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

Compiled body of work in Field Epidemiology

By: - Dereje Diriba Tufa (BSc)

Submitted to School of Graduate Studies of Addis Ababa University in Partial fulfillment for the degree of master of Public Health in field Epidemiology

June, 2019

Addis Ababa, Ethiopia

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Advisors

Pro. Fikre Enkusselassie

Mr. Muluken Gizaw

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Approved by Examining Board

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LIST OF Abbreviations or ACRONYMS

AA - Addis Ababa

AAU- Addis Ababa University

AIDS- Acquired Immunodeficiency Syndrome

ANC- Ante-Natal Care

AOR - Adjusted Odds Ratio

AR - Attack rate

ART- Anti Retro Viral Therapy

AWD - Acute watery diarrhea

BCG - Bacillus Chalmette Guerin

BPR - Business Process Reengineering

BSC - Business score card

BSC- Bachelor of Science

CDC - Center for Diseases Control and prevention

CDMA - Code Division Multiple Access

CFR - Case Fatality Rate

CI - Confidence interval

CMR - Child Mortality Rate

CSA - Central Statistical Agency of Ethiopia

DM - Diabetes Miletus

DTM - Displacement Tracking Matrix

EDHS - Ethiopia Demographic Health Survey

EFETP - Ethiopian field epidemiology training program

EFETP- Ethiopia Field Epidemiology Training Program

EFY - Ethiopian Fiscal Year

EIS - Epidemic Intelligence Service

EPHA - Ethiopian Public Health Association

EPHI - Ethiopia public health institute

EPI - Expanded Program on Immunization

EPRP - Epidemic Preparedness and Response Plan

EU - European Union

FDRE - Federal Democratic of Ethiopia

FMOH - Federal Ministry of health

FMOH - Federal ministry of health

FP - Family Planning

GC - Gregorian calendar

GP - General Practitioner

HC - Health Center

HCT - HIV Counseling and Testing

HEP - Health Extension Program

HF - Health Facility

HIV - Human Immune Deficiency Virus

HMIS - Health Management Information System

HO - Health Officer

HP - Health post

HSTP - Health Sector Transformation Plan

ICDDR - International Cod Disease Death Report

IDP - Internal Displaced Peoples

IDSR - Integrated Disease Surveillance Response

IgM - Immune globulin M

IHR - International Health Regulation

IMR - Infant mortality Rate

IPts - In patients

IRS - In door Residual Spray

ITN - Insecticide Treated Net

KG - Kinder Garden

LBRF - Louse born relapsing fever

MAM - Moderate Acute Malnutrition

MCH - Maternal and Child Health

MD - Medical Doctor

MDR- TB- Multi Drug Resistance TB

MMR - Measles-Mumps-Rubella

MPH- Masters of Public Health

MSF-S - Medicines frontiers

NGO- Nongovernmental Organization

NNT- Neonatal Tetanus

ODF -Open defecation free

OPD - Out Patient Department

OPV - Oral Polio Vaccine

OR - Odds ratio

OTP- Outpatient Therapeutic Feeding Program

PCV- Pneumococcal Conjugate Vaccine

PHEM - Public Health emergency Management

PITC- Provider Initiative Test and Counseling

PLWHA - People Living With HIV/AIDS

PMTCT - Prevention of Mother to Child Transmission

RF - Relapsing Fever

RHB - Regional health bureau

RRT - Rapid Response Team

SAM - Sever Acute Malnutrition

SC- Stabilization Center

SDG - Sustainable Development Goal

SIAs - supplementary immunization activities

SNNP - South Nation and Nationality of People

TB - Tuberculosis

TBRF - Tick born relapsing fever

TSF- Therapeutic Supplementary Food

UHEW - Urban Health Extension Worker

VCT- Volunteer Counseling and Testing

WHO - World Health Organization

WHO CC- World Health Organization Collaborative Center

WHO/AFRO - World Health Organization Africa Regional Office

ZHDs - Zonal Health

EXECUTIVE SUMMERY

Despite many intervention activities undertaking preventable communicable diseases are remain a public health problem globally. The Ethiopian government policy is more emphasis on prevention measures of communicable and non-communicable diseases. Also many strategies and programs were set to enhance disease prevention activities. Ethiopian Field Epidemiology Training Program that adapted from the United States Centers for Disease Control and Prevention (CDC) Epidemic Intelligence Service (EIS) is one of the programs focusing on capacity building public health practitioners. The training enables trainers to conduct disease surveillance and implement prevention and control measures of prioritized diseases.

I stayed from November 2017 to June 2019 in Addis Ababa university school of public health field Epidemiology training program and at Addis Ababa City administration Health Bureau field Base. During my stay, I carried out two outbreak investigations, surveillance data analysis, surveillance system evaluation, district health profile description, submission of one abstracts, one scientific manuscript for peer reviewed journals, one narrative summary of disaster management, and one epidemiological research proposal during my stay. We investigated two outbreaks (Measles and Relapsing fever) during field base residency. There was measles outbreak in Jeldu Woreda of west Shoa zone, Oromia region that we had investigated in February 2019. During this outbreak, a total of 179 measles cases and 2 deaths were reported from January 2019 to March 2019. Low measles vaccination, poor ventilation, malnutrition and weak community's awareness were attributed for measles in the Woreda. We recommend, strengthen routine and supplemental immunization programs, good cold chain management system and increase community awareness on measles prevention and control measures. Descriptive and analytical epidemiology methods were used to describe magnitude of the diseases and identify risk factors associated with diseases. In addition a total of 33 and 14 confirmed RF cases were reported from Woreda three of Bole sub City, Addis Ababa City administration health bureau in 2018. We identified that mass sleeping ,no changing cloth at night , no taking bath at least once every two week ,no washing cloth at least once every two week and having contact history with ill LBRF person for RF outbreak in the Woreda. We recommend to organize meeting session with representative of all sectors including the sub City administrators to discuss the way how to minimize mass sleeping houses and solutions for homeless people.

Increase awareness through continuous health information for street's or homeless people.

Homeless people must wash cloths and take bath at least once every week.

Homeless people must change their cloth at night and stack holder help cloth and close supportive supervision by sub City health office. I conducted typhoid fever surveillance data analysis at Addis ketema sub city health office, the analysis was indicate low water and sanitation coverage and I conducted surveillance system evaluation at Addis ketema sub city health office , surveillance of selected diseases (measles) was assessed. The system was satisfactory at sub City level; whereas not satisfactory at 1, 4, 5 Woredas. Poor data management, infrequent supportive supervision, absence of well-organized feedback, poor utilization of manuals and guidelines were contributed for unsatisfactory of the system at the Woreda level. Health profile description was carried in Woreda nine of Addis ketema sub City , Addis Ababa health Bureau from Janua ry 22-March 23/2018. Low community awareness and low coverage of latrine and Poor waste management in the Woreda. I prepared scientific manuscript for peer reviewed journals on typhoid fever data analysis in Addis ketema sub City health office ,Addis Ababa ,Ethiopia ,2013-2017. One abstracts were done for scientific conference submission; Measles outbreak Investigation and Intervention in Jeldu Woreda of west shoa zone ,oromia ,ethiopia, 2019.

Narrative disaster management was conducted in selected Woredas of (Hudet, Moyale and Mubarek) in Dawa zone in Ethio Somali region during 2018 to identify humanitarian needs following emergency occurrence. Malnutrition is anticipated to be a major public health concern in Dawa zone. We identified shortage of drugs and medical equipment at both zonal level and all Woreda of these zones. Epidemiological research project proposal on assessment of latrine utilization and factors associated with latrine utilization in Woreda nine of Addis ketema sub City, Addis Ababa, Ethiopia, 2019 was prepared. Descriptive cross-sectional study will be used for this study in Woreda nine. A total of population Woreda nine 35,636, HH 7424 and 422 sample households with latrine will be included in the study. The overall activities of study will be expected to finish in three month (June - September), 2019. The total estimated budget required for the study is **73,321.5 ETH** Birr**.** I prepared weekly bulletin on PHEM report of Addis ketema sub City health office for WHO Epidemiologic week 9 of 2018. The health facilities report completeness for that week was 98% and above the expected national level (80%). Dysentery cases and epidemic typhus cases were kept increasing during week 9 of 2018.

Chapter–I Outbreak Investigation

1.1 Measles Outbreak Investigation in Jeldu Woreda of west shoa zone, Oromia, Ethiopia, February ,2019

Abstract

Measles is a highly contagious respiratory tract infection caused by a morbillivirus. The disease causes high morbidity and mortality worldwide. In January, 2019, Jeldu Woreda health office informed to west shoa zone health office that there were 179 suspected measles cases identified in19 kebele of the Woreda. Hence Addis Ababa university EFETP residents were deployed to the epidemic site to confirm the existence outbreak, describe magnitude of the outbreak and identify risk factors associated with disease(1). Burden of measles was described by person, place and time.

Methods:- Unmatched 1:2 case-control study with simple random sampling selected 60 measles case-patients and 120 neighborhood controls was conducted from 27/2/2019-15/3/2019.We interviewed study participants using structured questionnaire. Epi info 7.2.1 and Microsoft Excel were used to enter and analyze the data.

Results:- A total of 179 measles cases and 2 deaths were reported from Jeldu Woreda during epidemic period. Five samples were collected for measles IgM confirmatory test and four of them are positive for IgM anti body. The case fatality rate of measles was 1.11%. Of the total of 179 cases, 91 (50.8%) were female. One hundred five (59%) and two deaths were not vaccinated for measles. Less than five years were more affected by the disease with age specific attack rate of 0.57 per 1000 population. Two health center and four health post of the Woreda did not have functional refrigerator for vaccine cold storage. Having vaccinated for measles had protective effect (AOR=:0.1852,95%CI(0.1897-0.7903). Presence of measles case in the family (AOR=5.7185,95%CI(2.1027-17.0781) Knowledge of prevention (AOR=0.1282,95%CI(0.0615-0.2573) were found to be significantly associated with measles outbreak.

Discussion:- Most of kebeles are low vaccine coverage that usually contributed for the occurrence and extent of measles outbreak. On the other hand some of measles cases inpatient admissions were developed pneumonia complication. Cross sectional retrospective study conducted in Philippines on risk factors associated with measles pneumonia identified that malnutrition was significantly contributed for measles pneumonia (11)

Low community awareness on measles treatment coupled with late detection of the outbreak may have contributed to increased cases and deaths from measles

Conclusion and Recommendation:- Low measles vaccination coverage, having contact with a person suspected to have measles, contact history of family with ill person and lack of knowledge of measles prevention were significant risk factors for contracting measles. We recommended enhance immunization programs, good cold chain system and increase community awareness on measles prevention and controls measures.

Keywords: Measles, Outbreak, Case-Control, Jeldu, Woreda, Ethiopia, 2019.

1.1 INTRODUCTION

Measles is an acute, highly contagious viral disease caused by measles virus. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva(1).

Measles is a leading cause of childhood morbidity and mortality worldwide. Despite the remarkable progress made in the control of the disease, measles continues to claim the lives of large numbers of children every year. The majority of these deaths occur in the world's poorest countries; particularly, in Sub-Saharan Africa, where a combination of factors such as overcrowding, exposure at a younger age and malnutrition contribute substantially to higher case fatality rates (2). An estimated 164,000 people died globally from measles in 2008 mostly children under the age of five. Measles is a human disease and is not known to occur in animals (3).

The risk factors for measles virus infection include: infants who lose passive antibody before the age of routine immunization, children with vitamin A deficiency and immunodeficiency due to Human immune Deficiency Virus (HIV) or Acquired Immune Deficiency Syndrome (AIDS), leukemia, alkylating agents, or corticosteroid therapy, regardless of immunization status and children who travel to areas where measles is endemic or contact with travelers to endemic areas. Malnourished and young children are at higher risk of developing complications and mortality from measles infection (4). Incubation period is approximately 10–12 days from exposure to the onset of fever and other nonspecific symptoms and 14 days (with a range of 7–18 days), from exposure to the onset of rash. Measles can be transmitted from four days before rash onset (i.e., one to two days before fever onset) to four days after rash onset. Infectivity is greatest three days before rash onset. Measles is highly contagious, secondary attack rates among susceptible household contacts have been reported to be 75%– 90%. Due to the high transmission efficiency of measles, outbreaks have been reported in populations where only 3% to 7% of the individuals were susceptible. Whereas vaccination can result in respiratory excretion of the attenuated measles virus, person to person transmission has never been shown (2). The first sign of measles is usually a high fever, which begins about 10 to 12 days after exposure to the virus, and lasts 4 to 7 days. The incubation period ranges from 7 to 18 days but on average lasts for 14 days. In the prodromal phase high grade cough, Runny nose (Coryza) and red eye (conjunctivitis) occur 2 to 4 days after the onset of the prodromal symptoms a red, blotch (maculapopular) rash occurs,

usually starting on the face and upper neck. Over about three days, the rash spreads, eventually reaching the hands and feet. The rash lasts for five to six days, and then fades in the order of appearance (4).In developing countries, up to 75% of cases may have one or more complications. These include pneumonia, diarrhea, otitis media, laryngo-tracheo-bronchitis (croup) or encephalitis. The three major causes of high case fatality are pneumonia, diarrhea and croup. Measles can lead to lifelong disabilities including blindness, brain damage and deafness. Low Vitamin A status is associated with a higher rate of complications and death from measles (5) . In Ethiopia, the expected case-fatality rate is between 3% and 6%; the highest case-fatality rate occurs in infants 6 to11 months of age, with malnourished infants at greatest risk. These rates may underestimate the true lethality of measles because of incomplete reporting of outcomes of measles illness. In certain high-risk populations, case-fatality rates as high as 30% have been reported in infants less than 1 year of age (6) .In WHO Africa Regions, the only effective preventive measure is vaccination with two doses of measles-containing vaccine, usually administered as a measles-mumps-rubella (MMR) vaccine .

National vaccine uptake of at least 95% with two doses of MMR vaccine is considered to be necessary to achieve region-wide (6) . However, a vaccination uptake of below 95% of the population in several European Union (EU) Member States has resulted in an accumulation of susceptible individuals. Thus measles has re-emerged in the region that resulted in an outbreak in sub-groups of populations with low vaccine uptake and then spread to the general population (4). In Ethiopia, measles is a common cause of morbidity and mortality in children; this demonstrates the need for achieving high quality immunization coverage. The immunization strategy is to provide two opportunities for vaccination, one through the routine activities at 9 months, which reached 92% of under one year old children in 2015 (JRF 2015, preliminary) and the second dose through scheduled preventive supplementary immunization activities (SIAs). However, due to the low coverage and prevailing poor living house conditions, measles outbreaks continue to occur frequently in different parts of the country (7) .After the report of the measles outbreak from Jeldu Woreda of west Shoa zone, team was deployed for investigation. The main aim of this outbreak investigation was to assess the magnitude, risk factor and control measure of measles infection in Jeldu Woreda of west Shoa zone, Oromia region, from 27/02/-15/03/2019 and make recommendations of the future.

1. 2 Objectives

1.2.1. General Objective

- To describe magnitude of the measles outbreak and identify risk factors associated with contracting measles in Jeldu Woreda of west shoa zone, 2019

1.2.2. Specific Objectives

- To confirm the existence of the outbreak in the Jeldu Woreda of west Shoa zone, 2019
- To describe magnitude of the disease by person, place and time.
- To identify risk factors and its sources contributed for contracting measles in Jeldu Woreda of west shoa zone
- To strength active case search and case management of measles during this outbreak.
- To propose recommendation on measles control and prevention measures

1.3. Methods and Materials

1.3.1. Study Area and period

Jeldu Woreda is one of 22 Woredas of west shoa zone Oromia region. According to population projection from 2007 census, the Woreda has a total population of 213,274 of which 107,834(50.6%) were females. Two town and 27 rural kebeles were found in the Woreda. There are six health centers and 29 health posts in this Woreda. Gojo is the capital town of the Woreda located at a distance of 90 kilometers from zonal town and 125 kilometers from Addis Ababa. The Woreda has a surface area of 3,289 kilometers square. Among total land of the Woreda, 58% is flat and the rest is mountainous, valley and sloppy nature. Of the total population of the Woreda, 90.20% are farmers and the rest 9.80% are merchant and unemployed. The Woreda is bounded by Abuna Gindeberet and Meta Robi Woredas to the North, by Ilefata Woreda to the south, by Chobi and Gindeberte Woredas to the west and by Dendi and Ejere Woredas to the east. The study was conducted from 27/2/2019- 15/3/2019 in the Woreda.

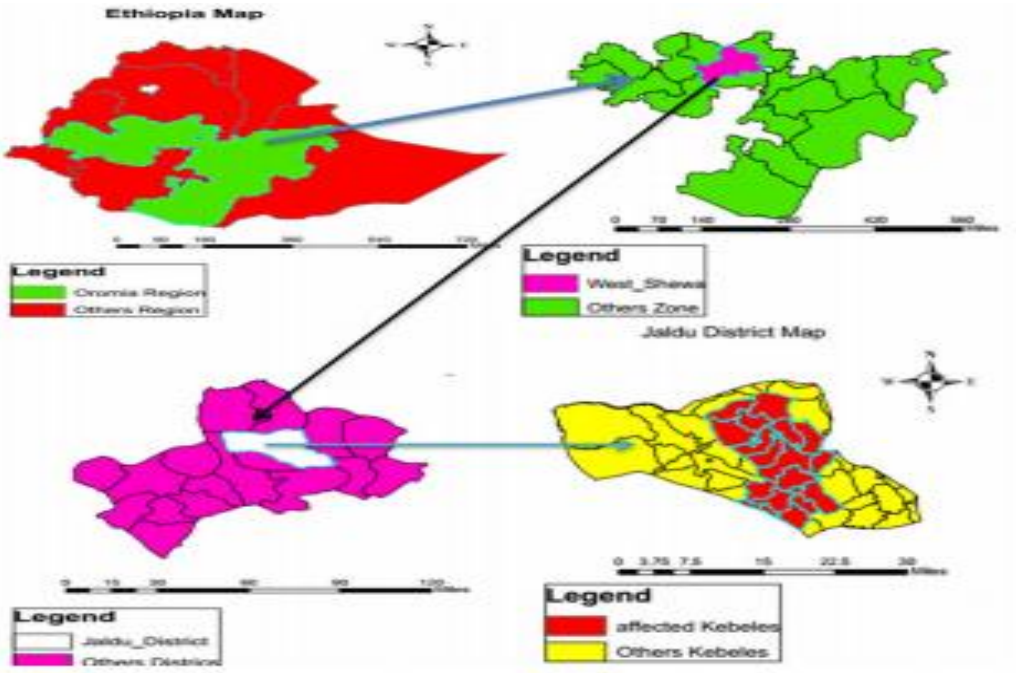

Figure 1 : Map of Jeldu Woreda kebeles affected by measles, west shoa zone, Oromia, Ethiopia, 2019

1.3.2 Operational Definition

Illiterate: 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

1.4 Standard Case Definitions

1.4.1 Measles suspected cases at community level

- A community member should report any person with rash and fever to a health worker and also advise the person to go to a health facility.

1.4.2 Suspected measles case

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

1.4.3. Confirmed measles case

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

1.4.4 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; i.e., living in the same household 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.

1.4.5 Measles death

- For surveillance purposes, a measles death is defined as 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.

1.5 Inclusion criteria

- **Cases**: Any residents of Jeldu Woreda who had signs and symptoms of measles and agreed to participate from 27/2/2019- 15/3/2019.
- **Controls**: Any resident of Jeldu Woreda who was a neighbor to a case and who did not develop signs and symptoms of measles and agreed to participate from 27/2/-15/3/2019 were included.

1.6 Exclusion criteria

- **Cases:** Those who refused to participate or unconscious were excluded
- **Controls**: Those who refused to participate as well as a family member from the same household.

1.7. Target Population

- Total population of Jeldu Woreda is study population of measles outbreak investigation.

1.8 Study Population

During this outbreak investigation, all confirmed and suspected to have measles cases, deaths and selected unmatched community controls were study population of this study.

1.9 Study Design

We used descriptive cross-sectional and case-control study design to identify the risk factors for the occurrence of measles infection.

1.10 Descriptive Epidemiology

The previous five years data of EPI coverage was reviewed and collected from the Woreda health office. Similarly, this data was collected from health facilities for data quality assurance. Also, data was gathered on current cold chain status and vaccination coverage of five year and magnitude of the disease was described by sex, age, kebeles, date of onset, vaccination status and others variable from measles line list.

1.11 Analytical Epidemiology

We conducted 1:2 ratio of case-control study in Jeldu Woreda. Cases were those who suspected to have measles by health facility workers before the study and active cases for suspected measles identified by investigation team at the community level. Neighborhood controls were selected and unmatched with measles case-patients by sex and age. Selected case-patients and controls were interviewed with standard and identical questionnaire. Different risk factors including vaccination status, contact history, housing condition, knowledge of the family assessed during this study.

1.12 Sampling Method

The cases and controls were recruited by simple random sampling method irrespective of the variables.

1.13 Sample Size

We used unmatched case-control sample size determination with a ratio of 1:2 for cases and controls.

The assumption taken from previous study indicates that, proportion of controls exposed was 10% with an OR of 0.35 and conventionally alpha level of 0.05 and beta of 0.20 for a power of 80% were used to calculate the sample size using the epi info 7.2.1 stat cal-sample size and power formula and we found a total of 180 samples of which 60 were cases and 120 controls.

1.14 Data Collection Tools and Procedure

Prior to conducting the investigation, structured questionnaire which include characteristics or variables for investigating measles outbreak in the Woreda were developed.

A questionnaire specifically designed for the case control part of the study was completed during an interview. The interview was conducted in the local language and with the subjects' parents, mostly mothers or caretaker .The principal investigator, PHEM focal person ,nurses from health centers and health extension worker were participated in data collection.

1.15 Data Processing and Analyzing

Data entered and summarized using Microsoft Excel. Analysis of different risk factors/exposures was done by using Epi info version 7.2.1. Epi-curve, magnitude and frequency of a disease was presented in figure and table forms. Measles attack rate and case fatality ratio were calculated among total cases and deaths. Additionally, estimated odds ratio and 95% confidence interval were determined through bivariate and multi variate analysis.

1.16 Data Quality Control

We used line listing for describing measles cases in terms of time, place and person. However, all data were checked for completeness before entry and analysis

1.17 Environmental Assessment

During this investigation, environmental factors that may contribute for the occurrence of measles outbreak and its magnitude were looked for. These factors include area of living house and ventilation status of the house for both selected case-patients and controls.

1.18 Ethical Consideration

Support letter was written from Federal Ministry of health and Oromia regional health bureau and west Shoa zonal health office to Jeldu Woreda health office. We obtained support and willingness to conduct the study from health office. Objective of the investigation was told to study participants briefly. Then after, their oral consent and support was asked to participate in this study. Their confidentiality was assured.

1.19 Data Dissemination

Findings of this investigation in both soft and hard copy was communicated with Oromia regional health bureau, West Shoa zonal health office, Jeldu Woreda health office and Addis Ababa University. Additionally, soft copy of the document was sent to EFETP Resident Advisors, Mentors, Co-coordinators and Field Supervisors.

1.20 Variable Specification

1.20.1 Dependent Variable

- Measles Infection

1.20.2. Independent Variable

- Measles vaccination status
- Over-crowding
- Travel history

- Contact history and awareness on mode of transmission of measles infection
- Awareness on prevention/control of measles infection and nutritional status

1.21 Results

1.21.1 Laboratory

Five blood samples were collected and sent to central laboratory for IgM confirmatory test. Of these sent samples, four (80%) of them were confirmed positive for measles IgM test.

1.21.2 Descriptive Epidemiology

A total of 179 measles cases and 2 deaths were reported from 7/12/2018 to 15/03/2019 from Jeldu Woreda.

