ANC4 Plan ____ Performance _____

Birth attended in Health facilities

Hospital Plan ____ Performance ____

HC Plan ____ Performance ____

PNC1 Plan ____Performance ___

Birth attended by HEWs _____

Birth attended by TBA __

FP

Total FP Coverage ____(___%)

Long act FP ____ (___ %)

Short FP ____(___%)

EPI

BCG Plan ____Performance ___

OPV-0 Plan ____Performance ___ OPV -1 Plan ____Performance ___

OPV-3 Plan ____Performance ___

Penta-1 Plan ____Performance ___ Penta-3 Plan ____Performance ___

PCV-1 Plan ____Performance ___PCV-3 Plan ____Performance ___

Measles ____ Plan ____Performance ___ Fully immunized Plan ____Performance ___

PW TT2+ Plan ___ Performance _____

NPW TT2+ Plan ____Performance _____

EnvironmentalHealth_____HealthEducation___Total budget allocated for the Woreda ___Total budget allocated for health Office ____ (____%)

Different Funds from NGO _____ Total _____

1. Endemic diseases:-

Malaria

Total malarias kebeles_____ Pop at risk___

Total Suspected cases__ Confirmed cases __

Tuberculosis

Total TB cases___ PTB negative_____

PTB positive____ Extra PTB ____TB detection rate ___TB treatment success rate_____ TB cure rate_____

ITNs distributed and used __Chemical sprayed ___Health education given __ Environmental sanitation ___

TB defaulter _____

Death on Treatment _____

Total Leprosy cases_____

HIV/AIDS:-

Total screened for HIV ___

HIV/AIDS prevalence____

VCT_____ Total PLWHA_____

PMTCT____

On Pre-ART____

ON ART___ Viral load ___

Suppressed (VL<1000 copies) ___

Nutrition

Total OTP sites_____, Total admissions to OTP/yr_____

Total SC sites _____ Total admissions to SC/yr _____

Is there TSF (Targeted Supplementary Feeding) program in the woreda? ____

If yes children no. in the program, _____

Is there CBN program_____ If yes children no. in the program, _____

Essential drugs: - _____

2. What are the main problems of the district? _____

   Discussion of the highlights and the main findings of the health profile assessment and description _____

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

Appendix 5 **CONSENT FORM**

DATE____/_____/____

My Name is Deribe Girma (MLT) Addis Ababa University master of Public health in Field Epidemiology student.

This study was planned to assess the prevalence of MDR-TB and treatment outcome among tuberculosis patients attending at Fitche General Hospital in North Shewa Zone Oromia Regional state. The findings will be distributed to all necessary stakeholders of MDR-TB to improve the patients' health status.

So that you willing to respond the following questions? Yes…… No……..

If willing confirm with signature……..

Appendix 6 **MDR TB Data Collection Tool**

This questionnaire is designed to assess MDR-TB patients and its treatment outcomes among tuberculosis patients attending in Fitche General Hospital in North Shewa Zone Oromia Region.

Part 1:- Questions for socio-demographic variables of the study group.