The overall attack rate of the disease was 1.2 per 1000 population and the CFR was 1.11% in this Woreda. Among a total of two deaths reported from C/kebena and Osole kebele, two of them were community deaths. These deaths are ranges from 10 year to 15 years age. Of these deaths, 2 (100%) were females. Of the total 179 cases, 91 (50.8%) were females. Out of 179 cases, 26 (15%) of them were admitted with measles complications such as pneumonia, diarrhea, otitis media and feeding problem. The cases reach its peak between first weeks of January 2019 to third weeks of February 2019 and started to decline forth of February 2019 (figure 2).

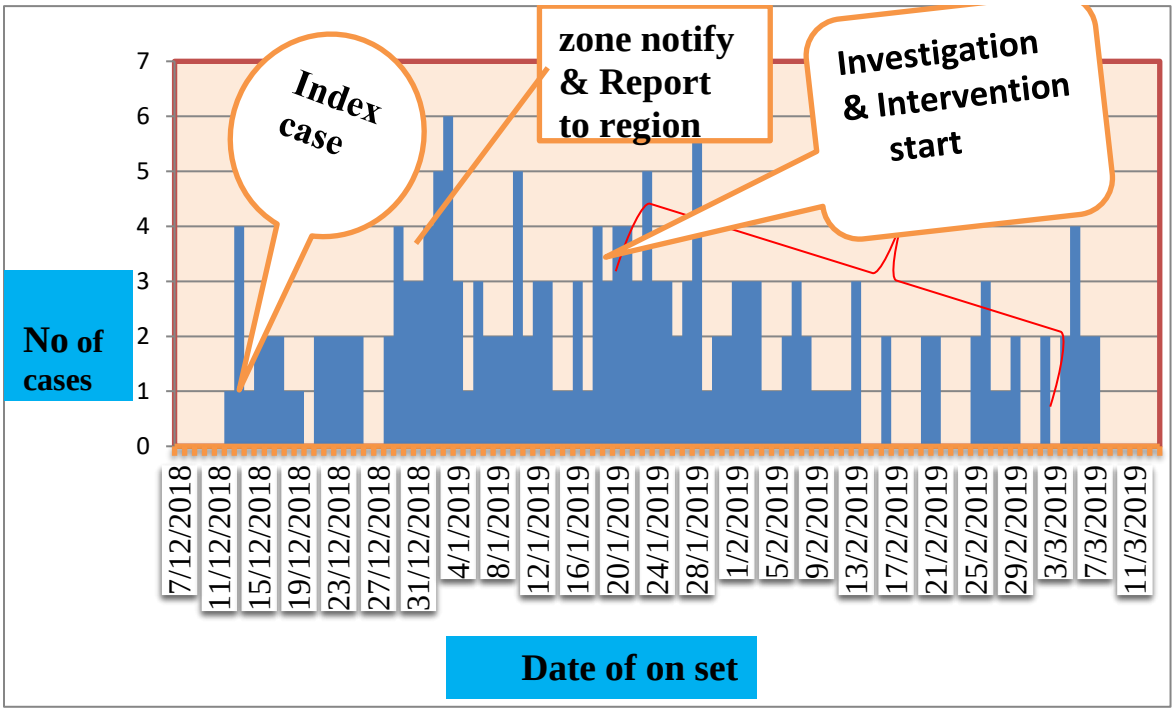

Figure 2: Epi-Curve of Measles Outbreak in Jeldu Woreda of west shoa zone, Oromia, Ethiopia, 2019

Of the total 29 kebeles of the Woreda, 19 (65.5%) kebeles were affected by this outbreak.

Of these affected kebeles, the highest attack rate (3.8 per 1000 pop) was reported from shukute kebele and followed by Gojo kebele (3.6 per 1000 population) and chancho kebene(1.9 per 1000 population Oda Bedesa 1.7 per 1000 pop. and Edensan galan 1.4 per 1000 pop.) kebeles of the Woreda (table1). The least attack rate (0.55 per 1000 pop.) was reported from Ilke kebele.

Table 1: Measles Attack Rate and Case Fatality Rate by kebele of Jeldu Woreda, west shoa zone, Oromia, Ethiopia, January, 2019– March 2019

S/No	Kebels	Total pop	Number of cases	Number of deaths	Attack Rate (per1000popn	Case Fatality Rate (%)
1	Gojo	10150	37	0	3.6	0
2	Shukute	4748	18	0	3.8	0
3	Kolu Galan	11766	9	0	0.76	0
4	Edensa Galan	7672	11	0	1.4	0
5	Tulu Bultem	9999	7	0	0.7	0
6	Tulu Gura	7003	9	0	1.3	0
7	H/Dh/Daba	7643	6	0	0.8	0
8	Kolu kilbe	11015	7	0	0.6	0
9	O /Bedesa	5312	9	0	1.7	0
10	Osole	8202	8	1	0.97	12.5%
11	S /Osole	6617	5	0	0.75	0
12	Sh/Q/Bula	5346	5	0	0.93	0
13	C/ kebena'e	6794	13	1	1.9	7.6%
14	Ilke	8968	5	0	0.55	0
15	U/Ereri	6490	5	0	0.77	0
16	Goro	4775	5	0	1.05	0
17	Taso	8151	8	0	0.98	0
18	Suki	8159	7	0	0.85	0
19	Becho	9299	5	0	0.53	0
	Total	146,393	179	2	1.2	1.11%

Table 2 :-Measles cases by Age and Sex category, Jeldu Woreda, west Shoa zone, Oromia, Ethiopia, January, 2019– March 2019

Age group	Sex		Total Number of cases
	Male (%)	Female (%)	
Under one	1 (0.56%)	3 (1.67%)	4 (2.23%)
1-4 year	41(22.9%)	39(21.8)	80 (44.7%)
5-14 year	17(9.5%)	16(8.93%)	33(18.43%)
15 -24 year	24(13.41%)	24(13.41%)	48(26.82%)
25-44 year	5(2.8%)	9(5.02%)	14(7.82%)
45-64 year	0	0	0(0%)
65 + year	0	0	0 (0%)
Total	88(49.2%)	91(50.8%)	179 (100%)

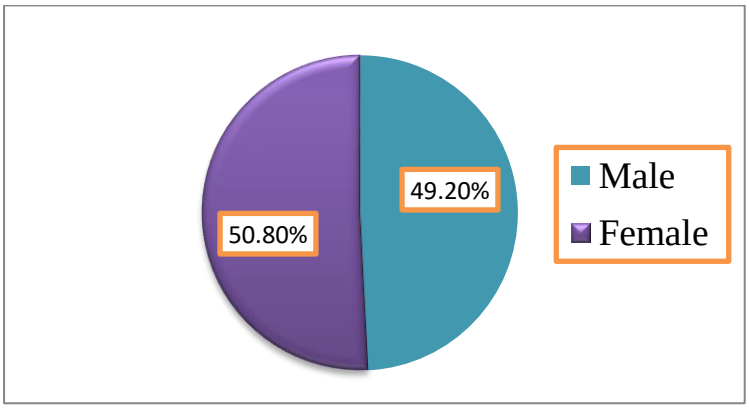

Figure 3: Measles cases by sex in Jeldu Woreda, west Shoa zone, Oromia, Ethiopia , 2019

Under five years age was more affected by the disease with attack rate of 46.9 per 1000 population. 105 (59%) cases and all deaths were not vaccinated for measles; whereas only 42 (23%) of them were vaccinated and the rest of 32(18%)was unknown .

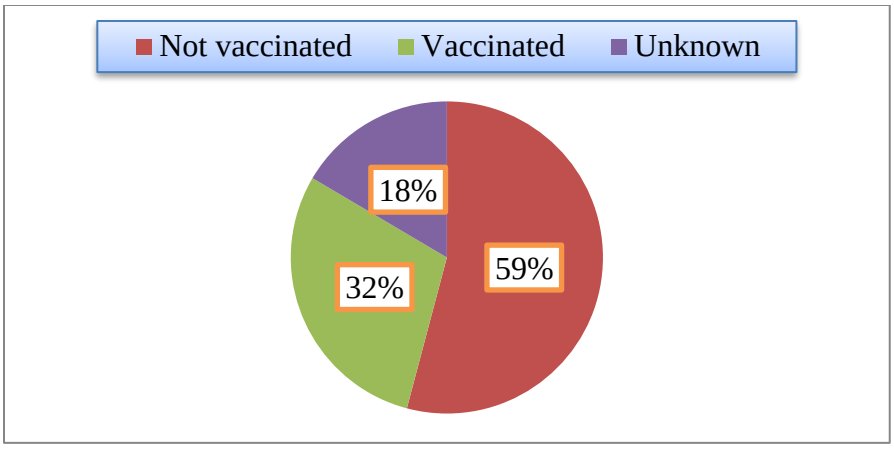

Figure 4:-Measles vaccination status of cases in Jeldu Woreda, west Shoa zone, Oromia, Ethiopia, 2019

1.21.3 Cold Chain

Six of government Health facility (four health posts and two health centers) of the Woreda do not have functional refrigerator for protection of vaccine efficacy. Due to this reason, the catchment of the health center are performing routine EPI and supplemental immunization activities by shipping the vaccines from two health centers found in their Woreda.

1.21.4 Vaccination Coverage

Measles vaccination coverage of the Woreda was 62% at 2018 and Due to outbreak occur measles vaccination campaign conducted in 2019 was 93% performance achieved.

Table 3:-Measles vaccinations coverage of Jeldu Woreda, west shoa zone, Oromia, Ethiopia, 2019

Year	Target	Achievement	%
2014	7898	6215	78.6
2015	8129	7263	89
2016	8372	8164	98
2017	6426	4997	78
2018	6612	4352	62

1.21.5 Analytical Epidemiology

In this investigation a total of 60 measles case-patients and 120 neighborhood healthy controls were selected with a ratio of 1 case to 2 controls. Selected controls were unmatched with case-patients. Among a total of 60 interviewed cases, 39 (65%) were females and 21 (35%) were males. The mean and Standard deviation age of case-patients was, 7.4 and 6.925 respectively.

Table 4:-Demographic Characteristics of measles case and control in Jeldu Woreda of west shoa, Oromia, 2019

S.No	Variables		Case		Control		Total
			No	%	No	%	
1	Age group	<1	4	6.67	2	1.67	6(3.3%)
		1 to 4	28	46.67	48	40.00	76(42.2%)
		5 to 14	17	28.33	45	37.50	62(34.4%)
		15-24	10	16.67	24	20.00	34(19%)
		25-44	1	1.67	1	0.83	2(1.1%)
2	Occupational status of the case/control	Farmer	3	5.0	6	5.0	9(5%)
		Merchant	0	0.0	1	0.8	1(0.6%)
		House wife	1	1.7	3	2.5	4(2.2%)
		Un employed	2	3.3	2	1.7	4(2.2%)
		Student	7	11.7	21	17.5	28(15.6%)
		NA	47	78.3	87	72.5	134(74.4%)
4	Religions	Orthodox	31	51.67	80	66.67	111(61. %)
		Protestant	28	46.67	40	33.33	68(37.8%)
		Muslim	1	1.67	0	0.00	1(0.6%)
5	Ethnic groups	Oromo	60	100.0	120	100.0	180(100%)
		Others	0	0.0	0	0.0	0 (0.0%)
6	Educational Level of Case/Control	KG	3	5.0	2	1.7	5(2.8%)
		Primary	7	11.7	14	11.7	21(11.7%)
		Secondary	4	6.7	9	7.5	13(7.2%)
		Tertiary	5	8.3	3	2.5	8(4.4%)
		NA	41	68.3	92	76.6	133(73.9%)
7	Educational Level of mother/care taker	Illiterate	39	65.0	98	81.7	137(76.1%)
		Primary	20	33.3	22	18.3	42(23.3%)
		Secondary	0	0.0	0	0.0	0(0.0%)
		Tertiary	1	1.7	0	0	1(0.6%)
8	Marital Status of Cases/Control	Single	7	11.7	9	7.5	16(8.9%)
		Married	3	5.0	7	5.8	10(5.6%)
		Divorced	0	0.0	0	0.0	0(0.0%)
		NA	50	83.3	104	86.7	154(85.6%)
9	Family Size	Crowded	54	90	83	69.2	137(76.1%)
		Normal	6	10	37	30.8	43(23.9%)

Vaccination status was significantly associated with measles cases (AOR,95%CI: 0.1852,(0.1897-0.7903). Bivariate analysis showed that having contact history with a person suspected to have measles case during the last 2-3 weeks was significantly associated with the

presence of the illness with AOR (5.7185,95%CI(2.1027-17.0781)). Travel history of patient is attributed for the disease that scored (AOR= 0.849995%CI(0.496-0.833). Crowdedness was one of the contributing factor for the occurrence of measles with AOR of (1.2533, 95% CI (0.649-1.07)). However; Education knowing measles prevention (AOR 0.1282, 95%CI (0.0615-0.2573)) was associated with contracting measles.

Table 5: Selected characteristics of measles case-patients and controls with their significance, Jeldu Woreda , west Shoa zone, Oromia, Ethiopia , 2019

S.No	**Variables**		**Case No.(%)**	**Control No.(%)**	**Crude OR(95%CI)**	**P-Value**
1	Age Group	<5 yrs	32(53.33%)	50(41.67%)	0.0105(0.035-0.244)	0.14
		>5 yrs	28(46.67%	70(58.33)		
2	Sex	Male	21(35%)	56(46.67%)	0.6154(0.3249-1.1675)	0.13
		Female	39(65%)	64(53.37%)		
3	Family Education status	Illiterate	13(21.67%)	28(23%)	0.9(0.4311-1.92	0.515
		Educated	47(78.33%)	92(76.67%)		
4	Vaccination status	Yes	13(21.7%)	50(41.7%)	0.1852(0.1897-0.7903)	0.008
		No	47(78.3%)	70(58.3%)		
5	Travel History	Yes	1(1.67%)	1(0.83%)	0.8499(0.496-0.833	0.6174
		No	59(98.33)	119(99.17%)		
6	Contact history	Yes	14(23.33%)	6(5%)	5.7185(2.1027-17.0781)	0.000187
		No	46(76.67%)	114(95%)		
7	Crowdedness(family size)	Normal	54(90%)	83(69.2%)	1.2533(0.649-1.07	0.0019
		Crowded	6(10%)	37(30.8%)		
8	Knowledge of prevention	yes	15(25%)	87(72.5%)	0.1264(0.0615-0.2573 **)**	0.000
		No	45(75%)	33(27.5%)		

1.21.6 Environmental Assessment

Housing condition of households in their ventilation status was not significantly associated with the disease (OR: 0.86, 95% CI 0.649-1.07)). The family size and estimated area of the house for interviewed case-patients and controls was compared (table 6).

Table 6: Family size and estimated area of the house for interviewed measles case-patients - and controls, Jeldu Woreda, West Shoa zone, Oromia, Ethiopia, 2019

Case status	Family size			Estimated Area of the House (M2)		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Case	2	6	4	6	13	9
Control	2	8	5	8	15	12

1.21.7 Public Health Interventions

Active measles case search and management were conducted in all affected kebeles of the Woreda. Additionally, Antibiotics drugs and vitamin A for measles treatment were mobilized from zonal health office. Tracing of vaccination defaulters were conducted in all kebeles. Woreda health office and health center professionals were sensitized on measles case detection and management. Communities were taught and mobilized on measles prevention and control measures.

1.22. Discussion

Many factors may contribute for the occurrence of measles outbreak in this Woreda. Measles outbreak is expected and could frequently occur in area with low measles immunization coverage and poor cold chain management. From the measles vaccination coverage of the last five years (2014 – 2018), we were able to observe that except the coverage in 2016 (97.5%) the rest were below 90%. Similarly, the average coverage of three years (2016 – 2018) in highly affected two kebeles namely Gojo and Shukute were 65% and 51% respectively. This shows that low vaccination coverage in the resulted from poor community mobilization activity was attributed for the occurrence of the outbreak. Additionally, absence of functional refrigerator in two health center and four health post may alter vaccine potency given at these kebeles level that contributed for measles since 23% of cases had history of vaccination status. Our study exhibited that presence of ill person in the family of in house was significantly contributed for the outbreak. Similarly, measles outbreak case-control study in china documented that basement of internet café which have comparatively poorer ventilation was a stronger risk factor for acquisition of measles (8) . Additionally, in this area the crowdedness of house may support measles transmission in the family. This can be explained that WHO recommends 11 or more meter square floor space for 2 persons, 9-10 for 1.5 persons and 7-9 for 1 persons (8) . However, in studied area the mean of family size for cases was 4 and the mean of estimated area was 9 meter square. This indicated that area of the house and number of persons did not coincide with WHO recommendation which may create favorable condition for measles transmission with in the family. The case fatality rate in this Woreda was 1.11 %. A retrospective, community-based study conducted in West Hararghe zone in Ethiopia following a measles outbreak in 2007 estimated that the case- fatality rate was 6.7% (9) . Similarly, several studies in other countries documented that case fatality rates were >2.4% including a case fatality rate of 18.2% among cases aged < 5 years during an outbreak in Niger (10) . Current estimates of CFR used by WHO

in endemic countries range between 0.05% - 6%. In these findings case-fatality rate was in this range. Most of kebeles are low vaccine coverage that usually contributed for the occurrence and extent of measles outbreak. On the other hand some of measles cases inpatient admissions were developed pneumonia complication. Cross sectional retrospective study conducted in Philippines on risk factors associated with measles pneumonia identified that malnutrition was significantly contributed for measles pneumonia (11) .

Low community awareness on measles treatment coupled with late detection of the outbreak may have contributed to increased cases and deaths from measles.

1.23 Limitation

- At the beginning of the outbreak investigation, there was a challenge of communities to bring measles case-patients to health facilities for modern treatment. However, this was gradually formed through intensive health education.
- Measles line-list was not properly filled by the workers until the zonal and Regional team arrived there and made corrections on.
- Absence of child immunization card at household level .

1.24 Conclusion

We confirmed the presence of measles outbreak in Jeldu Woreda of west shoa zone. The results of this investigation documented that low measles vaccination coverage in the Woreda was the main contributed factors for the size and severity of the outbreak. During this outbreak, age of 1-4 years children were more affected by measles compared with others age groups. Low community awareness on immunization service was also associated with the disease. Due to high magnitude of pneumonia in the Woreda, this outbreak was aggravated mainly in two kebeles from where more admissions of Pneumonia and otitis media were reported. Additionally, inadequate cold chain storage of vaccines and their low vaccine coverage were significantly contributed for the outbreak.

- Ventilation status and estimated area of the house were contributed for the transmission and magnitude of measles outbreak in Jeldu Woreda. The disease surveillance was poor as they detected lately

1.25. Recommendation

- Mop-up mass vaccination campaign should be conducted throughout the Woreda and its bounded Woredas mainly in especially for those their routine vaccination coverage is cheeked by zonal Health office and Routine EPI service should be strengthened
- Cold chain management should be improved and fridge should be distributed for Health center and health post and should be functional throughout the month.
- Strong social mobilization should be conducted to increase the community awareness on uses of immunization, and measles prevention and control mechanisms.
- Zonal and Woreda health office conduct active surveillance activities of the need to be revised and strengthen to enable early detection of the outbreak.
- Assessment of factors that contributed for low immunization coverage mainly among communities should be conducted to enhance routine immunization activities of the Woreda.

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1.2. Relapsing **fever outbreak investigation in Woreda three of Bole Sub City, Addis Ababa, Ethiopia, January 2019**

Abstract

Relapsing fever is a disease caused by louse or tick born transmitted bacteria of the genus Borrelia. It occurs worldwide but is most common in Africa where it is one of the most prevalent bacterial diseases. The main manifestation is a recurring fever which coincides with massive numbers of bacteria in the blood. Severity ranges from asymptomatic to fatal.

The host gene expression pattern is indistinguishable from that of uninfected animals, indicating that persistent bacteria are not recognized by the immune system not due they cause noticeable tissue damage(1).

Relapsing fever is a common cause of pregnancy complications, miscarriage and neonatal death in sub-Saharan Africa. We established a murine model of gestational relapsing fever to study the pathological development of these complications. Borrelia duttonii infection during pregnancy results in intrauterine growth retardation as well as placental damage and inflammation. Spirochetes cross the maternal- foetal barrier, resulting in congenital infection. Further, pregnancy has a protective effect, resulting in milder disease during pregnancy. The bacteria have a wave-like appearance with a length of about10µm. The length is very variable, especially during in vitro cultivation where it differs with growth rate but also between single bacteria(1).

Epidemics have been common in overcrowded situations with poor hygiene; street children and women are more affected. In Ethiopia, LBRF is within the 7th causes of hospital admissions, associated with significant morbidity and mortality(2) . Laboratory confirmed RF cases were identified in prison camps of Bahirdar and Mekele during civil war in Ethiopia in 1991(3).

Methods: Outbreak data of RF from line list and patient card were reviewed. Clinical examination of suspect cases was done. Blood samples were taken from suspected cases and laboratory tested using Gimisa stain and thick blood film was used. A case control study was conducted on 33 cases and 66 controls. Data were analyzed using Excel and Epi – Info 7.2.1

Results : We identified a total of 33 LBRF cases of mean age and SD ,16.6 and 2.38 respectively and [ranging: 12-24-year]. AR=9/10,000 **.**Multivariate population analysis showed that mass sleeping [(AOR) was 15.9873(95%CI [2.015_48.314]a risk factors for LBRF.

Conclusions

In Bole Woreda three, LBRF is still an important health problem .Poor personal hygiene among street, overcrowding (close contact), not taking bath at least every two week and lack of alternative cloths might contribute to increase the magnitude of the outbreak.

Recommendations

- Health education should be provided towards LBRF prevention in the Woreda .
- The outbreak was contained due to prompt intervention measures taken by Woreda health office
- Intervention activities were recommended to prevent the emergence of future outbreaks of relapsing fever.

Key Words: Crowding, close contact, Borrelia recurrentis, Relapsing fever

1.2.1 Introduction

Relapsing fever is a disease caused by louse or tick born transmitted bacteria of the genus Borrelia. It occurs worldwide but is most common in Africa where it is one of the most prevalent bacterial diseases(4).

The main manifestation is a recurring fever which coincides with massive numbers of bacteria in the blood. Severity ranges from asymptomatic to fatal. Relapsing fever is usually considered a transient disease. In contrast, B. duttonii causes a persistent, residual brain infection in C57BL/6 mice which remains long time after the bacteria are cleared from the blood(5). The host gene expression pattern is indistinguishable from that of uninfected animals, indicating that persistent bacteria are not recognized by the immune system nor do they cause noticeable tissue damage.

This is probably due to the quite low number of bacteria residing in the brain. The silent infection can be reactivated by immune suppression allowing bacteria to re-enter the blood. To investigate if the residual infection is in a quiescent state or if the bacteria are actively dividing, mice with residual brain infection were treated with the cell-wall disrupting antibiotic ceftriaxone, which is only active against dividing bacteria(4). Since all mice were cured by ceftriaxone we conclude that the bacteria are actively growing in the brain rather than being in a latent, dormant state(6). The brain is used as an immuno privileged site to escape host immune defence and probably as a reservoir for bacteria(6). RF is a common cause of pregnancy complications, miscarriage and neonatal death in sub-Saharan Africa. We established a murine model of gestational relapsing fever to study the pathological development of these complications. B. duttonii infection during pregnancy results in intrauterine growth retardation as well as placental damage and inflammation. Spirochetes cross the maternal-foetal barrier, resulting in congenital infection. Further, pregnancy has a protective effect, resulting in milder disease during pregnancy. The bacteria have a wave-like appearance with a length of about 10µm. The length is very variable, especially during in vitro cultivation where it differs with growth rate but also between single bacteria. The diameter is between 0.2-0.5µm and is fairly constant within a strain (Barbour and Hayes 1986)(7).

Two species of Borrelia are associated with a relatively high rate of relapsing fever–related fatality include B. recurrentis (the cause LBRF and the focus of this study) and B. duttoni (the cause of TBRF). The body louse spreads during direct contact with infected people or indirectly when infested clothing is shared. In the 1st half of the 20th century there was 50 million affected

by relapsing fever with case fatality rates of 10% - 40%. Largest epidemics claimed 1 million lives during World wars I and II(5). Epidemics have been common in overcrowded situations with poor hygiene; street children and women are more affected. Relapsing fever was the 7th most common cause of hospital admission and 5th most common cause of death in Ethiopia in 2004. Laboratory confirmed RF cases were identified in prison camps of Bahirdar and Mekele during civil war in Ethiopia in 1991 (3)

1.2.2 Objective

1.2.2.1 General Objective

To investigate RF outbreak, identify risk factors, and implement public health control measures in Jan, 2019.

1.2.2.2 Specific Objective

To verify the existence of outbreak in the Woreda three of Bole sub City ,Addis Ababa,2019

To characterize outbreak in terms of person, place and time in Woreda three of Bole sub City ,Addis Ababa, Ethiopia,2019

To identify factors contributing to the occurrence of louse born relapsing fever outbreak

1.2.3 Methods and Materials

1.2.3.1 Study area

The outbreak investigation was conducted in Woreda three of Bole sub City, Addis Ababa. There was one health center in Woredas and Total population of **37,000**. Among those 51%(18870) were female.

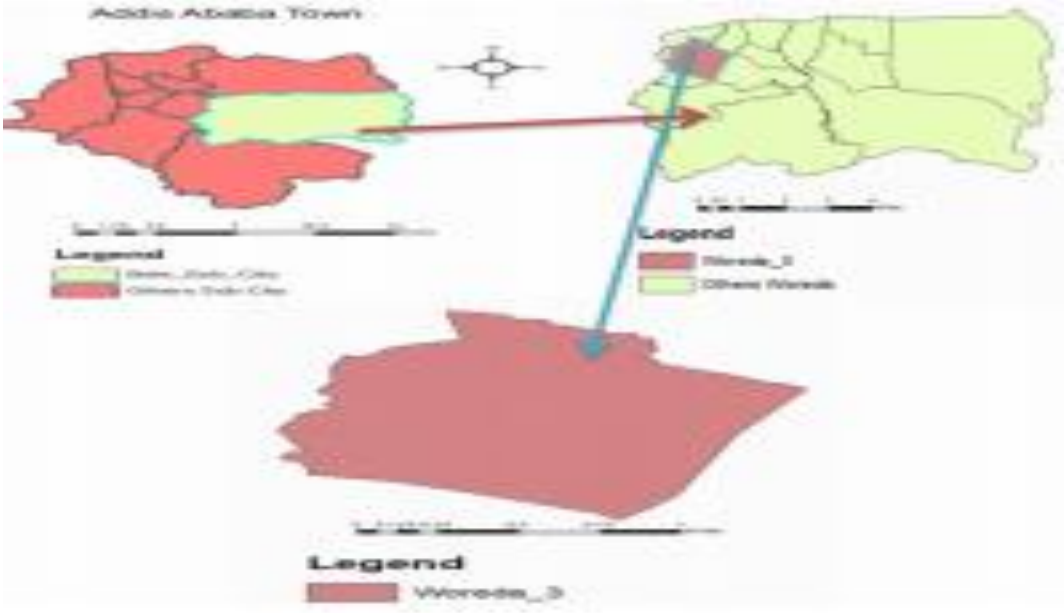

Figure 5:-Map of Relapsing fever affected Woreda three, Bole sub City, Addis Ababa, Ethiopi 2019

1.2.3.2 Study period

Study was conducted from January 2/2019 -January 15th/2019. 33 people were affected of which 24(72.7%) were males.

1.2.3.3 Study design and Sampling

Unmatched case –control investigation was conducted 33 cases unmatched with 66 controls that had no previous history of relapsing fever living in the same village as the cases.

Line list of cases was taken and followed daily within the study period or January 2/2019 - January 15th/2019, cases and controls interviewed using structured questionnaire, their sleeping spaces were observed and all information(mass sleeping, homeless people, not changing cloths and not take bath etc) hypothesized as risk factors for the relapsing fever outbreak was collected..

1.2.3.4 Source and study population

Total population of the Woreda and target population investigation was all patients with louse born relapsing fever cases in the community and fulfills the case definition/confirmed cases of louse born relapsing fever in affected Woreda three of Bole sub City, Addis Ababa, Ethiopia .

1.2.3.5 Data collection procedure

Data was collected with line list, observation of sleeping space and case management; purposively selected Surveillance focal person and health worker interviewed at all level and

discussion on health seeking behavior with homeless (Street) People. Cases were define using WHO standard LBRF case definition, for analytic analysis 33 LBRF cases and 66 control (cases to control ratio 1:2) were interviewed using standard questionnaire that included Socio demographic, Knowledge to disease ,exposure, and risk factors were included. Active case search was conducted. Discussion was conducted with Addis Ababa health bureau, Bole sub City health office, Bole 17 health center health personnel .

1.2.3.6 Case Definitions

Suspected: Any person who presented with an abrupt onset of rigors with fever, usually remittent, with headache, arthralgia and myalgia, dry cough, or epistaxisis.

Confirmed: A suspected case with demonstration of Borrelia in peripheral thick blood film

Epidemiologically Linked cases:-is a suspected case, which has contact (possibly got borrelia reccurentus with laboratory confirmed case or another epidemiological linked.

Index case: Suspected or confirmed louse born relapsing fever cases **(**case that met the criteria for the standard LBRF case definition) that initiate the public attention and visit health facility.

1.2.3.7 Data processing and analysis

The data were entered and analyzed using excels MS and Epi Info Version 7.2.1.

Results were presented using descriptive table and chart . Attack rate, P-value and 95% confidence interval (CI) for adjusted odds ratio (OR) were used in deciding the significance of the associations.

1.2.3.8 Data quality control

We used case based and line listing for describing louse born relapsing cases in terms of time, place and person. However, all data were checked for completeness before entry and cleaned before analysis.

1.2.3.9 Inclusion criteria

Cases: - Any resident in Woreda three of Bole sub City who tested positive laboratory confirmed cases and had symptoms of who agreed to participate in the study was included

Control: - A control was any neighborhood of case and who did not develop signs and symptoms of LBRF and who agreed to participate in the study was included

1.2.3.10 Exclusion criteria

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

C**ontrols**: Those who refused to participate, were exclude as well as family members from same household.

1.2.3.11 Ethical issues

A support letter was obtained from Addis Ababa Health Bureau and as this was emergency epidemic investigation conducted as part of public health intervention and oral informed consent was obtained from participant in the study. Confidentiality was assured and no personal detail were recorded or produced in this documentation.

1.2.4 Results

1.2.4.1 Descriptive Epidemiology

We identified a total of 33 louse borne relapsing fever (LBRF) cases with no deaths from December 24, 2018 to January 15, 2019. All the cases were reported from locality of "Chereka Sefer " around new stadium in Woreda three of Bole sub City, Addis Ababa. To confirm this outbreak 18 blood samples were taken and tested. Of which 14(42.4%) were positive for LBRF. The Index case was a 13 years old young man first seen in Bole 17 health center on December 24, 2018.three members of this index case was got sick at different time. All the cases were from "Chereka Sefer" who was homeless living of the street people.

Table 7: Socio Demographic characteristics of study participants, Woreda three of Bole sub City, Addis Ababa, Ethiopia, 2019

Variables		Case status				Total
		Case		Control		
Sex		No	%	No	%	
	Male	24	33.80	47	66.20	71(71.72%)
	Female	9	32.14	19	67.86	28(28.28%)
Age group (year)	5-14	6	31.58	13	68.42	19(19.19%)
	15-24	27	33.75	53	66.25	80(80.81%)
Religion	Orthodox	23	32.39	48	67.61	71(71.72%)
	Muslim	9	39.13	14	60.80	23(23.23%)
	Protestant	1	20.00	4	80.00	5(5.05%)
Ethnicity	Amahara	19	32.76	39	67.24	58(58.59%)
	Oromo	8	34.78	15	65.22	23(23.23%)
	Others	6	33.33	12	66.67	18(18.18%)

Educational Status	Illiterate	7	87.50	1	12.5	8(8.08%)
	Elementary	25	29.41	60	70.59	85(85.86%)
	Secondary	1	25	3	75	4(4.04%)
	Higher education	0	0	2	3.03	2(2.02%)

1.2.4.2 Description of RF cases by time

At the time of the outbreak investigation, the duration of the outbreak reaches six days. The epidemic curve showed that propagated (person-to-person) type of an outbreak which had multiple peaks of onset of fever which lasted from 24/12/2018-15/01/2019.

The outbreak starts during the WHO Epidemiologic week52/2018 and the highest peak of the outbreak was during the this week of 52/2018 followed up to week 3/ 2019.

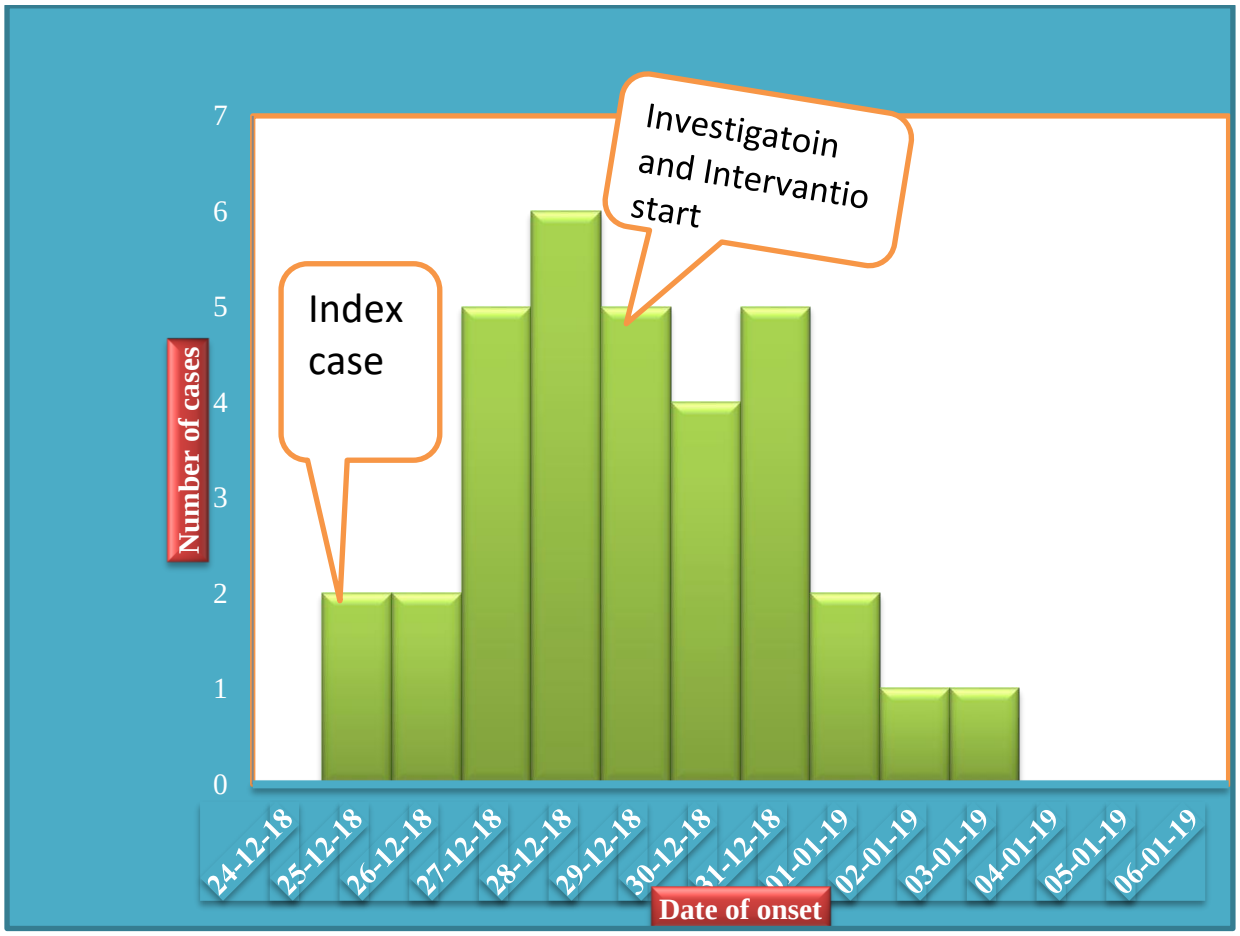

Figure 6: Epi Curve of RF outbreak of Woreda three of Bole Sub City, Addis Ababa Ethiopia, 2019

1.2.4.3 Descriptions of RF cases by person and place

Between 24 December 2018 and 15 January 2019, we detected with 42.4% laboratory confirmed relapsing fever cases. All of the cases were from "Chereka Sefer "of street people of Woreda three of Bole Sub City. The overall attack rate was 9 per 10,000 populations. The proportion of cases were higher in male 24(72.73%) compared with female. Eighteen case blood samples were tested and fourteen were positive for louse born relapsing fever B.recurentus. Hence, based on previous zero report of LBRF and the laboratory result typical louse born relapsing fever clinical manifestation and epidemiologically linked with laboratory confirmed cases, and the outbreak was confirmed and cases were treated as LBRF.

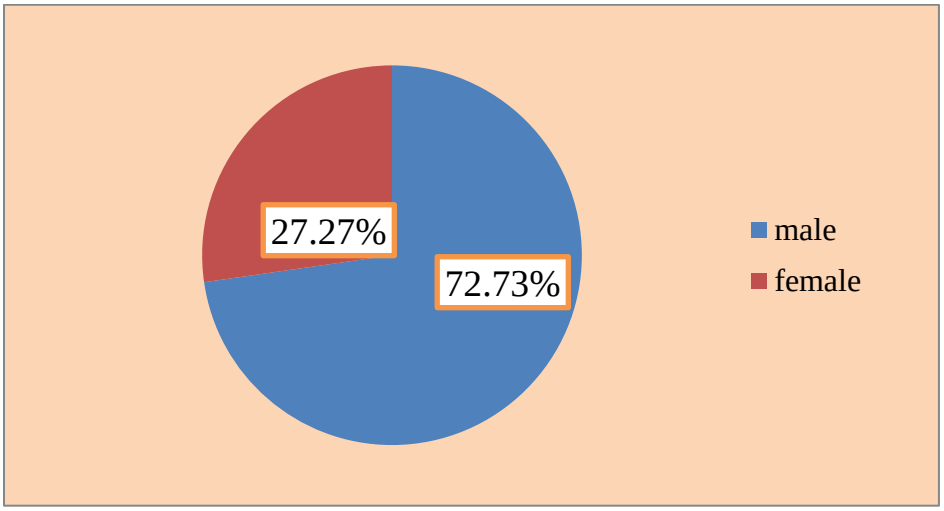

Figure 7: Proportions of RF cases by sex, Woreda three, Bole sub City, Addis Ababa, Ethiopia , 2019

1.2.4.4 Analytic Epidemiology

A total of 33 cases and 66 controls were included into this study to identify the risk factors associated with LBRF. The mean age and SD of the cases were 16.6 year and 2.38 respectively and median 16-year ,[ranging: 12 - 24-year]. Cases have a history of head ache 33(100%), fever 33(100 %), Chills 23(69.69%), joint pain 23(69.69%) and Nausea 11 (33.33 %).

Bivariate logistic regression analysis of respondents of the study 87.877% (29) patients and 30.3% (20) controls were more than three people sleeping together (OR=15.9873,95%CI [2.015-48.314],Not taking bath at least every two weeks (OR=27.532,95%CI[2.233-37.321],Contact with LBRF ill person (OR=8.6,95%CI [2.334-31.014], did not wash their clothes at least every two weeks (OR=13.121,95%CI[2.364-21.519], Not changing cloths at night (OR=23.615,95%CI [7.4733 -81.305]and p–value 0.000) and the associations were statistically significant.

Table 8: Factors associated with LBRF identified by Bivariate analysis of participants Woreda three, Bole sub City, Addis Ababa, 2019

Risk Factor	Case				Control				AOR	95% CI
	Yes	%	No	%	Yes	%	No	%		
More than 3 people Mass sleeping together	29	87.9	4	12.1	20	30.3	46	69.7	15.9873*	2.015 - 48.314
Not taking bath at least Every two week	28	84.9	5	15.2	11	16.7	55	83.3	27.532*	2.233 - 37.32
Not washing clothes at least Every two week	26	78.8	7	21.2	14	21	52	79	13.436	2.364 - 21.519
Not changing cloths at night	29	87.9	4	12.1	15	22.7	51	77.3	23.615*	7.4733 - 81.3058

* Significant

Multivariate analysis of mass sleeping (AOR =15.987,95% CI [2.015 - 48.314]), not changing cloth at night AOR=23.615,95%CI(7.4733-81.3058), Not taking bath at least Every two weeks (AOR 27.532,95%CI[2.233 - 37.32]) and Not washing clothes at least Every two weeks (AOR 13.436,95%CI[2.364 - 21.519]) showed a statistically significant association.

The likelihood of acquiring relapsing fever for those who were sleeping more than three was about sixteen times that those who were sleeping less than three person in a room , those who were not changing cloth at night was about twenty four times that those who was changing cloth at night, those who were not washing clothes at least every two weeks was about thirteen times that those who was washing clothes at least every two weeks and those who were not taking bath at least every two weeks was about twenty eight times that those who was taking bath at least every two weeks .

Table 9: Factors significantly associated with LBRF identified by multivariate analysis, 2019

Independent risk factor	p-Value	AOR	95 % CI for Exposure	
More than 3 people sleeping together	0.000	159873	Lower	Upper
			2.015	48.314
Not changing cloths at night	0.000	24.65	7.4733	81.3058

No statistical difference was found on age, sex, and educational status compared both cases and control. There was shortage of water for personal hygiene for cases.

Public health Intervention undertaken to contain the outbreak

Observation of the situation of street people

- Around the Bole new stadium there was 50 mass plastic sleeping houses
- The minimum number of homeless people who slept in a small room was two and the maximum was ten
- Almost all street or homeless people had no alternative cloth for day and night

Actions Taken

Discussion was made with Addis Ababa city administration health bureau and department of public health emergency officer, Bole sub City health officer, Woreda three health office and the team engaged in activating epidemic response task force to participate in active case detection & educating at gatherings to prevent and control the outbreak. The team engaged mass screening and conducted daily reporting cases to next level, supportive supervision in the case management & epidemiological linkage. Health education for all street and delousing was done and Mass sleeping houses of were clothed sprayed with Diazinon 60% within three days.

1.2.5 Discussion

Our investigation revealed LBRF outbreak in Woreda three of Bole sub City, Addis Ababa City Administration. The index case was on 24th of December 2018 in Bole 17 Health center reported by the PHEM focal person and Woreda three health offices and the study was conducted from January 2/2019 -January 15/2019. All cases 72.7% (24) were male streets within age range of 12 -24 years. There is no cases was reported the least 51 epidemiological weeks in 2018 (zero cases) reported to the regional health bureau in the same period. The overall attack rate (AR) was 9 per 10,000 populations and there was no death during the outbreak as compared with outbreaks occurred in other parts of Ethiopia(3). This could be due to high number of cases, lately

detection, by Woreda health office; (1.9 in Asella hospital, 3.6 in Hosaena hospital and 4.6 Gondar, 2.6 Baher-der of Ethiopia(3, 8). After discussion, action plan was designed with Addis Ababa City administration health Bureau and health facility authorities on prevention and control activities.

1.2.6 Limitations:

- Small number of sample size, specific age group, sex and occupation were not representative of the whole Woreda three, of Bole sub City population.

1.2.7 Conclusions

The attack rate (AR) was 9 per 10,000 populations and there was no death. The whole cases 100% (24) were male streets within age range of 12 -24 years. The reason for rise up and rapid spread of outbreak might be due to street /homeless , or low socio economic, poor personal hygiene, overcrowding and lack of alternative clothes. Poor personal hygiene among homeless or street, overcrowding (mass sleeping) and lack of alternative clothes might contribute to increase the magnitude of the outbreak. Exchanging information between different levels and providing prompt response in reducing undesirable disease outcomes, increasing homeless people awareness, capacity building to health personnel, permanent solution to interrupt the occurrence and distribution of the relapsing fever out-break requires more effort from all government and stakeholders.

1.2.8 Recommendations

- Organize Bole sub City health office meeting session with representative from all sectors including the sub City administrators to discuss the way how to minimize mass sleeping houses and solutions for homeless people.
- Increase Street's or homeless people awareness through continuous health information
- Homeless must wash cloths and take bath at least weekly
- Close supportive supervision by sub City health office

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Chapter–II Surveillance Data Analysis

2.1 Typhoid Fever Surveillance Data Analysis of Addis ketema Sub City, Addis Ababa, Ethiopia 2013-2017

Executive Summary

Typhoid fever is a serious disease and remains an important public health problem in many developing countries including Ethiopia. Therefore, this surveillance data analysis needed to analyze magnitude, trends, and geographical distribution of the disease in Addis Ketema sub City of Addis Ababa, Ethiopia 2013 to 2017(1).

Methods: Descriptive cross sectional study design was used to assess the health status. The five years typhoid fever surveillance data was collected from Addis Ketema sub City health office. Data analysis was carried out by using Microsoft excel.

Results: A total of 44,908 typhoid fever cases were reported with an average of 8,982 cases per year . The highest cases were reported in 2017, which was 11,909 (26.5%) and the lowest report was in 2016, which was 5389 case (12%)

Conclusions: Majority of the cases were treated at an outpatient department during past five years. On the other hand, cases admitted in different health facilities and treated in inpatient department and there is no death .

2.1.1 INTRODUCTION

Typhoid fever is a global health problem. Its real impact is difficult to estimate because the clinical picture is confused with those of many other febrile infections. Additionally, the disease is underestimated because there are no bacteriology laboratories in most areas of developing countries. In Ethiopia in 2012, 24,030,746 patients visited health facilities to get treatment or medication. Of these cases, 665,220 (2.8 %) were typhoid fever patients and it was in the top ten list of morbidity. Among the total deaths of 15,008, 336 (2%) deaths caused by typhoid fever(1). Typhoid is transmitted by water or food contaminated by Salmonella typhi. As it is water borne or food borne, a small infecting dose can cause the disease in someone who drinks contaminated water or eat contaminated food. As so many water sources are inadequately protected in Ethiopia, the disease is very common, particularly among overcrowded urban migrants who often live in wretched conditions(2). These factors are believed to result in many cases going undiagnosed. On the basis of the literature and the incidence of typhoid fever recorded in control groups in large vaccine field trials with good laboratory support it has been estimated that approximately 17 million cases of typhoid fever and 600 000 associated deaths occur annually (3). However, the estimates have been biased because study populations have usually been in areas of high incidence. Furthermore, these estimates of burden relate to the clinical syndrome of typhoid fever but not to *S.* typhi exposure. Since the prevalence of bacteraemia in febrile children is quite high (2_3%) in areas of endemicity it is suggested that exposure to the bacteria is higher than indicated by the figures that are based solely on the clinical syndrome of typhoid fever(4).

The incidence of the disease in areas of endemiCity may resemble the incidences observed in control groups in large vaccine field trials, viz. between 45 per 100 000 per year and over 1000 per 100 000 per year. Preliminary results from recent studies conducted in Bangladesh by ICDDR, B show an incidence of approximately 2000 per 100 000 per year. Typhoid fever also has a very high social and economic impact because of the hospitalization of patients with acute disease and the complications and loss of income attributable to the duration of the clinical illness (5). It is important to note that reports from some provinces in China and Pakistan have indicated more cases of paratyphoid fever caused by S. para typhi A than by S. typhi(1).

In areas of endemicity and in large outbreaks, most cases occur in persons aged between 3 and 19 years. In 1997, for example, this age range was reported during an epidemic of the disease in Tajikistan. Nevertheless, clinically apparent bacteraemic S. typhi infection in children aged less

than three years has been described in Bangladesh, India, Jordan, Nigeria, and elsewhere(4, 5). In Indonesia there is a mean of 900 000 cases per year with over 20 000 deaths. In Indonesia, people aged 3_19 years accounted for 91% of cases of typhoid fever and the attack rate of blood-culture-positive typhoid fever was 1026 per 100 000 per year. A similar situation was reported from Papua New Guinea(6).