1.1. Address of the patient Name of zone_____ District _____

1.2. Age of in year …….. 1.3. Sex 1. Male 2. Female

1.4. Religious 1.Orthodox 2Muslim 3.Catholic 4.Protestant 5. Wakefata 6. Others ----------

1.5. Ethnicity 1. Amhara 2. Oromo 3. Tigre 4. Others ----------

1.6. Marital status 1. Married 2. Single 3.Divorced 4.Widowed

1.7. Educational status

1. Illiterate 2. Read and write 3. Elementary school 4. High school 5.Preparatory 6. College diploma and above

1.8. Occupational status

1. Farmer 2. Governmental employee 3. Non-governmental employees 4. Daily labor

5. Owner private 6. Others----------

1.9.Income level

1. <1000 2. 1001-1500 3. 1501-2000 4. 2001-2500 5. 2501-3000 6. >3000

Part II. The check list of different MDR-TB registration formats

2. The recording formats forms

2.1 MDR-TB treatment card (form 01)

1. Completely filled 2.partialy filled 3. Not filled

2.2 MDR-TB registers (form 02)

1. Completely filled 2. Partially filled 3. Not filled

2.3 Request for sputum examination (form 03)

1. Completely filled 2. Partially filled 3. Not filled

2.4 Laboratory registers for genxpert (form 04)

1. Completely filled 2. Partially filled 3. Not filled

2.5 Laboratory Request for Cultures and DST (form 05)

1. Completely filled 2. Partially filled 3.not filled

3. Reporting formats

3.1. Quarterly report on MDR-TB case finding (form 05)

1. Completely filled 2. Partially filled 3. Not filled

3.2. Quarterly report on MDR-TB case Enrolment (form 06)

1. Completely filled 2. Partially filled 3. Not filled

3.3. Six month interim outcome Assessment of confirmed MDR-TB cases(form 07)

1. Completely filled 2. Partially filled 3. Not filled

3.4. Final report of treatment result of confirmed MDR-TB patients (form 08)

1. Completely filled 2. Partially filled 3. Not filled

4. Additional formats

4.1. MDR-TB suspect register

1. Completely filled 2. Partially filled 3. Not filled

4.2. MDR-TB treatment follows up register

1. Completely filled 2. Partially filled 3. Not filled

4.3. Treatment supporter card

1. Completely filled 2. Partially filled 3. Not filled

4.4. Monthly MDR-TB Treatment follow up reporting format

1. Completely filled 2. Partially filled 3. Not filled

Part III. Questionnaire related to clinical outcome of the study variable groups.

1. MDR-TB patient treatment started date……./……./……..

2. Registration category of MDR-TB disease.

1. Category I 2. Category II 3. Category III 4. Category IV 5. Category V

3. MDR-TB patients‟ treatment regimens 1. Standard regimen 2. Individual regimen 3. Empirical treatment

4. Did you use the second line drug in the past? 1. No 2. Yes

5. Did you MDR-TB patient contact history in the past? 1. No 2. Yes

6. Microscopic examination results 1. Positive 2. Negative

7. Laboratory examination of genxpert results

1. Positive 2. Negative

8. Radiological (x-ray) results of the patient 1. Unilateral cavitary 2. Bilateral cavitary 3. Abnormality (x-ray) without cavitary

9. Co morbidity of MDR-TB patients 1. Previous TB 2. Previous HIV 3. Current HIV 4. Others such as DM, HPN… 5. None co morbidity

10. MDR-TB disease type 1. PTB 2. EPTB 3. PTB and EPTB

Declaration

I the undersigned, the declare this proposal is my original work has never been presented in this or any university and agree to accepted all responsibilities for the scientific and ethical conducts of the research proposal .I will provide timely progress report to my Advisor Dr.Ayele Belachew and Mr.Abdulnasir Abagaro and need Advice. I communicated with all stakeholders involved in the study including any source of the findings for this document.

Name: Deribe Girma Signature:_____

Place: Addis Ababa University

Appendix 7 **Post and pretest for PHEM Basic training**

Pre/post Test: Disease surveillance Training for Health Facility, Wereda and Zone PHEM Officers.

(Optional): HF_____ _____ Wereda_____ Zone:_____ Code_____

Part I: Choose only one letter that best answers the question (6 points each) (HF and health offices)

1. In Ethiopia one of the following diseases is not classified as immediately reportable

a. Measles
b. Neonatal Tetanus
c. Rabies
d. Meningococcal Meningitis
e. None of the above

2. During outbreak situations of some diseases only the first few cases should be reported using the case based form. During measles outbreak how many suspected cases should be reported using the case based form

a. 2 b. 5 c. 20 d. 15

3. In Ethiopia confirmation of a single case is considered as an epidemic for:

A. Measles
B. Polio
C. AFP
D. Meningitis
E. All of the above
F. None of the above

4. One of the best tools for polio eradication is the availability of Oral Polio Vaccine (OPV). There are three types of OPV, namely trivalent OPV, bivalent OPV and Monovalent OPV. Which serotypes of polio virus are protected by bivalent OPV (bOPV)?

a. Type 1 and Type 2
b. Type 1 and Type 3
c. Type 2 and Type 3

5. What is the difference between Injectable Polio Vaccine (IPV) and Oral Polio Vaccine (OPV)?

a. OPV is killed vaccine whereas IPV is live attenuated
b. IPV has superior intestinal immunity than OPV
c. IPV has better sero conversion rate than OPV.
d. OPV has higher cost than IPV
e. IPV is associated with VAPP but not OPV.