To reduce the incidence of typhoid some control and prevention measures should be under taken like- health education on personal hygiene and environmental sanitation, Community measures on sanitary disposal of human face, chlorinating or boiling of water, milk and food hygiene, Fly control, isolation (enteric precaution), treatment of patients and Exclude carrier from handling food(2).

2.1.2 Significance of the study

Ongoing analysis of surveillance data is important for detecting outbreaks and unexpected increases or decreases in disease occurrence, monitoring disease trends, and evaluating the effectiveness of disease control programs and policies. This information is also needed to determine the most appropriate and efficient allocation of public health resources and personnel (3).

Analyses should be performed at regular intervals to identify changes in disease reporting. These analyses can be performed using standard approaches (e.g., running computer program to generate a summary report). Findings of analyses should be reviewed regularly and provided as feedback to medical providers and others in the community who are asked to report cases. Often additional, special analyses are needed to answer specific questions that arise; these analyses may require additional customized approaches beyond what are routinely performed (3). So in Addis ketema sub City health office there is a PHEM and communicable diseases control experts but the trend of doing surveillance data analysis were not performed regularly and they do not use data for decisions making purposes. Therefore, this surveillance data analysis was helped to identify prevalence and trends of typhoid fever disease throughout 5 years.

2.1.3 Statement of the problem

Typhoid fever is a systemic infection caused by salmonella typhi, usually through ingestion of contaminated food or water. The acute illness is characterized by prolonged fever, headache, Nausea, loss of appetite, and constipation or sometimes diarrhea.

Symptoms are often nonspecific and clinically non-distinguishable from other febrile illnesses. However, clinical severity varies and sever cases may lead to serious complication or even death (7). Risk factor include contaminated water or flooding, food and drinks purchased from street vendors, row fruits and vegetables grown in field fertilized with sewage, ill household contacts, lack of house hold contact, lack of hand washing and toilet access, and evidence of prior helicobacter pylori infection an association probably related to chronically reduced gastric acidity.

2.1.4 Significance of the study

The analysis of any data is the back bone in the interpretation of any public health raw data; and as being in the public domain typhoid fever data is also need to be interpreted as of other data as well since it is one of the public health concerns. So that there is no formal and regular data analysis trend on typhoid fever data in terms of place and time in the area. So, for this reason data analysis in terms of place and time has been conducted.

2.2. OBJECTIVES

2.2.1. General Objective

- To described and analyze the magnitude of five years data of typhoid fever surveillance data by person, place and time, Addis ketema Sub City, Addis Ababa ,Ethiopia ,20132017.

2.2.2. Specific Objectives

- To describe the magnitude of typhoid fever in Addis ketama Sub City of Addis Ababa, Ethiopia , 2013-2017
- To analyze and interpret the surveillance data in terms of time, person and place in Addis ketema sub City of Addis Ababa ,Ethiopia , 2013-2017
- To show trend analysis of typhoid fever of Addis ketema sub City of Addis Ababa ,ethiopia , 2013-2017
- To show the report completeness of typhoid fever of Addis ketema Sub City of Addis Ababa ,Ethiopia, 2013-2017

2. 3. Methods and materials

2. 3.1 Case Definitions

2. 3.1.1 Suspected typhoid fever cases

Any person with gradual onset of remittent fever (rising stepladder fashion) in the first week, head ache, arthralgia, anorexia, constipation and abdominal pain.

2.3.1.2 Laboratory Confirmed cases

A patient with fever (38°C and above) that has lasted for at least three days, with a laboratory-confirmed positive culture (blood, bone marrow, bowel fluid and stool) of *S.* typhi and suspected case with reactive Widal test or ''O "titer of 1/160 and more, is very suggestive (8).

2.3.1.3 Probable case of typhoid fever

A patient with fever (38°C and above) that has lasted for at least three days, with a positive sero diagnosis or antigen detection test but without *S.* typhi isolation (8).

2.3.1.4 Chronic carrier

Excretion of S. typhi in stools: or urine (or repeated positive bile or duodenal string cultures) for more than one year after the onset of acute typhoid fever. Short-term carriers also exist but their epidemiological role is not as important as that of chronic carriers. Some patients excreting *S.* typhi have no history of typhoid fever.

Operational definition

2.3.2. Study area

We conducted surveillance data analysis Addis ketema sub City, Addis ketema sub City is one of the ten sub cities in Addis Ababa City administration health Bureau . The sub City is bounded by Gulele sub City in the north, Lideta sub City in the south, Kolfe Keraniyo sub City in the west and Arada sub City in the East. The sub City has ten Woredas. (Based on the estimation of 2007 census, the Central Statistical Agency of Ethiopia (CSA) the sub City has a total population of 322,120 from which 167,502 (52%) females . With an area of 14.6 square kilometers, Addis Ketema sub-City has a population density of 21,901 population lives per 1 square kilometers .A total of 67,108 households were counted in this sub City, which results in an average of 4.8 persons to a household. The sub City is one of the biggest markets in east Africa were traveled to in daily bases (Merkato). These make the sub City where large number of mobile population exists. It is also facilitates people to live in slum areas.

Due to this reasons there are multiple factors for different communicable disease like typhoid fever, Epidemic Typhus, dysentery, relapsing fever and AWD .

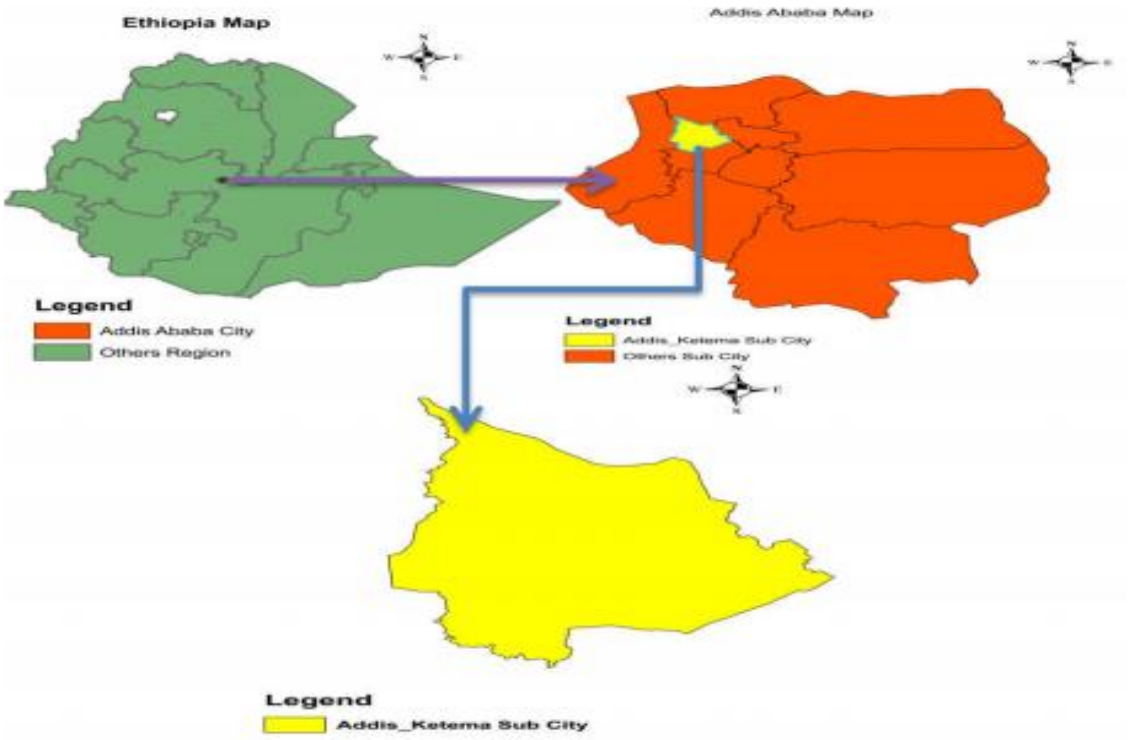

Figure 8 : Administrative Map of Addis ketema Sub City, Addis Ababa, Ethiopia 2018

2.3.3 Administrative and Human Resources Structure of Addis ketema sub City health office

There are a total of 73 health facilities. Among those health facilities, 10 health centers are owned by government. Health service in this sub-City was being provided on different categories of health needs. All health facilities in sub-City are giving health service for community according to their capacities and their specialties. The health services being provided to population, based on their needs are:- In patient department (IPt), outpatient department(OPD), diagnostic and confirmatory laboratory test , Ante –Natal care for pregnant women(ANC), Vaccination service(EPI), Pediatrics care and treatment, Family planning (FP), HIV counseling, and Testing(VCT), Anti Retroviral Therapy(ART) and Provided Initiated Counseling and Testing(PICT), Delivery service, safe abortion services, TB diagnosis and its management, Emergency service, Maternal and Child health service, Medication dispensing service (Pharmacy), and other health needs. The sub City has a total of 1363 employees of which 740 were health professionals .

A total of 29 Health professionals were being working in the sub City health office and the remaining 711 are working in Woredas and health centers.

The sub City has succeeded its targets of health center to population ratio 1:1.25. In addition to this to strengthen the health promotion and disease prevention activity, about 85 urban health extension workers including 30 supervisors were assigned in different Woredas of the sub-City.

2.3.4. Study period

- We conducted the surveillance data analysis from March 7-18/ 2018

2.3.5 .Study design

- Descriptive cross-sectional study was used to analyze the five year Surveillance data of typhoid fever in Addis ketema sub City of Addis Ababa

2.3.6. Population

2.3.6.1 Target population

- The target population was the total population found in Addis Ketema sub City, 2018

2.3.6.2 Study population

- Typhoid fever cases reported from 2013- 2017 in Addis Ketema sub City.

2.3.6.3 Study subject

- The study subjects were all suspected cases (all cases to collect from PHEM report

2.3.8 Data collection procedures

Secondary data from the last consecutive five years (2013-2017) were collected and reviewed by using structured check list. An observation of reports from the source and discussions with PHEM focal person was also undertaken in Addis ketema Sub City of Addis Ababa.

2.3.9 Data analysis procedures

The five years of data were analyzed by using Microsoft Office Excel to analyze the data appropriately.

2.3.10 Inclusion criteria

Suspected typhoid fever cases and deaths with complete variables were included.

2.3.11 Exclusion criteria

Suspected typhoid fever cases and deaths with incomplete variables were excluded, Reports with unknown sources and time was also excluded.

2.3.12 Ethical consideration

The official letter was obtained from the Addis Ababa university school of public health and to Addis Ababa health Bureau and Addis Ketama sub-City health office. Data is collected from Addis Ketama sub City PHEM department and Addis Ababa PHEM department report.

2.3.13 Data dissemination

Report /result of this typhoid fever surveillance data analysis was submitted timely to Addis Ababa university school of public health /Department of EFETP, Addis Ketama sub City health office and resident advisors by hard copy and electronic soft copy.

2.4. Result

A total of 44,908 cases were registered from 2013 to 2017; among them, 23,352 were female. The proportion of males and females among the cases reported for the period 2013 –2017 was 0.92:1.

In the last 5years (2013 to 2017), sub City public health emergency management department received 44,908 reports concerning cases of typhoid fever among cases in Addis ketema sub City. The mean was 8,982 cases per year, ranges between 5,389 and 11,909 or (6520) with a standard deviation of 22.4.

Table 10 : Number of Cases and Death typhoid fever by year in Addis Ketama sub City, Addis Ababa 2013 to 2017

Year	Population at risk	No. of Cases	No. of Deaths	Percent		Prevalence		CFR
				Case	death	Cases/10000	Death /1000000	0
2013	293732	8638	0	2.94%	0	294	0	0
2014	300032	9024	0	3%	0	301	0	0
2015	306468	9948	0	3.24%	0	325	0	0
2016	313042	5389	0	1.7%	0	172	0	0
2017	322120	11909	0	3.69	0	369	0	
Total	**1,535,394**	**44,908**	**0**	**-**	**-**	**1,461**	**0**	**0**

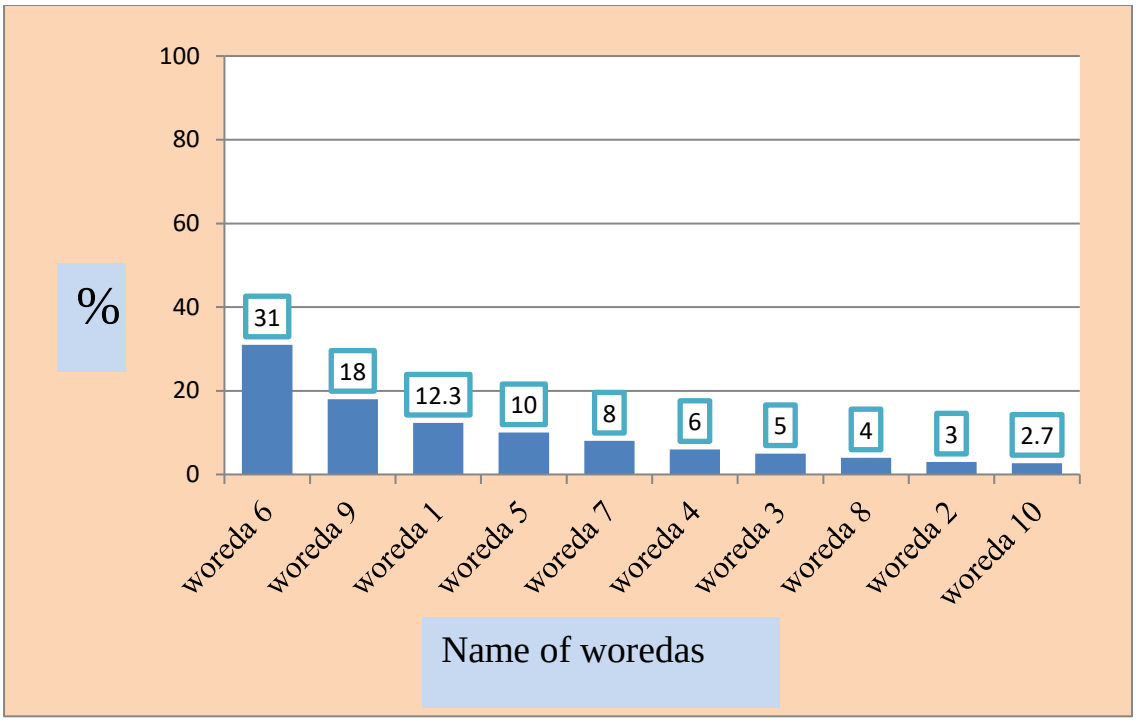

Figure 9: Proportion of typhoid fever cases by Woreda Addis ketema sub city, Addis Ababa ,Ethiopia ,2018

2.4.1 Report Completeness

In Sub City there was an increment on potential health service coverage by the mid 2017 (100%) compared to 2013 (90%). Furthermore, there were 10 H.Cs and 63 different private health facilities. As the number of expected Woredas to report increased, the completeness of reporting rate of the sub City also increased and the sub City completeness rate in 2017 was 89 %, which means it increased by 3 % compared to 2013.

Table 11:-Sub City Surveillance report completeness rate by year in Addis ketema sub City from 2013-2017

Year	Expected	Reported	Completeness (%)
2013	144	126	86 %
2014	263	234	89 %
2015	361	332	92 %
2016	200	177	89 %
2017	2675	2368	89%
Total	1059	964	89 %

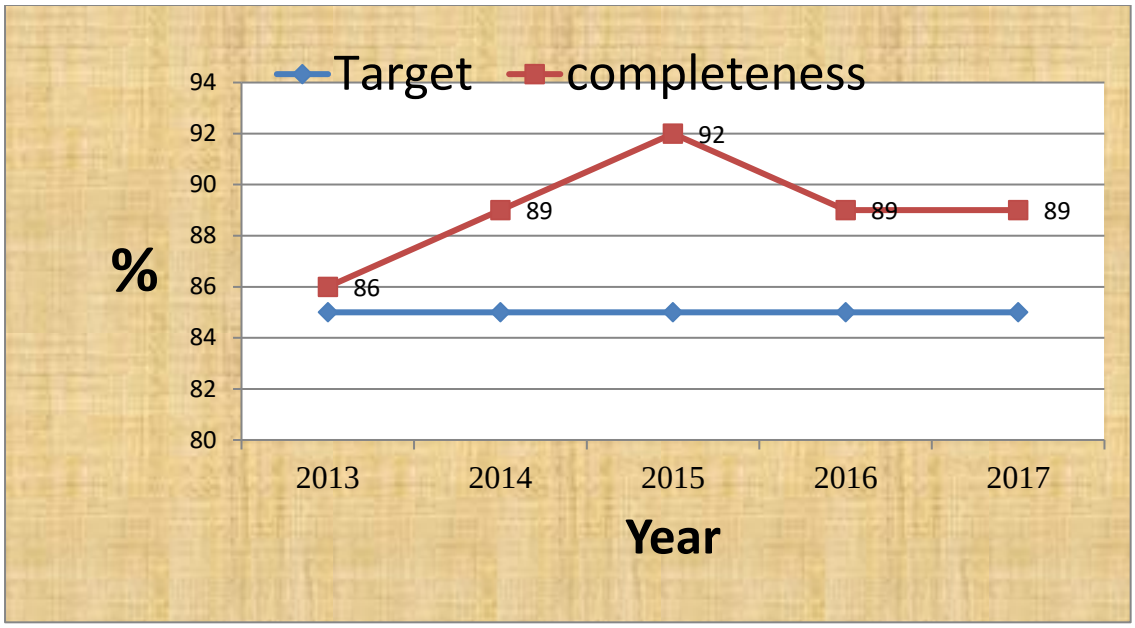

Figure 10: Addis ketema Sub City surveillance data report completeness rate by year, 2013-2017

During the past five years, the sub City report completeness rate, which is reported from all types of health facilities like, health Centers, private and others, was greater than 85% in all years. Moreover, it is greater than the requirements or the standards of national target.

2.4.2. Water supply

According to data obtained from Addis ketema sub City water Resource Office, of the total Urban population of the sub City 87 % was supplied with potable water as of the UHEW was reported. Water and hygiene is one of the core activities in water and food born diseases control and prevention

2.4.3. Latrine Coverage and Utilization

Among 67,108 households, 55,957 of them has standard latrine in 2017. There is no clear data on utilization of latrine in the sub city. When we see the sub City people living style related to WASH the sub-City has multiple communities who have no enough public latrine ; Due to this, open defecation across the river and compounds are countless. According to the sub city report the latrine coverage is 84% . After identifying these risk areas the sub-City level, hygiene and sanitation activities has been planned and done throughout the epidemic time:- the sub City has identified major community problems as shortage of latrine, overflowing toilets, toilets which are connected to rivers and solid and liquid waste problems.

2.5 Discussion

The prevalence rate of typhoid fever cases in outpatient departments increased through a year. The increment was not only in Addis ketema Sub City but also as well as at Addis Ababa City administration level. The increment might be occurred because of the increasing of reporting health facilities, which was a total of 73 health facilities (the sum of 10 health centers and 63 private health facilities in 2018) (4).

In 2013, the report completeness from health center and private health facilities was 86 % and improved to 89 % in 2017(5) . The five years Addis ketema sub City report completeness rate was greater than national target of 85% (8). However, from 2013 to 2017 completeness rate was improved and it meets the national target of reporting completeness rate 85% (2). On the other side, the average reporting completeness rate was 89%.

In Ethiopia, mostly performed diagnosis is Widal test at all health centers and hospitals. The classic Widal test measures antibodies against O and H antigens of S typhi and is more than 100 years old. Although robust and simple to perform, this test lacks sensitivity and specificity, and reliance on it alone in areas where typhoid is endemic may lead to over diagnosis (8).

Therefore, due to the lack of specificity and sensitivity, the identification of true cases is very difficult for diagnosis and the Positive cases for Widal test might not be positive for typhoid fever. There for the imperfection of the test makes very difficult for the diagnosis and treatment of typhoid fever early and may affect the prevalence.

According to national health and health related indicator, 2011 report, the prevalence of typhoid fever was 34 and 39 cases per 10000 inhabitants in Addis Ababa City Administration and at national level respectively and the CFR was 0.1% at national level(9). The sub City prevalence rate in 2017, which was 369 cases per 10000 populations, is greater than national prevalence. However, the admission rate decreased or nulls a year. This is because health facilities and service expanded throughout the Woreda . On the other hand, health extension workers are giving health education for the community members on different health and health related topics at "ketenes" and during home-to-home visiting. In addition, health centers staffs also giving health education in health centre as routine activities. For this reason, the awareness of the community is increased and the health seeking behavior of the community also increased. Therefore, increasing awareness and health seeking behavior, early detection of cases and appropriate diagnosis and treatment can minimize inpatient cases.

Finally, the case fatality is zero within the 5 years. If the patients treated with prompt antimicrobial therapy, case fatality rate will be less than 1%(10).

2.6 Limitation

- Surveillance data had missing information on important variables (i.e. demographics, final classification of the case, age group and sex) which made meaningful review of some of these records difficult
- Poor documentation of surveillance data

2.7 Conclusion

Majority of typhoid fever cases were treated at outpatients department and there is no cases treated at inpatient department. In addition, when we see the reported cases by year, the highest number of typhoid fever cases reported in 2017. The surveillance report completeness were increased to the expected range and early detection of cases also strengthened.

2.8 Recommendations

- Prevention is based on ensuring access to safe water and by promoting safe food handling practices.
- Awareness creation activities on typhoid fever should be strengthened in the sub City.
- In line with awareness creation activities, health education on personal hygiene and environmental sanitation activities should be conducted in a strengthen way.
- Diagnosis of typhoid fever should be strengthened and its appropriate measures should be taken by health professionals at all levels.
- Some important information concerning personal identification like age and sex should be included in the PHEM reporting formats by EPHI . .
- Safe and adequate water supply should be maintained by Addis Ababa Water Supply Authority.
- The PHEM Surveillance system should be strengthened at all levels

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Chapter–III Evaluation of Public Health Surveillance System

3.1 Surveillance System Evaluation of Addis ketema Sub City of Addis Ababa City Administration.

Abstract

Public health Surveillance system is recognized as the cornerstone of public health decision-making and practice. The aim of this study was to assess the performance of core functions and key attributes of surveillance system in Addis ketema sub City of Addis Ababa City administration {5}.

Methods: A cross-sectional study was conducted from March 3, 2018 to march 15, 2018 in Addis ketema sub City of Addis Ababa City administration.

To assess the functionality of the surveillance system in the Addis ketema sub City, measles were selected. In the study one sub City health office , three Woreda health offices and three health centers were interviewed during the field visit. Data collection was conducted by using structured questioner by reviewing different documents and observation. The questioner was prepared based on CDC 2001 updated guidelines for evaluating public health surveillance system checklist. During data collection PHEM officers and other concerned experts were interviewed in all visited sites. Data analysis was carried out by using epi info7.2.1 and Microsoft Excel office.

Result: The population under surveillance in the sub City was 327,362. Standard case definition used for cases and outbreak detection. Regarding to system attributes, the simplicity of surveillance system for all respondents (Sub City health office, Woredas health office and health center) agreed upon easy to use for case detection and filling the data by their all level of health professionals. Related to flexibility of the surveillance system, 95 % of the study participants reported that the current reporting formats be used for other newly occurring health event (disease) without much difficulty and 100% of the respondents reported that public health surveillance reporting format was easy to add new variable. All respondents agreed on the system which integrated to other systems.

According the evaluation result, 100% of the visited health institution had case definition for measles. Of these interviewed PHEM officers 100% of them understood the case definition accordingly as per the national guideline. Similarly the availability of surveillance formats were assessed and identified that there was shortage of padded surveillance formats, including weekly reporting formats, in all visited sites. The updated surveillance formats distributed by FMOH

were stored in Addis ketema sub City health office store. On the other hand all visited sites have updated public health emergency management guideline.

Completeness of surveillance report was measured and sub City from 3952 expected report (92.2%) of them were received by sub City health office. From this 100 % of governmental health facilities and 90.8% of private health facilities sent their weekly surveillance reports for sub City health department. Concerning the report timeliness, 98% Addis Sub City surveillance report was sent timely to regional health bureau. However, during the assessment time because of incompleteness data base of reporting date on the reports document, timeliness of the health offices and health facilities were not measured.

In Addis ketema sub City, including sub City health department, all visited health offices and health facilities were not conducting surveillance data analysis, Whereas twenty three measles cases were reported from January 2017 to December 2017. A total of 23 cases of measles were reported from ten Woredas. Of these cases, 17.3% and 17.3% of measles cases were reported from 5 and 8 respectively. However, the outbreaks were not reported to sub City health office.

Regarding preparedness plan, except sub City health office of the visited Woredas and health center were not prepared epidemic preparedness plan in written form and All of them have drugs and supplies in their stock for emergency purpose. Similarly all of the visited Woredas, Health Center and sub City health office formally established multi-sectorial task force committee and 100% of them established rapid response team. However, those established committees were not fully functional and lack regularity.

The presence of supportive supervision and feedback in any institution is the confirmation of existence of strong surveillance system. In spite of that, in all visited Woredas and Sub City health office have prepare plan for program specific supportive supervision and feedback. Similarly from December 2017 to January 2018 supportive supervision was conducted to lower health facilities and the sub city health office also supervised by regional health bureau. However, integrated supportive supervision was conducted by sub City and Woreda health offices. Assigned PHEM focal persons in the visited sites were trained on the new approaches of public health emergency management and selected surveillance priority diseases (such as measles, typhoid fever and AFP.... etc). Similarly only sixty six percent of interviewed health extension workers were trained on community PHEM. The Woredas health office and the

visited health centers were compiled surveillance data manually. However, only the sub City PHEM department of the visited sites had computer in their office.

Conclusions and Recommendations: The overall functioning of public health surveillance system underway except in Addis ketema sub City but Woreda 4 health office and Addis ketema health center was not satisfactory to achieve its targeted goals of prevention and control of measles. Absence of timely analysis and not utilization of data, absence of Computer for PHEM data base unavailability of budget and logistic for surveillance and delayed for the response for improvement shortage of resource made the existing surveillance system weak. Therefore, it is necessary to strengthen the surveillance system through providing resource and room for working for PHEM department at Health Center and Provide Training for health extension and it should be achieved targeted goals of prevention and control of measles.

3.1. INTRODUCTION

3.1.1. Background

Public health surveillance is the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health(1). Data disseminated by a public health surveillance system can be used for immediate public health action, program planning and evaluation, and formulating research hypotheses.

Data from a public health surveillance system can be used to guide immediate action for cases of public health importance, measure and monitor the burden and trends of a disease, guide the planning, implementation, and evaluation of programs to prevent and control disease, prioritize the allocation of health resources, and others(2, 3). In addition, a surveillance system should be simple, flexible, acceptable, situation specific and should be established at the beginning of public health activities set up in response to an emergency(4).

Efforts to establish disease surveillance system was initiated in Ethiopia 1947 when the government issued quarantine rules. Subsequently several legal and administrative measures were taken to strengthen communicable disease surveillance. However, these efforts were not supported with appropriate resources thus; surveillance was limited in scope and usefulness. In the health sector, various institutional arrangements were implemented to strengthen surveillance services. In 1948, an anti-epidemic service was established that later in 1951 identified 35 priority diseases for surveillance; those diseases were classified into first class disease (immediately notifiable) and weekly reportable second-class diseases(5). These arrangements continued with several minor changes until the 1994 health system reform. The health reform taking into account the resource constraints and the need for strengthening functional surveillance system selected nineteen priority diseases (including those under vertical programs) for through the WHO Africa regional office (WHO/AFRO) made a resolution (resolution AFRO/RC48/R2) in September 1998 to develop an integrated disease surveillance and response (IDSR) initiative as a regional strategy to effectively control priority communicable diseases in the African region. IDSR emphasizes on capacity building at district level, integration and coordination of activities at all levels, timely feedback and use of information for action, improve laboratory capacity in support of surveillance, and community participation(6).

The FMOH adapted a comprehensive strategy recommended by WHO for member state during the 48th assembly in 1998 for improving communicable diseases surveillance and response through Integrated Disease Surveillance and response (IDSR) linking community, health facility, and national levels(7). Accordingly, as a first step a comprehensive assessment of the existing surveillance, epidemic preparedness and response system of the country was conducted in October 1999. The assessment revealed that most disease prevention programs have vertical surveillance systems, resources are scarce for surveillance at all levels, quality of surveillance is compromised by uncoordinated and multiple use of data collection tools, data are not processed timely and completely to guide health interventions, no data processing and utilization at the district level, there is hardly any feedback at all levels, and epidemic preparedness and management capability are weak(8).

Based on the findings of the assessment the FMOH developed a Five-year strategic plan and plan of action in 2000 for sustainable implementation of IDSR strategy in Ethiopia. Following that the MOH of FDRE has adopted the WHO/AFRO generic technical guidelines and training modules for integrated disease surveillance and response, established a National IDSR Taskforce, officially launched the IDSR strategy, strengthened the IDSR team, conducted a series of training from national to district levels for trainers and focal persons, disseminated the IDSR technical guidelines, developed and distributed new reporting formats, developed and disseminated standard case definitions, distributed laboratory reagents, provided computers, and established feedback system using monthly bulletin and quarterly newsletter(8). Accordingly, Public health emergency management is one of the core processes identified by the Federal MOH for redesign. Public Health Emergency Management is defined as the process of anticipating, preventing, preparing for, responding to and recovering from the impact of epidemics and health consequences of natural and manmade disasters. The sub processes identified for the process include Preparedness, Early Warning, Response and Recovery. However, as the existing process focuses only on disease surveillance and epidemic response processes, the remaining processes mentioned above couldn't be shown in the As-Is part(9).

In BPR, IDSR is included under PHEM core process and before BPR implementation 23 priority diseases included under IDSR by categorizing it three major groups which is epidemic-prone diseases, diseases targeted for eradication and elimination, and other diseases of public health importance . However, after redesigning those priority disease modified in to 20 (13 are

immediately reportable whereas 7 are weekly reportable),but now the priority diseases are modified in to 22(14 are immediately reportable whereas 8 are weekly reportable). Those diseases are selected based on diseases which have high epidemic potential, Required internationally under IHR 2005, Diseases targeted for eradication or elimination, Diseases which have a significant public health importance and Diseases that have available effective control and prevention measures for addressing the public health problem they pose(9).

Measles is an acute, highly contagious viral disease caused by measles virus. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva. Measles, malaria, and AFP are parts of those reportable disease lists mentioned in the guideline which is weekly and immediately basis of public health important in sub city . As an instance, there was measles epidemic in the sub City in the past years including 2012. The routine flow of surveillance data is usually from reporting sites to the next level up to the central level as indicated in figure 1. The community and health facilities especially health posts are the main source of information. The information collected from this site is compiled in standard forms, analyzed and then forwarded, to the health office. level uses standard formats to compile aggregate, and send the data to sub City/ City administration, from which the central level receives. Feedback and information sharing will follow the same route.

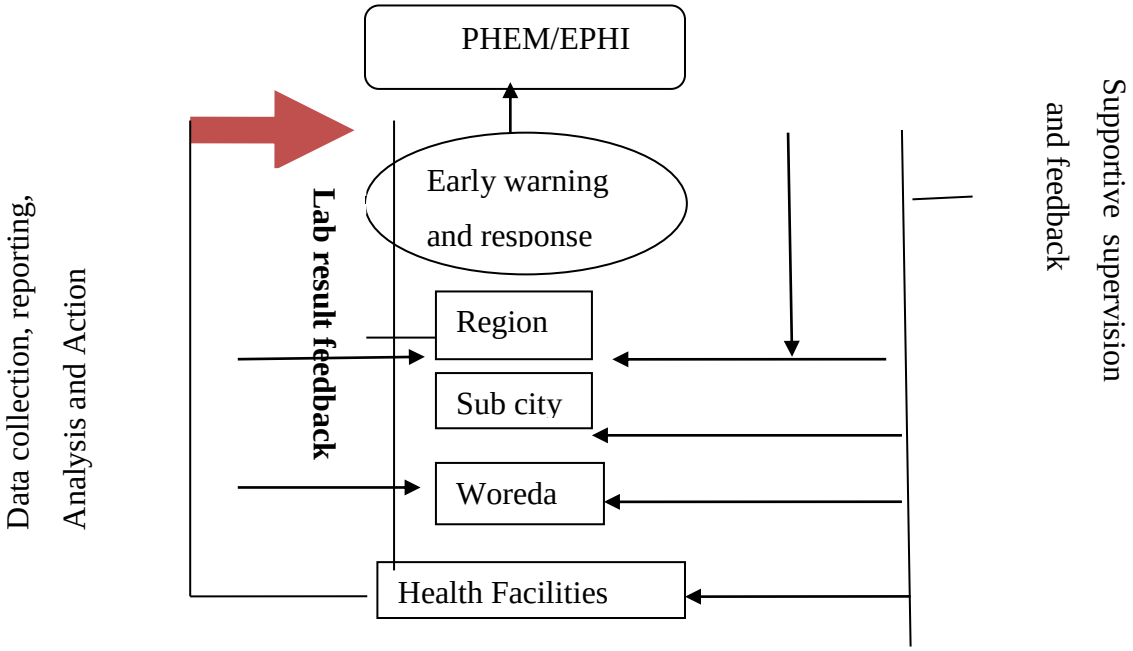

Figure 11:Diagram illustrating the formal flow of surveillance data

On the other hand, evaluation of public health surveillance system is used to ensure that problems of public health importance are being monitored efficiently and effectively.

Thus, Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and usefulness (5).

While evaluating surveillance system, the evaluation of public health surveillance systems should include an assessment of usefulness of the system, system attributes, including simplicity, flexibility, data quality, acceptability, sensitivity, predictive value positive, representativeness, timeliness, and stability (5).

3.1.2 Rationale of the study

The public health system is continuously challenged by recurrent and unexpected disease outbreaks and is facing the challenge of managing health consequences of natural and human made hazards.

Early detection and prompt response to outbreaks need effective and well organized surveillance system in all level, from region to the health facility. In order to ensure the effectiveness of the surveillance system, regular evaluation and assessment of measles surveillance system is crucial. This study will benefit the people of Addis ketema sub City who are largely suffering from measles infection.

Therefore it is important to assess the gaps and challenges of the surveillance system as whole measles surveillance in particular in the sub City that could help to critically identify the gaps

3.2 OBJECTIVES

3.2.1.General objective

- To evaluate the surveillance system of measles in Addis ketema sub City and to provide recommendation.

3.2.2 Specific objectives

- To assess and describe key attributes of the surveillance system mainly on prioritized diseases in Addis ketema sub City.
- To identify strengths and challenges of the current surveillance system in Addis ketema sub City
- To assess the availability of the resources

3.3. METHODS AND MATERIA

3.3.1. Study area

We conducted this Surveillance system evaluation in Addis ketema sub-City. Addis ketema sub City is one of the ten sub City in Addis Ababa City administration. The sub City is bounded by Gulele sub City in the north, Lideta sub City in the south, Kolfe Keraniyo sub City in the west and Arada sub City in the East. The sub City has 10 Woredas Addis ketema sub-City in 2018 (Based on the estimated from 20016 population census the central statistical agency of Ethiopia (CSA) has a total population of 327,362 from this (170,228)52% were females . With an area of 14.6 square kilometers, Addis Ketama sub-City has a population density of 22,422 population lives per 1 square kilometers. A total of 68,200 households were counted in this sub City, which results in an average of 4.8 persons to a household. Regarding health facilities distribution within the sub City, there are 10 functional health centers and with a total of 63 private health facilities including medium clinic, small clinic, drug store Addis Ketama sub-City health center coverage was 100%.

3. 3.2. Study subject

The study subjects were Addis ketema sub-City health office, Woreda 1 health office, Woreda 4 health offices Woreda 5 health office, Addis ketema health center ,Abebe Bekila Health center and Ginbot 20 Health center which lies in the Addis Ketama sub-City.

3.3.3 Study period

The study was conducted from June 10 /2018 – June 23/2018

3.3.4. Study design

We conduct cross sectional study design was used to evaluate Addis Ketama sub-City surveillance system.

3.3.5. Sample size and Sampling technique

3.3.5.1 Sampling technique

We have selected the study area according to the, purposive sampling method

3.3.5.2. Selection of sites

a. Selection of Addis Ketama sub-City

Addis ketema sub-City was selected purposively out of ten sub City by making discussion with Addis Ababa PHEM core process owner based on the presence of suspected measles cases, strengthens of surveillance system .

b. Selection of Woreda Health office (1, 4, and 5 Woreda health office)

Addis Ketama sub-City is divided in 10 Woredas administration. From these 10 Woredas, 3 Woredas (1,4, and 5 Woreda health office) were selected by using simple random sampling system and Woredas were included purposively in the assessment based on occurrence and currently existence of suspected measles cases.

c. Selection of Addis ketema health center, Abebe Bikela health center and Ginbot 20 H.C

Regarding health facilities there were a total of 10 functional health centers in the Addis ketema sub-City. Therefore according to their distribution by Woredas, from selected Woredas 3 functional health centers were included in the assessment. Addis ketema Health center, Abebe Bikela health center and Ginbot 20 health center were selected purposively based on their accessibility.

3.3.6. Data collection tools and procedure

Data collection was conducted by principal investigator. Well-structured questioner was used to interview sub City health office , Woreda health office and health center PHEM focal person and practical observation of documents was also conducted in sub City health office, Woreda health office and health center.

3.3.7. Standard Cases definition

3.3.7.1. Measles Suspected

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

3.3.7.2 Confirmed measles

A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed cases in an epidemic.

3.3.8 Operational case definitions

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

- **Case detection**: is the process of identifying cases and outbreaks.
- **Case registration**: is the process of recording the identified cases
- **Case/outbreak**: Confirmation: refers to the epidemiological and laboratory capacity for confirmation.
- **Reporting**: Refers to the process by which surveillance data moves through the surveillance system from the point of generation.

- **Epidemic preparedness**: Refers to the existing level of preparedness for potential epidemics
- **Stakeholders**: The organizations or individuals that generate or use surveillance data for promotion of health, prevention and control of diseases.
- **Usefulness**: Usefulness of the surveillance system is reflected by documented changes in policies and procedures as a result of information generated by the system.
- **Simplicity**: Simplicity denotes the structure and ease of operation of the surveillance system.
- **Flexibility**: Flexibility of a surveillance system is its capacity to adapt to changing information needs or operating systems within minimal additional time, personnel and funding.
- **Quality**: The quality of data reflects the completeness and validity of the data recorded in the Sub City Health Department.
- **Acceptability**: Acceptability is the willingness of persons, institutions or organizations to participate in the surveillance system.
- **Sensitivity**: Sensitivity refers to the ability of the system to detect cases or outbreaks through trends in the surveillance data.
- **Positive predictive value**: Positive predictive value refers to cases that actually have the health condition in question.
- **Representativeness:** Representativeness refers to the extent to which the surveillance system accurately describes the occurrence of medical condition over time and their distribution in the population by place and person.
- **Stability:** Stability was assessed by questioning the surveillance officers on the consistency of the system.

3.3.9. Data analysis

Data analysis was carried out by using Microsoft excel.

3.3.10. Ethical clearance

This study was conducted to assess the functionality of the surveillance system for measles.

In addition the study subject was in health institutions which were found in the Addis ketema sub-City. However, later of permission was written letter from Addis Ababa health bureau and Addis ketema sub-City health office to visited Woredas and health center.

3.4. Results

The surveillance system of Addis ketema sub-City was assessed. In this assessment a total of three sites were participated. The main focuses of the evaluation was the key attribute , core activities, supportive functions and quality components of the surveillance system.

3.4.1. Description of surveillance system Importance of the surveillance system

3.4.1.1 Measles

Sub City in 2017 a total of 23 cases was reported due to measles. Of these cases, 8 (35%) were reported from Woreda 5 and 8. In these two Woredas measles outbreak was not occurred.

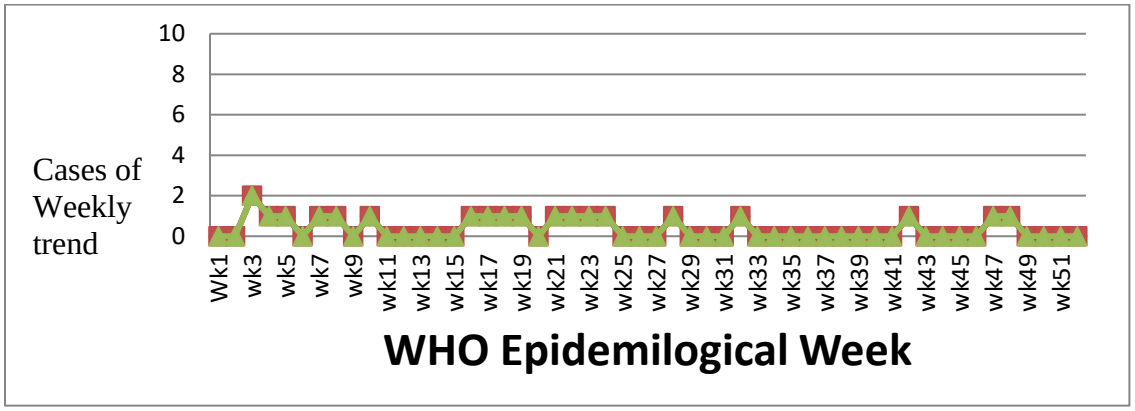

Figure 12: Trend of Measles cases in Addis ketema Sub City, Addis Ababa, Ethiopia, 2018

In addition, in nine Woredas except Woreda 10 there were measles cases in the last year (tab.10)

Table 12 :Distribution of measles cases by Woreda of Addis ketema sub City , Addis Ababa, Ethiopia ,2018

S.No	Name of	No of cases	%
1	1	1	4.3%
2	2	1	4.3%
3	3	2	9%
4	4	3	13%
5	5	4	17.3%
6	6	3	13%
7	7	3	13%
8	8	4	17.3%
9	9	2	9%
10	10	0	0%
Total	**10**	**23**	**100%**

Of these 23 measles cases the vaccination status was assessed 43.5 % unknown ,39.1% vaccinated and 17.4% are not vaccinated respectively .

Table 13: Vaccination status of measles case in Addis ketema Sub City in, 2018

Vaccination status	Frequency	%
Vaccinated	9	39.1
Unvaccinated	4	17.4
Unknown	10	43.5
Total	23	100%

3.4.2. Targeted diseases under surveillance and included under this study

Resource is very scarce and it needs prioritization. Although because of shortage time and other resources surveillance could not carried out for all diseases and conditions. For the reason of that, Federal ministry of health the public health emergency management core process given prioritization to those diseases that are of interest at national and international levels. Based on this PHEM core process selected 22 diseases to be included into the routine surveillance system. Of these, 8 diseases (malaria, meningitis, dysentery, typhoid fever, epidemic typhus, relapsing fever, SAM and scabies) are reported as weekly base and the rest 14 diseases (yellow fever, rabies, small pox, polio, NNT, measles, guinea warm, viral hemorrhagic fever, cholera, anthrax, avian human influenza, sever acute respiratory syndrome, pandemic influenza and maternal death) are reported as immediately and weekly base. Of these targeted diseases under surveillance:- measles were covered in this study (table 14).

Table 14: Lists of weekly and immediately reportable diseases/ conditions in Ethiopia

Immediately Reportable		Weekly Reportable	
1	Measles	1	Malaria
2	AFP	2	Meningococcal Meningitis
3	Yellow fever	3	Typhoid fever
4	Anthrax	4	Epidemic typhus
5	Guinea warm/ Dranculculiasis	5	Sever Acute Malnutrition
6	Viral hemorrhagic fever (VHF)	6	Relapsing fever
7	Avian Human influenza	7	Dysentery
8	Rabies	8	Scabies
9	NNT		

10	Pandemic influenza (H1N1)		
11	Cholera		
12	Small pox		
13	Sever acute respiratory syndrome (SARS)		
14	Maternal Death		

3.4.3. Availability of case definition, clinical register and surveillance manuals

According to Ethiopia PHEM guideline, there are two types of case definition: standard case and community case definition

Standard case definition: is a case definition that is agreed upon to be used by every health professional within the country. Standard case definition can be classified as confirmed, probable, and possible or suspected(5).

Community case definition: is a case definition of disease and conditions adapted to suit to health extension workers (HEWs) and community members. The community case definitions were modified for simplicity and ease understanding by HEWs and the community members list of 14 disease or syndromes and conditions are identified to give simplified case definitions for community levels (5).

According to the assessment, from three visited sites 3 (100%) of them had case definition for AFP and Measles. On the other hand, health practitioners and health extension workers who were interviewed during the assessment, 16/18 (89%) of them, were understood the case definition clearly and apply the case definition accordingly as per the national guide line. clinical register was found in all of visited health centers but the handling of registration book was poor (Table 15).

Table 15: Availability of guide lines, case definitions and clinical registers in visited health institutions of Addis ketema sub City in, 2018

S.n	Variable	Health Center	Health office	Zonal health department	Total
Availability of case definition (measles & AFP).		100%	100%	100%	100%
Availability of clinical register		100%	NA	NA	NA
Availability of guide lines		100%	100%	100%	100%
IDSR for measles & AFP (2006)		100%	100%	100%	100%

PHEM guideline	100%	100%	100%	100%
Updated Measles (2012)	100%	100%	100%	100%
Updated AFP/ Polio	100%	100%	100%	100%
Updated NNT	100%	100%	100%	100%
Guide line For AWD	100%	100%	100%	100%

3.4.4. Availability of surveillance formats

Even though reporting format is prepared and distributed from central level to regional and sub City health offices, there was shortage of reporting forma of scabies in most of visited health facilities in the past 3 months. Due to this reasons they visited health facilities were using different types of reporting formats.

3.4.5. Report completeness and timeliness

Addis ketema Sub City PHEM department were expected about 3,744 weekly surveillance reports in the past twelve months of 2017 from Woreda health Office, health centers, and other private health facilities. However, 3,529 (94%) report were received from 10 Woredas. The visited Woredas were collecting weekly surveillance report from health facilities by reporting format (in hard copy). Whereas Sub City PHEM officers collect the weekly surveillance data from all Woredas by using telephone and email. Table:`16 shows number of reporting site by government and private institution in visited sites.

Table 16: Reporting by visited sites in Addis ketema Sub City ,Addis Ababa ,Ethiopia ,2018

S.No	Visited site	Government reporting unit	Private reporting unit	Total
1	Addis Ketema Sub City	10	63	73
2	Woreda 1	1	1	2
3	Woreda 4	1	4	5
4	Woreda 5	1	9	10
5	Addis ketema health Center	1	0	1
6	Abebe Bikela health center	1	0	1
7	Ginbot 20 health center	1	0	1

According to Addis ketema sub City report (52 weeks summary report), the reporting completeness rate of sub City and all Woredas were greater than the national target. The detail summary report of reporting completeness by is presented in (table 17) .

Table 17: Reporting completeness weekly surveillance report by , Addis ketema sub City, Addis Ababa ,Ethiopia ,2018

S.No	Name of	Total Expected reporting site	Total expected report	Total report received	Completeness
1	1	7	364	340	93%
2	2	2	104	104	100%
3	3	4	208	203	98%
4	4	5	260	260	100%
5	5	6	312	301	96%
6	6	5	260	241	93%
7	7	8	416	387	93%
8	8	20	1040	958	92%
9	9	10	520	490	94%
10	10	5	260	245	94%
Total		**72**	**3744**	**3529**	**94%**

According to Sub City weekly report, the trend of sub City reporting completeness is above national expected target (85%) in the previous 52 continuous weeks. Within this 52 weeks, the maximum reporting rate was 100 % and the minimum was 92% with an average of 94% for 12 months at Sub City level (Figure 13).