6. The standard case definition of AFP is

a. Any child under 15 years of age with sudden onset of fever followed by weakness or floppiness of one or more limbs regardless of the cause.
b. Any child under 15 years of age with sudden onset of weakness or floppiness of one or more limbs regardless of the cause.
c. Any child under 5 years of age with sudden onset of weakness or floppiness of one or more limbs regardless of the cause.
d. Any child under 5 years of age with sudden onset of fever followed by weakness or floppiness of one or more limbs regardless of the cause.

7. In AFP Surveillance we should investigate and collect stool sample from:

a. A 5 years old child with paralysis of both legs since birth.
b. A 10 year old child presented with one week history of flaccid weakness of right lower limb which appeared 2 days after taking intramuscular injection in his right buttock.
c. A 7 years old child presented with 3 months history of flaccid paralysis of lower limbs.
d. An 11 months infant presented with spastic paralysis of left upper and lower limbs of 5 days duration.

8. What is the standard case definition for suspected measles case

a. Any person with conjunctivitis (red eye), maculopapular rash and one or more of the following: Cough coryza (runny nose) or fever.
b. Any person with cough, maculopapular rash and one or more of the following: conjunctivitis (red eye), coryza (runny nose) or fever.
c. Any child under 5 years of age with fever, maculopapular rash and one or more of the following: cough, coryza(runny nose) or conjunctivitis (red eye).
d. Any person with fever, maculopapular rash and one or more of the following: cough, coryza(runny nose) or conjunctivitis (red eye).

9. One of the following is considered as an inadequate AFP case

a. An AFP case with 1st and 2nd stool samples collected on 4th and 5th days after onset of paralysis
b. An AFP case with 1st and 2nd stool samples collected on 14th and 15th days after onset of paralysis
c. An AFP case with 1st and 2nd stool samples collected on 7th and 8th days after onset of paralysis
d. None of the Above

10. Suppose suspected measles epidemic is detected in one remote kebele of your wereda. Which of the following is true on actions to be taken?

a. Blood/serum samples for lab confirmation should be collected from the first 3 cases only.
b. Routine measles immunization should be stopped for one month in that kebele.
c. All cases should be reported using the line listing form.
d. Antibiotics should be given for all cases with cough.
e. Vitamin A should be given for complicated cases only.
f. All of the above

Part II: True or False (4 points each)

1. An immediately reportable disease should be reported to the next level within the first 48 hours of detection.
2. In AFP case investigation and follow up sixty-day follow up should be done for all AFP cases.
3. Neonatal tetanus is considered to be eliminated as a public health problem when all Woredas of a country have annual neonatal Tetanus rates of less than 1 per 100,000 live births
4. Due to the low number of malaria cases malaria monitoring charts are less useful at kebele level than at woreda level.
5. More complete reporting can be achieved with Active surveillance than passive surveillance

Part III: Work out (Zonal and Woreda PHEM Officers)

1. A Wereda with a total population of 299,540 reported 2 AFP cases till week 30. Calculate the annualized Non-polio AFP Rate at week 30. (Assume under-15 yrs are 50% of the total population). (8 points)
2. A Woreda with a total population of 299,540 reported 6 Measles cases till week 30. Two cases are positive for measles IgM and the other 4 are negative. Calculate the non-measles febrile rash illness rate at week 30. (8 points)
3. What are the major components that you are expected to incorporate during emergency plan preparation in your respective woredas/zones? (4 points)