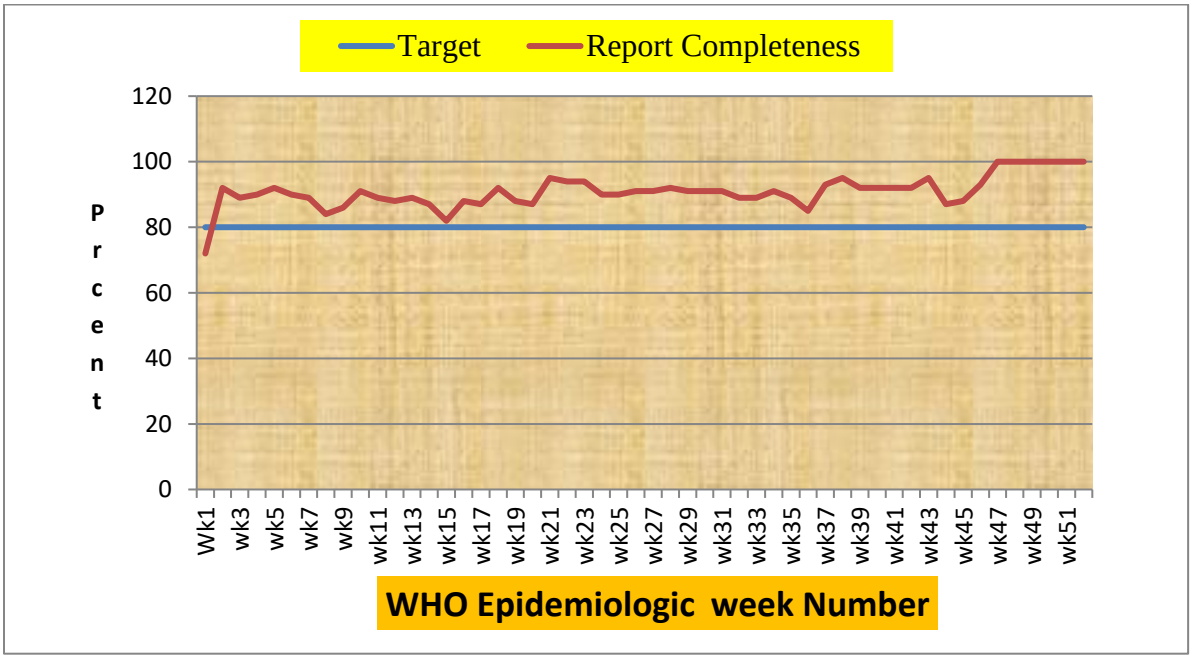

Figure 13:Data completeness of reporting health facilities by WHO Week in Addis ketema Sub City, 2018

In Addis ketema sub City reporting completeness rate of governmental health facility was above the national target. In the last 12 months, on average the sub City governmental health facilities reporting completeness rate was above 85% and within this reporting period only one month's (January) registered less than 85%. In contrary, the reporting completeness rate of private health facilities was greater than expected national target. As the same reporting period (12 months) with governmental health facilities, the completeness rate of private health facilities were 87% on average and the maximum was 95% (figure14).

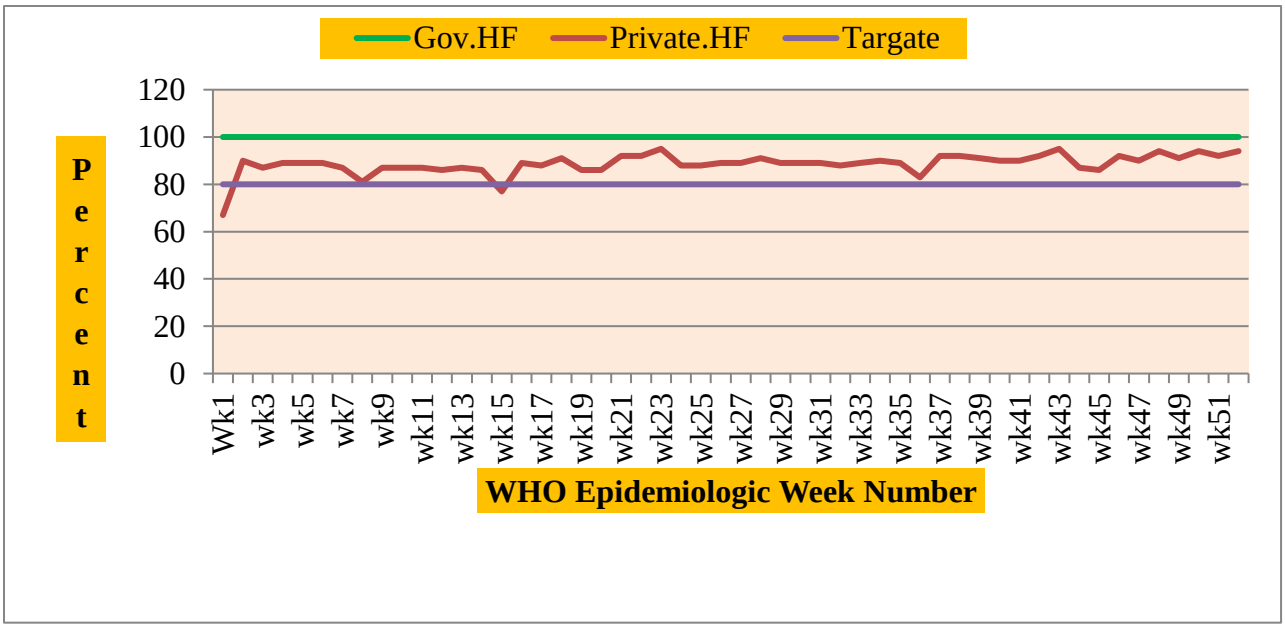

Figure 14 :Data completeness of reporting facilities by owner ship in Addis ketema Sub City, 2018

When we see the report completeness rate of governmental health facilities by Woreda , almost 100% of Woredas which found in Addis sub City had completeness rate of above 85%. On the other side, in the Woreda private health facilities reporting completeness rate was greater than 85% except two surveillance report week and the maximum was 95% reported by week 43 , followed by week 48 (94%), Week50 (94%), week52 (94%) and week46 (92%) (Figure 15).

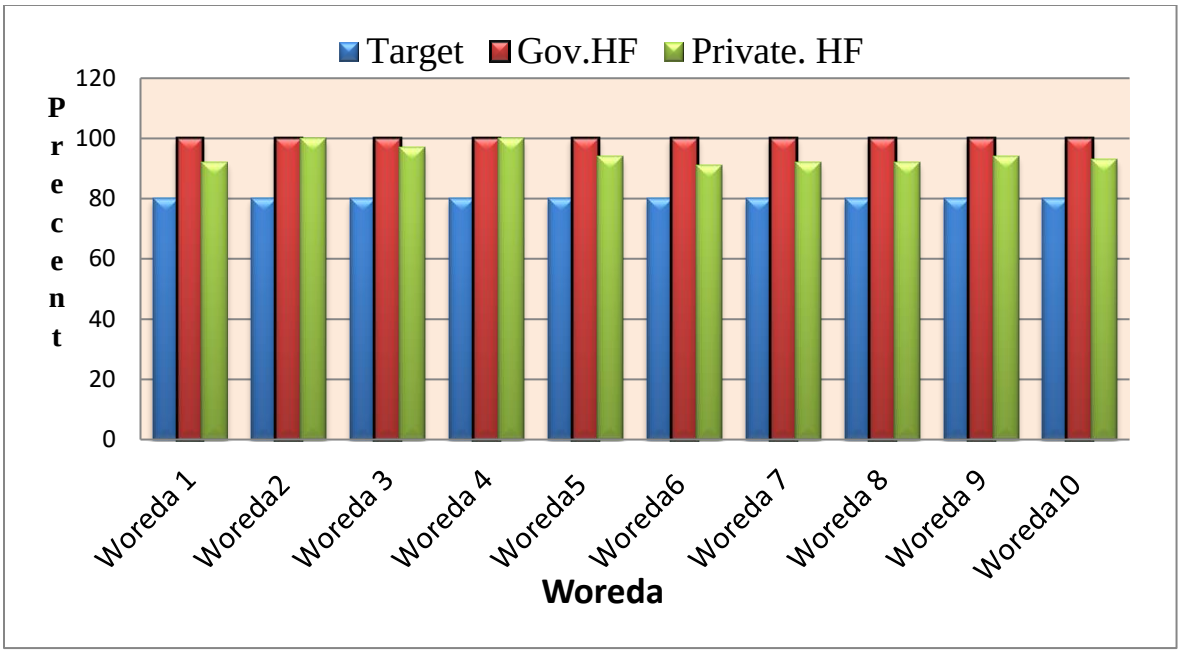

Figure 15 : Weekly PHEM Report completeness by facility ownership and in Addis ketema sub City of, 2018

3.4.6. Data analysis

In all assessed health facilities and Woreda health offices, there was assigned responsible person for report compilation and data analysis. In most of visited sites, they had appropriate denominator for data analysis. Including sub City health office data analysis was not taken as usual routine activity. From visited sub City, Woreda health office and health center only 2 (66%) visited sites were analyzing the trend collected surveillance data by time irregularly by using simply raw data.

In all visited health facilities and health offices, they were not prepared action threshold for surveillance reportable diseases.

3.4.7. Measles Case detection

Case detection of measles and sample adequacy was assessed by taking data from case based and line listing formats reported to EPHI. This helps to assess the functionality of the surveillance system of the sub City in detecting cases of measles cases.

In the past three years a total of 80 measles suspected cases specimen was taken from all health facilities of Addis ketema sub City.

Table 18:- Detection of suspected measles cases / year/100,000 pop. by Woreda , Addis ketema sub City in 2016-1018

S.No	Name of Woreda	2016	2017	2018
1	1	6	0	1
2	2	4	1	1
3	3	2	1	2
4	4	2	1	3
5	5	6	2	4
6	6	4	2	3
7	7	7	4	3
8	8	11	2	4
9	9	1	1	2
10	10	0	0	0
Total		43	14	23

About 90% of the Woredas were reported at least one cases of measles (or >1 reported cases per 100,000 population) with a blood specimen in the last year of 2017. Proportion of Sub City that have reported at least one measles cases for the last three years of Addis ketema sub City is presented in (figure 16) as follow.

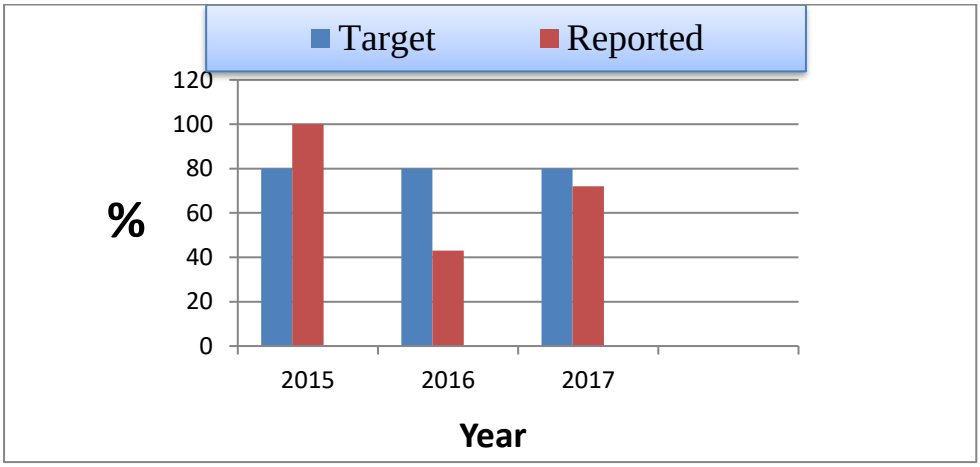

Figure 16: Proportion of measles reported at least one measles cases with blood specimen by year, Addis ketema sub City 2016, 2017 and 2018.

Sample adequacy rate was also assessed at sub city and level by using case based and line listing formats. As result sub city sample adequacy rate was 100% till June, 2017. In the past year of 2017, 90% of Woredas were sending suspected measles cases with blood specimen for laboratory confirmation. These Woredas were not achieving the national target of sample adequacy rate (80%).

3.4.8. Outbreak investigation

All the respondents from assessed sub City health office ,Woreda health offices and health center responded that, they had investigated different outbreaks. As a result they were used the findings for intervention, but there was neither written document nor standard procedures for outbreak investigation was seen during the assessment. There is no outbreak of measles were reported from all Woredas in the last year to the Addis ketema sub city health office.

3.4.9. Epidemic preparedness and response

In all visited Woreda health offices they had not experienced any shortage of drugs and supplies during epidemic time. Of visited Woreda health offices, 33% of them had prepared written document for epidemic preparedness plan and 66% of them had emergency drugs and supplies in the store. In addition, 100% of them were established Rapid Response Team and task force committee but it lacks continuous functionality in all Woreda health offices and health facilities. All visited Woreda health office, health center and Sub City health office encountered shortage of budget and they didn't allocate budget for epidemic preparedness and response activities (table 19).

Table 19: Availability of epidemic preparedness and response resource in visited sites Addis ketema Sub City , 2018

S. N	Variables	Sub City health office (N=1)	Woreda health office (N=3)	Health Center (N=3)	Total
1	Availability of Epidemic response and preparedness plan	1	0	0	1
2	Availability of Emergency stock of drugs and supplies	1	1	1	3
3	Availability Outbreak investigation check list	1	1	0	2
4	Availability of Rapid Response Team (RRT)	1	1	1	3
5	Availability of task force committee	1	1	1	3
6	# of epidemics responded within 72 hours	0	0	0	0
7	Availability of budget for epidemics/ emergency	0	0	0	0
8	Experienced shortage of drugs and supplies during epidemics	0	0	0	0

3.4.10. Supervisions and Feedback

In all visited health institutions including Woreda health office and Health center regular specific supportive supervision was not conducted to lower levels except sub City health office. But in most visited sites integrated supportive supervision was conducted every three month (quarterly) and some surveillance activities were included in the check list. Because of shortage of resources any of visited institutions were not prepared specific supportive supervision plan for their lower level in this year. In 2018 from visited sites 100% Woreda health office and 100% Health center of them were supervised by higher level during integrated supportive supervision and health center they have no surveillance supportive supervision checklist (table 20). In addition, during the assessment time all visited sites had not received specific PHEM feedback from higher level in written document.

Table 20: Availability of supportive supervision, plan and feedback in visited sites, Addis ketema sub City in, 2018

S. No	Variables	Sub City health office(N=1)	Woreda health office (N=3)	Health Center (N=3)	Total
1	Specific S/ supervision to lower level	1	1	0	2
2	Integrated S/supervision to lower level	1	2	1	3
3	Availability of supervision plan	1	0	0	1
4	Availability supportive supervision checklist	1	0	0	1

3.4.11. Training

All sub City technical staffs working in PHEM department were trained short term training on selected priority diseases (such as measles, AFP and NNT) by city administration health bureau and WHO. From all visited sites, 1 (100%) Sub City Health office 3 (100%) Woredas health offices and 3 (100%) health centers were assigned PHEM officer/ focal person. Of those assigned PHEM officers, all of them were trained on the new approaches of public health emergency management (PHEM) and selected surveillance priority diseases (such as measles, AFP and NNT). On the other hand, according to sub City PHEM department report, all health extension workers which are working in the Sub City were trained for 2 days on surveillance

system and selected priority diseases such as measles and AFP/polio. But during the assessment time from interviewed health extension workers 8/12 (66%) HEW attended the training.

3.4.12. Resources

From visited Woreda health offices, 3 (100%) of Woreda health offices and all of health centers 3 (100%) were compile weekly PHEM report manually.

According to interviewed staffs response in sub City PHEM department, Sub City PHEM officers can use Microsoft office applications (MS word, MS excel and power point); but one PHEM Officer they don't have any clue on epi info. utilization . On the other hand, from Woreda health office and health center have no computer skill on Microsoft office application respectively. Regarding availability of computer and printer, sub City PHEM unit have computer but they have no printer and telephone for data management and communication; from visited Woredas and health center all of them they have no computer and printer respectively . Availability of resources related to data management and communication in visited sites is presented in detail in (table 21)

Table 21 : Availability of resources for PHEM activates in visited sites of Addis ketema sub City, 2018

S.No	Variables	Sub City health department (N=1)	health office (N=3)	Health Center (N=3)	Total
1	Electricity	100%	100%	100%	100%
2	Bicycles	0%	0%	0%	0%
3	motor cycle	0%	0%	0%	0%
4	Vehicle	0%	0%	0%	0%
5	Computer	100%	0%	0%	0%
6	Printer	0%	0%%	0%	0%
7	Fax	0%	0%	0%	0%
8	Telephone	0%	0%	0%	0%
9	Internet service	0%	0%	0%	0%

3.4.13. Laboratory Capacity

At national level, the visted site have capacity to collect and send the to national for 8 immediately reportable priority diseases.

Regarding the laboratory capacity at health center level, almost all health centers have microscope chemistry Machine and, Addis ketema health center have Gene-xpert machine for the other cases they send specimen to regional or national laboratory. However, the feedback

from national laboratory was let. It takes more than three or more months to get the feedback. From the visited health centers, who sent the specimen in year 2017, all were not received laboratory result before three months.

3.4.14. Description of key attributes of the surveillance system

3.4.14.1 Usefulness

Public health surveillance system is useful if its contributes to the prevention and control of adverse 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 helps to determine that an adverse health-related event previously thought to be unimportant is actually important(5).

All visited health institution respondents have common understanding on usefulness of existences of public health surveillance system. Respondents believe that, if there is functional public health surveillance system; the system can detect out breaks of priority diseases early and allows accurate diagnosis, estimate the magnitude of morbidity and mortality related to these diseases including identification of factors associated with these diseases and permit assessment of the effect of prevention and control program.

3.4.14.2 Simplicity

The simplicity of a public health surveillance system refers to both its structure and ease of operation.

Easiness of case definition

To confirm the existence of suspected cases of selected priority diseases there should be case definition to facilitate easy detection. In addition to that, the case definition should be easy and simply understandable by health care providers and Woreda health office staffs. As the assessment result, all interviewed respondents were replied that the case definition is easily understandable and simple to any health care provider and Woreda health office staffs.

To identify exact number of cases or incidence rate in the area each health facilities should be participate in reporting system. According to 2017 annual Sub City report, in Addis ketema sub City there were on average 10 health centers, one NGOs Clinic and 62 all types of private clinics in the year. Of these total health facilities, on average 94% of them sent their reports regularly. Furthermore, out of 10 all types of governmental health facilities 100% of them were

participated and out of 63 all types of private clinics about 87% of them sent their report to the nearest health center or Woreda health office.

In addition, the visited health centers had fixed common line telephone service; but the visited health centers had mobile network access. The visited Woredas health office has telephone service in their office. However, there was budget shortage to pay for telephone service. For that reason using mobile or telephone system was not appropriate and sustainable communication method for weekly surveillance report at health center level.

According to the assessment, the respondent said that they needed greater than 10-15 minutes for collecting and filling weekly data.

Concerning types and contents included in the reporting format, all respondents said that all data elements included in weekly surveillance reporting format is important. But the Visited sub City health office, Woreda health office and health center respondents were suggested that the reporting format lacks some personal information like sex and age of the cases space for scabies. So that to get full information for the investigation of the conditions.

3.4.14.3 Flexibility

A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds. Flexible systems can accommodate, for example, new health-related events, changes in case definitions or technology, and variations in funding or reporting sources. In addition, systems that use standard data formats (e.g., in electronic data interchange) can be easily integrated with other systems and thus might be considered flexible (5).

In the visited Woredas and health facilities the respondents are responded that the existing surveillance system is flexible in the structure and reporting format. The reporting format is open for newly emerged and re-emerging diseases and conditions.

3.4.14.4 Positive predictive value/ cases definition ability

The ability of the case definitions to detect true positive cases was assessed. Because of the incompleteness of surveillance data, In Addis ketema sub city a total of 23 measles cases were identified as suspected measles by using case definition and sent to laboratory for confirmation but there is laboratory results feedback and we can't calculate PPV.

3.4.14.5 Representativeness

The representativeness of the surveillance system is related to the health service coverage, the

reporting rate of the health facilities, the health seeking behavior of the community, and the technical capacity of the health care providers. The sub City health service coverage was 100%. The health seeking behavior of the community was changed due to awareness creation done by HEWs in most of the urban communities of Addis ketema sub City as the sub City PHEM focal person response. In addition, the health service converges of visited 100%.

3.4.14.6 Stability :- refers to the reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system(5).

Measures of the system's stability can include:-

- The number of unscheduled outages and down times for the system's computer;
- The costs involved with any repair of the system's computer, including spare parts, service, and amount of time required for the repair;
- The percentage of time the system is operating fully;
- The desired and actual amount of time required for the system to collect or receive data;
- The desired and actual amount of time required for the system to manage the data, including transfer, entry, editing, storage, and back-up of data; and
- The desired and actual amount of time required for the system to release data.

Stability of surveillance system as visited in Addis ketema sub City health office relating to data collection, data entry, data analysis and transfer is stable.

3.4.14.7 Data quality

Data quality reflects the completeness and validity of the data recorded in the public health surveillance system. Quality of data is influenced by the performance of the screening and diagnostic tests (i.e., the case definition) for the health-related event, the clarity of hard copy or electronic surveillance forms, the quality of training and supervision of persons who complete these surveillance forms, and the care exercised in data management.

Examining the percentage of "unknown" or "blank" responses on surveillance forms is a straightforward and easy measure of data quality. According to the copies of weekly reports of visited sites, at some health facilities and Woreda health offices the reporting format lacks reporting date and reporting facilities. At sub City level, three months of weekly reports were assessed and there is no blank/ unknown space. On the other hand, from visited Woredas and

health facilities 85% of the reporting formats were complete with necessary information including zero report.

3.4.14.8 Timeliness

The timeliness of a public health surveillance system should be evaluated in terms of availability of information for control of a health-related event, including immediate control efforts, prevention of continued exposure, or program planning.

Concerning timeliness, data were not available in all visited sites; because of that the timeliness of weekly surveillance report of visited sites were not measured except Addis ketema sub City health office . The Addis ketema sub City timeliness rate was measured by month from January 2017- December 2017 for one fiscal year. In 2017 annual timeliness rate of Addis ketema Sub City was 95% and it is greater than the national target (figure 17).

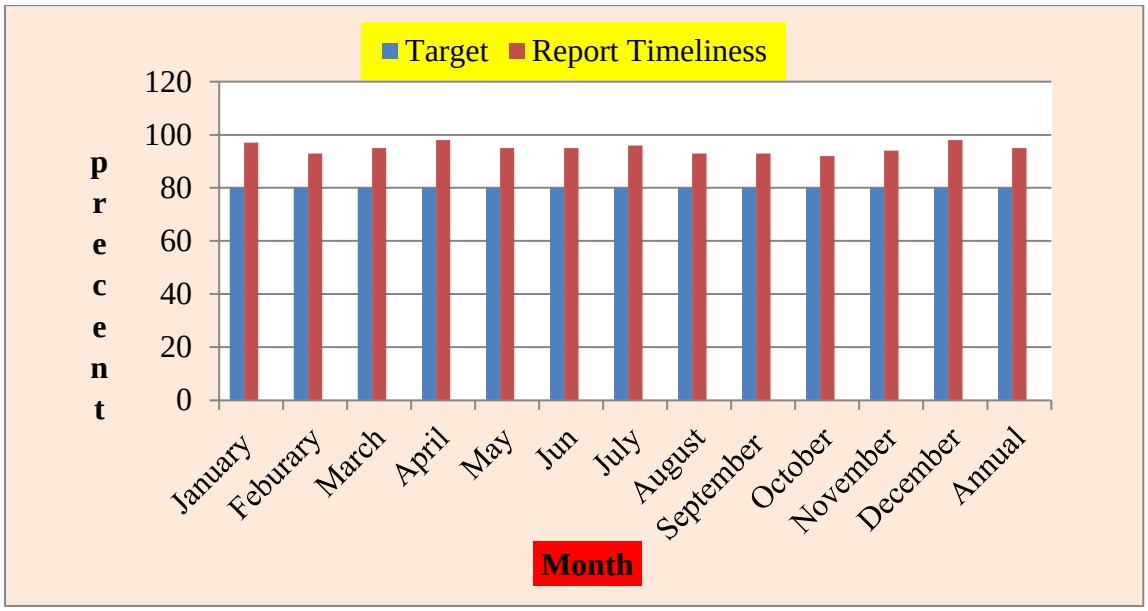

Figure 17: Weekly PHEM Report timeliness by month, Addis ketema Sub City, 2018

3.4.14.9 Acceptability reflects the willingness of persons and organizations to participate in the surveillance system. In this case the participants of the surveillance system are health facilities, health offices, nongovernmental organizations and private health facilities as Organizations and health workers and the community as individuals. Therefore all the mentioned agents accept and are well engaged to the surveillance activities. But the engagement of private health facilities in the surveillance system is weak as visited in the documents of sub City and Woreda health offices. The acceptance of the surveillance system by the above responders was indicated by the use of the standard cases definitions and the recent and standard reporting formats. Almost all

visited health facilities and health offices were using surveillance standard case definition and reporting formats.

3.4.14.10 Sensitivity

The sensitivity of a surveillance system can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease (or other health-related event) detected by the surveillance system. Second, sensitivity can refer to the ability to detect outbreaks, including the ability to monitor changes in the number of cases over time(5).

The extent to which these situations are explored depends on the system and on the resources available for assessing sensitivity. The primary emphasis in assessing sensitivity assuming that most reported cases are correctly classified is to estimate the proportion of the total number of cases in the population under surveillance being detected by the system, represented by A/(A+C) in this report. For example, the sensitivity of a system might be improved by:-

- conducting active surveillance (i.e., contacting all providers and institutions responsible for reporting cases);
- using external standards (or other surveillance indicators) to monitor the quality of case reporting;
- identifying imported cases;
- tracking the number of cases of suspected disease that are reported, investigated, and ruled out as cases
- monitoring the diagnostic effort (e.g., tracking submission of laboratory requests for diagnostic testing); and
- monitoring the circulation of the agent (e.g., virus or bacterium) that causes the disease

During the assessment of the sensitivity of Addis ketema sub city surveillance system ,there is conduct active case search and uses of standard case definition .

During visted Addis ketema sub city health office surveillance system, Woreda health office and health center that does not have high sensitivity can still be useful in monitoring trends as long as the sensitivity remains reasonably constant over time

3.5 DISCUSSION

We aimed to evaluate the surveillance system of Addis ketema Sub City by describing the system and measuring the usefulness, simplicity, data quality, acceptability, representativeness, timeliness, sensitivity, flexibility ,PPV and stability of the system for the selected diseases of measles.

Appropriate use of data and conclusions that can be drawn from surveillance data will depend on the quality of data collected. The data quality of the surveillance system as a whole depends on the compilation of the quality of the entire source(9).

Quality of data is influenced by the performance of the screening and diagnostic tests (i.e., the case definition) for the health-related event, the clarity of hardcopy or electronic surveillance forms, the quality of training and supervision of persons who complete these surveillance forms, and the care exercised in data management. A review of these facets of a public health surveillance system provides an indirect measure of data quality (9).

Report completeness rate is one of the indicators to determine whether the surveillance system is strong or not. According to the finding, the Addis ketema sub City weekly surveillance report completeness is greater than the national target, 80%(3). When we see the reporting facilities by ownership, participation of private health facilities in sending weekly surveillance report is higher (14%) than expected national target as well as Sub City annual performance. However, the governmental health facilities completeness is (100%) performance. Therefore, if reports are late, or are not submitted, the aggregated information for the Woreda (or other administrative area) will not be accurate .Outbreaks can go undetected, and other opportunities to respond to public health problems will be missed.

When reports are sent and received on time, the possibility of detecting a problem and conducting a prompt and effective response is greater; So that, ministry of health prepared an indicator to measure the timeliness of the report and aimed to reach a target of 85% (9). As indicated in the result, the sub City reporting timeliness was greater than the national target. This performance will indicate the quality of work towards disease surveillance as the reporting weekly itself tells the sensitivity of surveillance system. This clearly illustrates that timely reports will give timely information which helps to predict future outbreaks, trends of diseases occurrence, cases for further studies, future impact of diseases surveillance and action for problems identified on time.

Surveillance is information for action. Analyzing and interpreting public health surveillance data are the links between the design and operation of a surveillance system and the use of data from the system to implement public health action and disease control program. Surveillance data are used to detect epidemics, suggest hypothesis, characterize trends in disease or injury, evaluate prevention program, and project future public health needs. In general, analyzing and interpreting surveillance data should be of primary importance, resisting the urge to allow the time consuming problems of collecting, managing and storing surveillance data to supersede the analysis itself. Thus, analysis should be implemented as part of a routine surveillance program so results can be monitored over time (6).

According to this, the practice of data analysis and trend of Addis ketema sub City for priority diseases of measles was seen. Accordingly, the practice of making data analysis and trend for measles in the visited places was good, particularly at sub City health office but Woreda health office and health facilities still there is need improvement and attention. However, any data collected from the surveillance system (epidemic report and routine weekly surveillance report) should be analyzed only by time regularly and the visted sub City, Woreda Health office and health center were not analysis surveillance data by person and place. In addition to that, trends of measles should be followed regularly at each level to detect any unusual rising number of cases of health events or conditions at local, sub City or higher level which indicates the occurrence of outbreak situations that require immediate investigation and intervention. Therefore, the absence of performing data analysis regularly may hinder early detection of health events and taking appropriate controlling and preventive actions before the events are causing more illness and disability in the community.

Correspondingly, epidemic preparedness is essential and the basic action prior to the occurrence of any health related events. A public health emergency such as an acute outbreak or public health event calls for an immediate response. Being prepared to detect and respond to such an event is an essential role of the district. Examples of advanced preparations include: identifying key members of an event management team, mapping available resources, and estimating required supplies and procuring them. If these steps are carried out in advance of an event, the health system will be able to function promptly, effectively, and efficiently to prevent unnecessary deaths or disabilities due to the emergency(8). Preparedness activities and tasks includes development of plans, procedures, protocols, and systems; establishment of mutual aid

agreements and provision of training for health workers and concerned stake holders. The aim of preparedness is to strengthen capacity in recognizing and responding to public health emergencies through conducting regular risk identification and analysis, establishing partnership and collaboration, enhancing community participation and implementing community-based interventions and strategic communication during the pre-emergency phase and ensuring their monitoring and evaluation (9).

Establishing multi-sectorial PHEM committee and rapid response team is the primary steps of preparedness at each level(8). In addition, this established committee should be oriented or trained on epidemic preparedness and response (especially for RRT). The committee should have a regular meeting as monthly basis for multi-sectorial committee and RRT will meet regularly when there is an outbreak. In the visited sites even though there is established multi-sectorial task force committee in all Woredas and sub City, it lacks functionality or regular monthly meeting in all levels. On the other hand, rapid response team/ technical committee were established and had meeting when there was an outbreak and most of team members were trained on epidemic preparedness and response.

Similarly, in most of the visited health institutions lacks epidemic preparedness plan including drugs, supplies and financial resource for epidemic response of measles and others.

On the other hand, any outbreak should be detected, investigated and responded within the expected standard time frame (in 72 hrs)(4). The benefits of a rapid and effective response are numerous. Rapid response limits the number of cases and geographical spread, shortens the duration of the outbreak and reduces fatalities. These benefits not only help save resources that would be necessary to tackle public health emergencies, but also reduce the associated morbidity and mortality. However, in Addis ketema sub City none of the outbreaks occurred in year 2017.

At least one case of suspected measles cases per 100,000 populations is expected from each Woreda. According to national target, 80% and above Woredas should report at least one case of measles with a blood specimen per year(8). According to the assessment result, most of the Woredas were sending at least one suspected measles cases per 100,000 populations in the least years. However, the recent performance of the sub City (six months) was less than the national target. Ensuring reliable reporting of surveillance data throughout the country is important so that program managers, surveillance officers and other health care staff can use the information for action. The community and health facilities especially health Extension worker are the main

source of information. The information collected from this site is compiled in standard forms, analyzed and then forwarded to the Woreda health office. level uses standard formats to compile aggregate, and send the data to sub City /region, from which the central level receives(8). In addition to routine data transferring tools, there are also standardized surveillance formats like line listing, case based formats, Measles investigation format, rumor log book, epidemic reporting formats for every level of health institutions which should be available in every health institutions to record information as per standard during existence of outbreak or any health event suspects. However, the availability of surveillance formats is not sufficient and the utilization was also poor. The problem was not only lack of surveillance format, but also because of absence of follow up and monitoring by higher level, the utilization of format and their documentation system is poor.

For the success of surveillance program capacity building plays pivotal role. To increase the quality of early detection of diseases and reporting system formal or on job training for PHEM officers is necessary. Likewise, the Sub City and lower level PHEM officers were trained on surveillance of selected diseases like NNT, measles Typhoid fever and AFP/ polio. However, the practice of investigating an outbreak and conducting data analysis by and lower level PHEM officers was weak. Therefore, conducting refreshment training is important to update and upgrade the health workers knowledge. Furthermore, community surveillance is not given emphasis by Sub City and Woreda health offices. From visited Woreda health office some of health extension workers have no information about the surveillance of measles, NNT and AFP/ polio. However, they are the peripheral source of surveillance report. Any events that happened in the "ketenas" were reported to Woreda health office or the nearest health center through health extension workers. They should be well familiar with different types of public health related events.

Laboratory-based surveillance is the key part of the overall surveillance system. Laboratory based surveillance helps to detect and control the outbreaks with rapid identification of the pathogens and their source of infection. Starting from the national level to the health center level, suspected outbreaks should be confirmed by laboratory investigation. The laboratory confirmation for most of diseases under surveillance like measles can be performed at national levels. However, the feedback from the national lab was late, because of that it was not appropriate for outbreak confirmation. During interviewing the health staffs, we investigated that

some of the interviewed staffs were not understood the time of sample collection, purpose of sample collection and number of sample to be taken to confirm the existence of outbreak for measles.

Case definition is used to decide if a person has a particular disease or condition by specifying clinical criteria and limitations on time, place and person. Using standard case definitions ensures that every case is diagnosed in the same way, regardless of where or when it occurred, or who identified it. This allows for comparing the number of cases of the disease or condition that occurred in one time or place with the number occurring in another time or place. Health staff should be aware of case definitions of measles, NNT and AFP/ polio that may afflict not only the local community but also have the potential for spread across geographic boundaries{4}. Measles, AFP, Cholera and maternal death standard case definitions were available in most of visited area and most of the interviewed health staff were understood the case definition.

On the other hand, the case definition should be simple and have high ability to detect the true positive cases relative to confirmatory test. Public health emergency management guidelines were available in all visited sites.

3.6. Limitation of the study

- Private health facilities were not included in the assessment
- There is no Hospitals and participated in the assessment
- In completeness of data specially sample document send to national laboratory

3.7. CONCLUSION

The overall functioning of public health surveillance system underway in Addis ketema sub City was not satisfactory to achieve its targeted goals of prevention and control of measles.

On the other hand, in all assessed Woreda health offices and health facilities there were assigned responsible PHEM officers for report compilation and data analysis. However, routine surveillance data analysis was not exercised, Except Sub City.

In all visited Woreda health offices were not experienced any shortage of drugs and supplies during epidemics time. Most of them had not prepared epidemic preparedness plan including emergency drugs and supplies.

Higher level officials should give special emphasis to strengthen lower level (Woreda health office and health facilities) capacities in developing emergency preparedness plan.

The practice of investigation an outbreak and data trend analysis was poor .

Therefore; this may affect the efficiency and effectiveness of the surveillance system to detect early and prevent health related harms.

Regarding supportive supervision, in Addis ketema Sub City program specific supportive supervision was not conducted regularly for lower level health institutions in 2018. Similarly there was no feed backing system at Woreda health office and health Center level. Specimen is referred to national laboratory for confirmation for those selected priority diseases (like measles). However, the feedback from national laboratory was late and it takes more than three months for measles and difficult to decided an outbreak.

3.8. Recommendations

- The sub City health office needs to strengthen the quality, core activities and supportive functions of the surveillance system at all levels of the health system. According to the assessment results this recommendation was given for some identified gaps as follows:
- EPRP should be prepared and updated every year at all level especially for measles, malaria, AFP/ polio and other health related threats. In addition, Resources that are necessary for epidemic response such as drugs, supplies and other logistics should be available in all health office stores.
- To increase the representativeness of the surveillance system all private health facilities should be included in the system (especially in 5, 6, 7,8 and 9) and the Sub City or Woreda health offices should receive their weekly surveillance report regularly and timeliness of surveillance data also should be measured.
- Rapid response team should be functionalized at all level.
- Budget should be allocated for PHEM to strengthen early detection of health events and response system at all level .
- To strengthen community surveillance, all UHEWs should be trained on PHEM and some selected priority diseases such as NNT, measles and AFP/ polio, and Community case definition should be distributed for all health facilities.
- Plan for specific and integrated supportive supervision for PHEM department should be prepared at Sub City and Woreda health office level and the supervision should be conducted every quarter based on the schedule and Feedback should be given to lower level based on the supervision findings in written document timely .

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Chapter–IV Health Profile Description

4.1 Health Profile Description in Woreda nine of Addis ketema Sub City , Addis Ababa, Ethiopia ,2018

Executive Summary

Health profile is a system of collecting and summarizing health and other health related events, Demographic, Socio economic, political and cultural aspect of a particular in Woreda nine of Addis ketema Sub City(1). This summarized and prioritized health and health related information is useful for planning, implementing and evaluating health programs. Therefore, well described health profile can be useful for health program managers and stake holders. The objective of this study is to prepare health profile of Addis Ketema Sub City by identifying health problem and overall health status of the population in the catchment. Health and health related data was collected in Woreda nine from January 22-March23/2018. Interviews and standard questionnaires were used as tools for data collection. Sources of data were Woreda nine health office, Woreda nine education office, Woreda nine water resource office, Woreda nine Finance and Economic Development office and Woreda nine administration office of Addis ketema Sub City Data was compiled and analyzed using micro soft excel. Acute Upper respiratory tract infection, hypertension and Related disease and typhoid fever accounted for adult morbidity with 15%, 13.3% and 10.5% respectively from among adult total OPD cases. While Upper respiratory tract infection, Diarrhea and Skin infection were 50%, 17% and 7.1% respectively among under-five children. One lost to follow up TB cases were reported. The coverage of water were 87% but skin diseases is among the ten top diseases of the third one .There were 16 Severe acute malnutrition and 35 Moderate acute malnutrition cases of the in Woreda nine of Addis ketema Sub City .Presence of treatment failure and lost to follow up may facilitate to Multi-Drug Resistant (MDR) TB which is dangerous and very difficult to treat in nearby health facilities and can results in death. IEC/BCC and strong follow up tracing mechanisms TB should be established.

4.1. INTRODUCTIN

Health profile is a system of collecting, organizing and summarizing health and others health related events to describe health and others health related conditions, demographic, socioeconomic, political, cultural and others aspect of a particular geographic areas of interest (1). This health profile assessment is both a process and a product. It is a process of gathering and interpreting information from multiple and diverse sources in order to develop a deep understanding of the health of a community. It is also a process that uses these results to develop strategies to improve the health status of the community(2).

The health profile provides an overview of the situation and trends of priority health problems and the health systems profile, including a description of different institutional frameworks, key issues and challenges of the Woreda nine of Addis ketema sub City health office. It is important to obtain enough, accurate and reliable data of particular geographic area in order to develop meaningful developmental plan Organizing, summarizing and analyzing of health and health related data of the Woreda nine of Addis ketema sub City health office. These summarized data is important for public health surveillance officials for planning, implementation and evaluation of public health surveillance programs(3).

The profiles present estimates to track changes in insurance status, disease prevalence, health behaviors and overall health status over time and enables frequent release of health estimates that will help policymakers, media, health advocates and others better respond to current events and the impact of a changing economic and social climate on health(4).

In Ethiopia health profile presents in one place shows the best and latest evidence to enable an assessment of progress in improving reproductive, maternal, newborn, and child health and achieving HSTP(5, 6). The profile presents the most recent available information on selected demographic measures, coverage rates for priority interventions across the continuum of care, and indicators of equity, policy support, human resources, and financial flows(7).

Its purpose is to promote evidence-based health policy making through a comprehensive and rigorous analysis of the dynamics of health situations(8) and health systems in the Woreda nine of Addis ketema Sub City. Therefore, the main objectives of this document are to present compiled information concerning physical and socio-economic condition of Woreda nine. The main sources of data used for the preparation of the document are different offices and The document covers data from July2017 to June 2018.

4.2. OBJECTIVES

4.2.1. General Objective

- To assess and describe health and health related data and to identify problems of Woreda nine of Addis ketema Sub City, 2017

4.2.2 Specific objectives

- To summarize health and health related data in Woreda nine of Addis ketema sub City.
- To understand basic infrastructures in Woreda nine of Addis ketema sub City.
- To identify major health problems and setting prioritize problem of Woreda nine of Addis ketema sub City.

4.3. METHODS AND MATERIAL

4.3.1 Study Area

We conducted in Woreda nine of Addis ketema Sub City in 2017

4.3.2 Study Period

From January 22, to March 3/2018.

4.3.3 Study Design

We used cross sectional study design was conducted using standard questionnaire.

4.3.4 Data collection methods

Health and others health related data of the year 2017/2018 were collected and reviewed secondary data of Woreda nine of Addis ketema Sub City.

4.3.5 Data analysis procedures

Data was compiled and analyzed using Microsoft Excel offices.

4.4. RESULTS

4.4.1 Historical Background

Woreda nine is one of the Woredas of Addis ketema Sub-City in Addis Ababa city administration . Historically, name of the Woreda was "simply Numbering". As the culture and tourism office said. Woreda nine of Addis ketema Sub City is bordered by Woreda five at the north east, Woreda four at the south west .

4.4.2 Geography and climate

Woreda nine is found at 5 Kilometer away from Addis Sub City to the southern part of Addis ketema Sub City. The altitude of the is 2800-3500 meters above sea level. The climatic condition of the Woreda is Dega.

The annual temperature is estimated to be between 10^{o}c and 21^{o}c. Annual range of rainfall is 1825-2150 mm with an average of 150 rainy days.

4.4.3 Administrative and political structure

Structurally the is sub divided in to six urban kebeles and 12 "ketenes" for political administration.

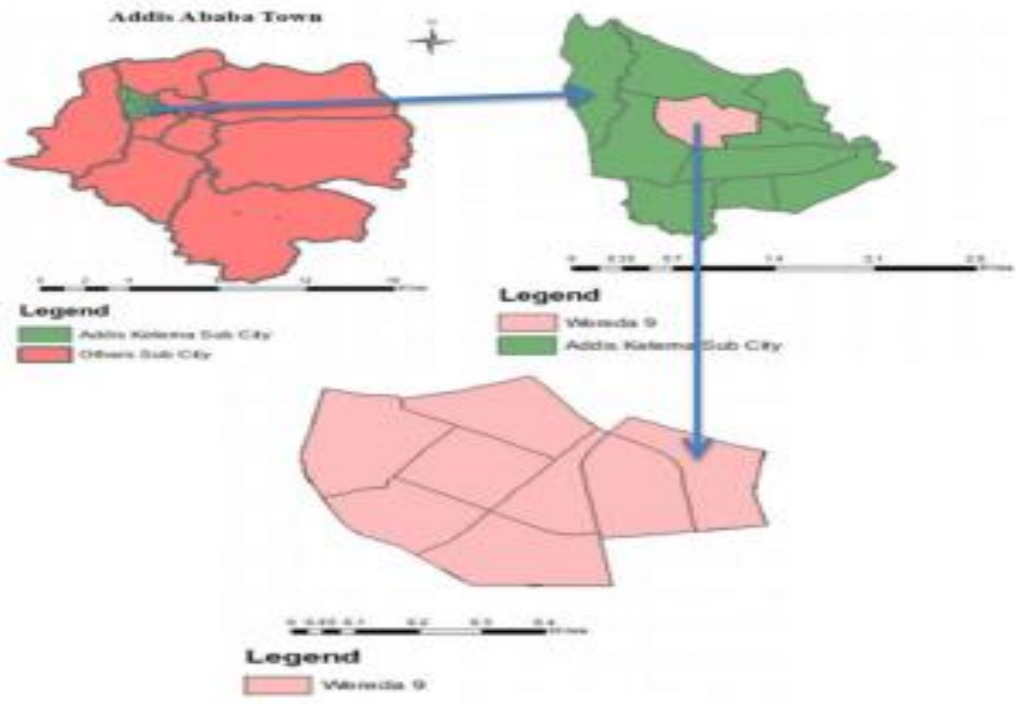

Figure 18: Woreda nine Map of Addis ketama Sub City, Addis Ababa, Ethiopia 2018

4.4.4 Demographic Information

The total population of the Woreda is estimated to be 34,780 of which 17,738 (51%) are male . Among the total population Under one year, less than five years and less than 15 years constitutes 1078, 5703, and 16,694 respectively. The older age group (>65) consists 1,649 of the total population. Women of child bearing age (15-49 years of age) accounts 7,686 of a population.

Table 22: Estimated population by kebeles and age category of Woreda nine of Addis ketema Sub City,2017.

S.N	Name of kebeles	Total Popn	Total HH (4.8)	<1 years (3.1%)	< 5 years (16.4%)	<15 years (48%)	>65 years (4.74%)	Women (15-49) (22.1%)
1	Ketena 18	5382	1122	167	883	2583	255	1189

2	Ketena 19	4893	1019	152	802	2349	232	1081
3	Ketena20	7672	1598	238	1258	3682	364	1696
4	Ketena 21	5435	1133	168	891	2609	258	1201
5	Ketena27	6245	1302	194	1024	2998	296	1380
6	Ketena 28	5153	1074	159	845	2473	244	1139
	Total	**34780**	**7248**	**1078**	**5703**	**16694**	**1649**	**7686**

4.4.5 Education

In 2018, there are seven governmental kindergartens and private, five primary schools and there is no secondary school in Woreda nine of Addis ketema Sub City. As information obtained from education office, number of female students in primary schools showed increment when compared to previous year .There are 542 primary schools teachers in the Woreda .

Table 23: Number of students and teachers enrolled in Woreda nine of Addis ketema Sub City by sex, 2017.

Types of School	**Level**	**Number of students**			**Number of teachers**		
		Male N %)	**Female N (%)**	**Total**	**Male N (%)**	**Female N (%)**	**Total**
Kindergarten	KG	413	531	944	14	43	57
Primary schools	1-4	442	496	938	137	109	246
	5-8	0	0	0	0	0	0
Secondary School (9&100	0	0	0	0	0	0	0
Colleges	TEVT	543	296	839	143	96	239
Total		**1398**	**1323**	**2721**	**294**	**248**	**542**

4.4.6 Facilities/Infrastructures

All ketenas of Woreda nine has an access for all seasonal road transportation. Telecommunication is one of effective mode of communication. The has fully covered by telecommunication through mobile networking and fixed lines and All "ketenas" has supplied with electricity power and There is one Postal office, Commercial Bank of Ethiopia, Awash International Bank and Addis international bank that serves the community in the woreda.

4.4.7 Health facilities and their services.

Regarding health facilities, one functional health centers namely “Kuas Meda” Health Center in the Woreda .

The health centers were giving both inpatient and outpatient services. The potential health service coverage of the Woreda were 100% among health center.

Table 24 :Infrastructures in health facilities, Woreda nine of Addis ketema Sub City, Addis Ababa, Ethiopia, 2018

S.No	Types of facilities	Health facilities	
		Health Center (N=1)	Remark
1	Water supply	**1**	
2	Electricity Power	**1**	
3	Telecommunication	**1**	
4	Road access	**1**	

4.4.8 Primary health care unit

Primary health care unit is a system designed by Ministry of Health to enhance the linkage between health center and Kebeles by Urban health extension worker. In this system the health center staff is expected to support technically the urban health extension worker under their catchment. According to the principle of primary health care unit one health center should be served for at least five satellite kebeles.

They were implementing community based health insurance for 2,011 households in pilot test and the community was served properly when they visit health center.

4.4.9 Health indicators and vital statistics

Health indicators and vital statistics are important to estimate/evaluate performances of health activities and to set policies.

There is no mortality data of some vital statistics such as IMR, MMR, NMR, Under Five Mortality Rate, and Crude Death Rate .

Table 25:-Vital statistics of Woreda nine of Addis ketema Sub City, Addis Ababa, Ethiopia 2018

S.No	Indicators	Number (%)	Remark
1	Total population	34,780	
2	Male	17,738(51)	
3	Female	17,042(49)	
4	Total live birth	1,207(3.47)	
5	Under one years	1,078(3.1)	
6	Under five years	5,703(16.4)	

7	Women 15-49 years old	7,686(22.1)	
8	Pregnant women	1,207(3.47)	
9	IMR/1000	40/1000	
10	Neonatal Mortality Rate	29/1000	
11	Under five Mortality Rate	53/1000	
12	MMR	420/1000	
13	Crude Birth Rate/1000	6.3/1000	
14	Crude Death rate	8.8/1000	

4.4.10 Child immunization coverage

Immunization activity was started in Ethiopia before three decades. This Expanded Program on Immunization is focused on vaccine preventable diseases, and Now included about ten diseases of vaccine preventable. In this among total children, 865 were vaccinated for BCG in 2017. In addition, of the1,078 eligible infants, 831 and 831 OPV1 and Pent1 was Vaccinated respectively. The immunization service performance of the showed that 787,787, 774 and 774 of the eligible children were immunized for OPV3, Penta-3 vaccines, measles and fully immunized respectively. Of a total 831 under 1-year children, 69 % of them were protected at birth; their mother was immunized two or more doses of TT vaccination during their pregnancy or three or more doses before her give birth. Of 400 planned non-pregnant women, 8 were vaccinated for TT2 during the reporting period. During the same year, out of 1,147 planned pregnant women, 831 were immunized for TT2 in Woreda nine of Addis ketema Sub City.

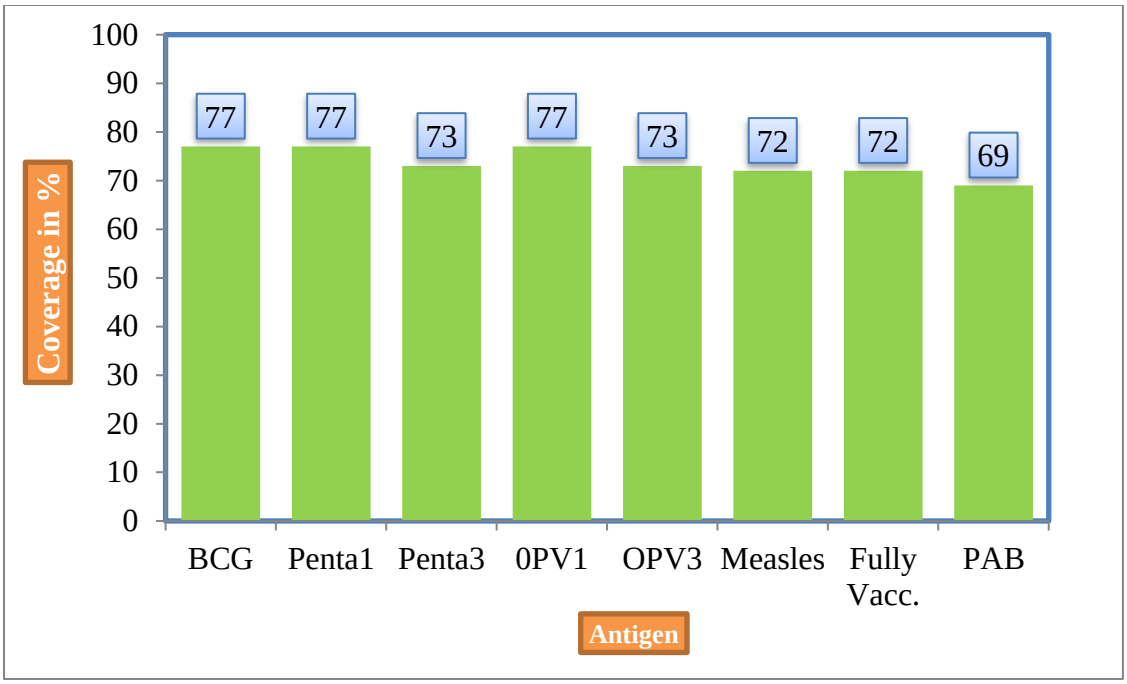

Figure 19: Vaccination coverage of children in Woreda nine of Addis ketama Sub City, Addis Ababa ,2017

4.4.11 Maternal Health Service

First Anti-natal care (ANC1) services which indicates the access of the health facility and 971 pregnant mother were received services, while the focused Anti-natal care (ANC4) that shows quality were 578mther was got services .Of these eligible pregnant mothers expected to deliver in the health facility attended by skilled professionals, 477 of them were got the service. There is also HIV /AIDS counseling and test service provided for 1056 pregnant women of which 42 of them tested mothers were HIV positive and 100% are taken Option B+ services in 2017.

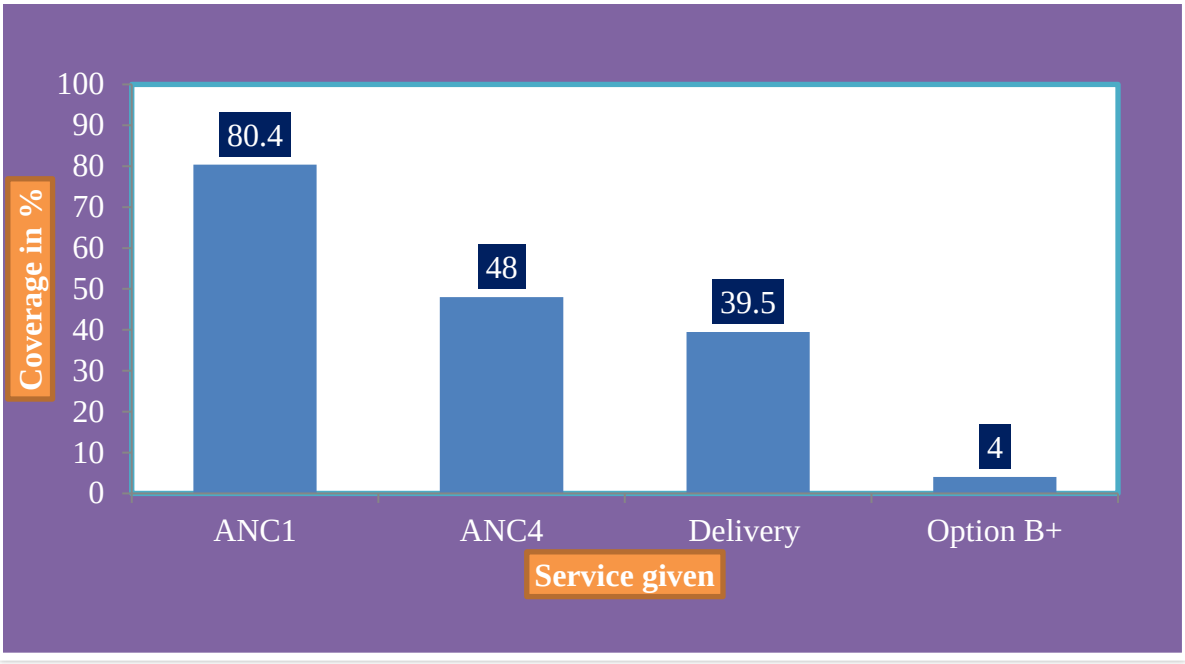

Figure 20 : Maternal Health services of Woreda nine of Addis ketema Sub City Addis Ababa, Ethiopia ,2017

4.4.12 Water supply

According to the data obtained from Woreda nine of Addis ketema sub City water resource office 87% of the total urban population supplied with potable water. In this there are 6306 stand pipe lines that served the households separately. There is no data obtained, regarding other sources of water supplying the community in the Woreda .

4.4.13 Latrine Coverage and Utilization

Regarding the latrine coverage of the Woreda , (84 %) 6,088 of the HHs has an access to latrine during the assessment time. while the latrine utilization of those households was not obtained. When we see population living style related to WASH the has 16% HHs with no latrine facility; Due to this, open defecation across the river and compounds (slum area) are common.

4.4.14 Top leading causes of outpatients (Morbidity)

Upper respiratory tract infection and Hypertension is a top leading cause of outpatient morbidity among adults in the Woreda, which is responsible for 1,496(15%) and 1,328 (13.3%) cases respectively. Upper respiratory tract infection, and Non bloody diarrhea are among top ten diseases that cause outpatient morbidity of pediatrics <5yrs in the Woreda , which is responsible for 2,846(50 %) and 944(17%) cases respectively in 2017/18.

Table 26 : Top ten leading causes of Adults outpatient morbidity in Woreda nine of Addis ketema Sub City, Addis Ababa, Ethiopia, 2017

Rank	Disease	Number	%
1	Upper respiratory tract infection	1496	15
2	Hypertension	1328	13
3	Typhoid	1046	11
4	Other un specified Diseases	1033	10
5	Diabetes mellitus	969	10
6	Acute febrile infection	918	9
7	Urinary tract infection	885	9
8	Epidemic typhus	863	9
9	Dyspepsia	717	7
10	Musculoskeletal diseases	708	7
	Total	9963	100%

Table 27: Top ten leading causes of outpatient morbidity in pediatrics in Woreda nine of Addis ketema Sub City, Addis Ababa, Ethiopia,2017

Rank	Disease	Number	%
1	Upper respiratory tract infection	2846	50
2	Diarrhea Non Bloody	944	17
3	Skin Infection	401	7
4	Other Un specified skin infection	309	5.4
5	Helementhesis	276	5
6	Other Un specified disease of Eye Adnexia	248	4.4
7	Other Un specified disease	210	4
8	Other Un specified disease of Dysentery	149	3
9	Trauma	129	2.2
10	Other Un specified disease of parasites	110	2
	Total	5622	100%

4.4.15 Communicable Diseases

4.4.15.1 Tuberculosis and Leprosy

A total of 58 tuberculosis cases (All form of tuberculosis) were reported from health facilities to the Woreda in 2017. From the total all forms of TB cases 22 PTB negative, 19 PTB positive and

17 Extra PTB. They were TB detection rate, TB success rate, TB cure rate was 78.3 % , 78.9% and 78.9 % respectively. There was one TB patient Lost to follow up and 1 TB patient treatment failure at 2017/18. All of 58 TB patients were screened for HIV in the same year.

4.4.15.2 HIV/AIDS

In this Woreda ,1673 people were tested for HIV/AIDS at 2017, 40 (0.02%) of them were confirmed as positive result. The positivity rate of HIV/AIDS is 2.3 %. HIV testing was performed in VCT, PITC and PMTCT service unit, of which the highest yield obtained from PMTCT (4%) followed by PITC (2.7%).There are 1874 PLHIV were got the care and support service and 1088 currently on ART. The UHEW participate in awareness creation of the community on prevention and control of HIV/AIDS in all ketenas of the catchments.

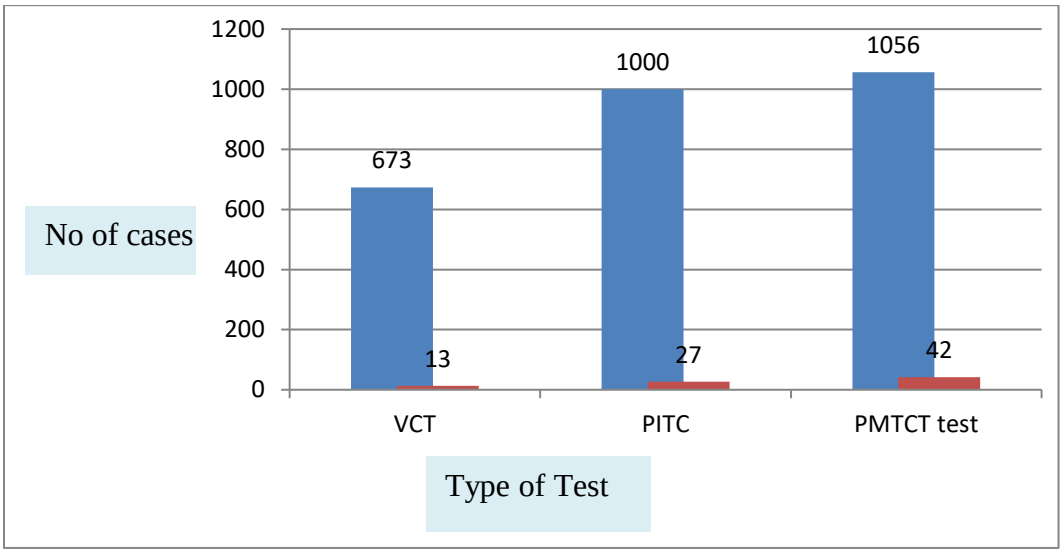

Figure 21: Number of HTC and positive clients for HIV in nine of Addis ketama Sub City, Addis Ababa, Ethiopia, 2017

4.4.16 Severe Acute Malnutrition (SAM)

Malnutrition is one of the health problem of the Woreda nine. In this Woreda one OTP and one SC sites were established in 2017. There are 35 cases were reported as MAM, 16 cases SAM and refer to hospital and no admission at SC in the Woreda .

4.4.17 Outbreak and other disaster situations

In this Woreda , there are no any outbreak or disaster situations that happened/occurred during the assessment period.

4.4.18 Budget allocation for Woreda health office

In 2017/18, 10,606,254 ETB was allocated for Woreda health office. Of this total budget, 6,825,000 had allocated for salary. They had allocated 82% for salary and 18% for running cost for different routine activities. During the same year, 484,549.70 ETB sourced from different donors were distributed for this Woreda through regional health bureau for different activities such as prevention and control of HIV/AIDS.

4.4.19 Human Resources and Structural organization system

In the Woreda , 68 health professionals, 12 Urban health extension workers and 66 supportive Staffs have been working in Woreda health office, health center .

Table 28 : Distribution of human resources in Woreda nine of Addis ketema Sub City health office, Addis Ababa, Ethiopia, 2017

S/N	Profession	Level of education	Number		
			Male	Female	Total
1	Physician /GP	Dig	0	0	0
2	HO	Dig	6	8	14
3	Nurse	Dig	4	5	9
		Dip	7	12	19
4	Env. Health	Dig	0	0	0
6	Laboratory	Dig	1	2	3
		Dip	1	3	4
7	Pharmacist	Dig	3	1	4
8	Druggist	Dip	0	2	2
9	Midwifery		0	13	13
10	Town HEW	Dip	0	12	12
11	Supportive staff		25	41	66
	Total		**47**	**99**	**146**

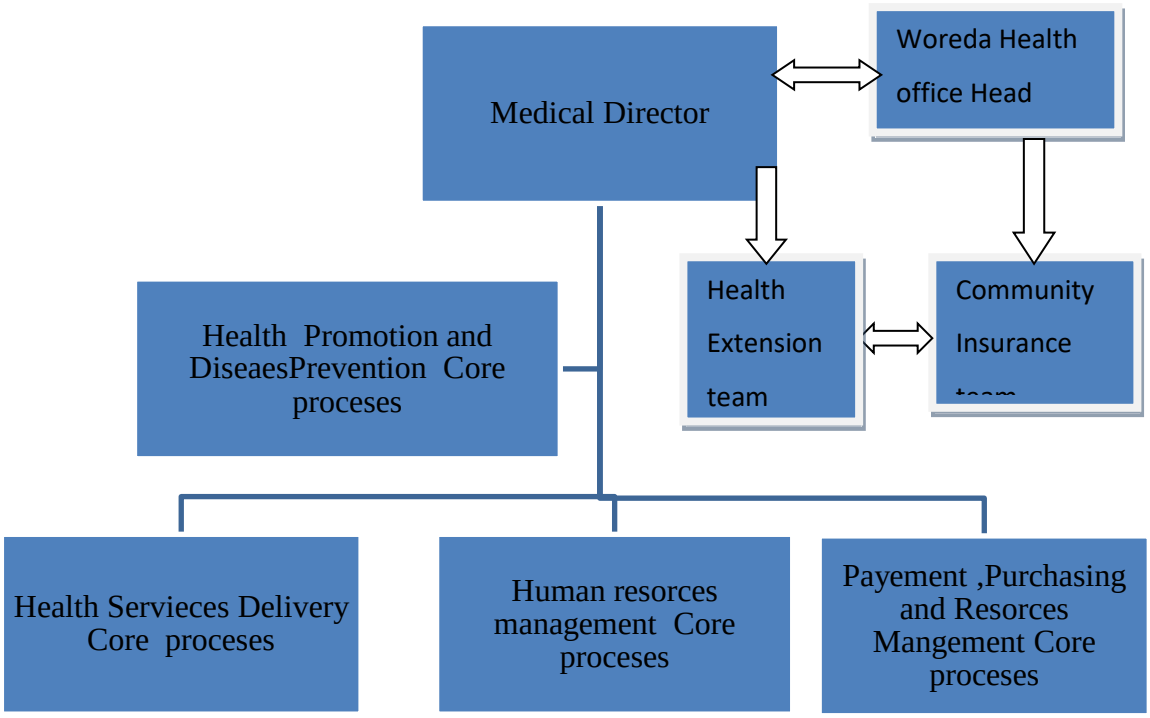

Figure 22 : Organizational structural system Woreda nine health offices and health center of Addis ketema sub City, Addis Ababa, Ethiopia, 2018

Table 29: Identified Health related problem in Woreda Nine of Addis Ketema Sub city ,2018

S/N	**Identified Problems**	**Relevance**	**Availability of information**	**Urgency of the problem**	**Feasibility**	**Political acceptance**	**Applicability**	**Ethical acceptability**	**Total**	**Rank**
1	Poor sewerage system	3	2	3	2	3	3	3	19	1
2	Poor waste management	2	2	3	2	3	3	3	18	2
3	Low latrine coverage	2	2	2	2	3	2	3	16	3
4	Over crowdedness	2	2	2	1	2	2	2	13	4

4.5. DISCUSSIONS

Upper respiratory Tract Infection is a public health problem leading by 15% of among total diseases reported among adult outpatients. Even though hypertension and typhoid fever among ten top diseases morbidity of Adult in the Woreda , there was no death reported due to those diseases in the past one year. This may be because of expansion of health service to the community levels by HEP in addition to health workers and improved clinical diagnosis at health facility. Hypertension (13.3%) was taking the second top next to Upper respiratory Tract infection among adult outpatient and leading causes of morbidity among pediatrics acute upper respiratory tract infection (50%) disease in <5yrs OPD and diarrhea (17%) among pediatrics OPD which are placed in the second and third top morbidity respectively according to their proportion setting.

However, upper respiratory tract infection is being the leading causes of among OPD visited; this might be due to the housing conditions and they were overcrowded in the Woreda. Therefore, treatment of upper respiratory tract infection should be supported with specific laboratory diagnosis to rule out Pneumonia, Bronchitis ,Asthma or other diseases with respiratory infection like symptoms which sometimes mimic one over the others. Tuberculosis detection rate of the Woreda was 78.3% which less than the national case detection rate. Out of 1874 clients screened and tested for HIV 1173 (63%) of them were female. This may revealed that there was poor awareness creation from the health professionals among male partners particularly during ANC/PMTCT services. Among the total clients registered at OPD level (20,790), only 4.8% of them were screened for HIV particularly at PICT service which is below the expected 95% with National plan. The explanation for this may be low initiation and commitment of health workers who worked at OPD rooms and/or the refusal of clients for HIV testing due to poor awareness or shortage of HIV test kites at health facility level .

The recorded immunization coverage in the last year among targeted children less than one year to prevent them from vaccine preventable diseases were less than national target 95%(9). Malnutrition is some public health problem of the Woreda. Prevalence of HIV among PMTCT service was 0.03%, which is low as compared to 5.2% of the national prevalence of 2017 ANC HIV sentinel surveillance (9). The proportion of pregnant women counseled and tested for PMTCT and positive mother was 87.4 % and 4 % respectively.

4.6. Limitations

- Incompleteness and inconsistency of some data (latrine, water coverage and maternal health, etc) and specifically number of house hold with stand pipe line water.

4.7. Conclusions

Upper respiratory tract infection is a top leading cause of outpatient morbidity among both adults and pediatrics cases respectively in, 2017; due to house condition and over crowdedness.

Regarding tuberculosis, the case detection rate of the was low the recommendation national guide line which were 87%. In addition outcome of TB patient one lost to follow up was reported, and one case was reported as treatment failure and moved to MDR due to weak attention given to follow up. Male clients have lower awareness and negative attitude towards HIV testing services than females. HIV Screening at PICT site service was low and the overall incidence of HIV infection 0.03% in the among the general population. Malnutrition is public health problem of the Woreda and shortage of plump nut and the major problem of among Woreda was sanitation and hygienic condition was poor; especially there are many overcrowded slum areas and due to this people are urinate and defecate open areas because of this diarrhea and typhoid diseases are common in the Woreda ; Therefore, special attention should have to be given to communities practices on latrine utilization and safe water supply by health extension workers and governments.

4.8. Recommendations

- EPI program and maternity health service should have to be strict follow up in all health facilities and more efforts have to be done on the increase performance of health facilities in the Woreda .
- Any OPD clients and pregnant mothers visiting the health facility should have to be counseled and tested or screened for HIV.
- Awareness creation by health extension workers to improved HCT among men population in the Woreda .
- OTP and TSF programs working on nutritional activities should have to be strengthen in heath facilities.
- Improve sanitation and safe water supply for the communities .

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Chapter-V Scientific manuscript for peer reviewed Journal

5.1 Surveillance Data Analysis of Typhoid fever, Addis ketema sub City, Addis Ababa, Ethiopia , 2013-2017

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Abstract

Typhoid fever is a serious disease and remains an important public health problem in many developing countries including Ethiopia. Therefore, this surveillance data analysis needed to analyze magnitude, trends, and geographical distribution of the disease in Addis Ketema sub City of Addis Ababa, Ethiopia 2013 to 2017.

Methods: Descriptive cross sectional study design was used to assess the health status. The five years typhoid fever surveillance data was collected from Addis Ketema sub City health office. Data analysis was carried out by using Microsoft excel.

Results: A total of 44,908 typhoid fever cases were reported with an average of 8,982 cases per year . The highest cases were reported in 2017, which was 11,909 (26.5%) and the lowest report was in 2016, which was 5389 case (12%)

Conclusions: Majority of the cases were treated at an outpatient department during past five years. On the other hand, cases admitted in different health facilities and treated in inpatient department and there is no death and Prevention is based on ensuring access to safe water and by promoting safe food handling practices. Awareness creation activities on typhoid fever should be strengthened in the sub City.

.

5.1 Introduction

Typhoid fever is a global health problem. Its real impact is difficult to estimate because the clinical picture is confused with those of many other febrile infections. Additionally, the disease is underestimated because there are no bacteriology laboratories in most areas of developing countries. In Ethiopia in 2012, 24,030,746 patients visited health facilities to get treatment or medication. Of these cases, 665,220 (2.8 %) were typhoid fever patients and it was in the top ten list of morbidity. Among the total deaths of 15,008, 336 (2%) deaths caused by typhoid fever (1). typhoid is transmitted by water or food contaminated by Salmonella typhi. As it is water borne or food borne, a small infecting dose can cause the disease in someone who drinks contaminated water or eat contaminated food. As so many water sources are inadequately protected in Ethiopia, the disease is very common, particularly among overcrowded urban migrants who often live in wretched conditions. These factors are believed to result in many cases going undiagnosed . On the basis of the literature and the incidence of typhoid fever recorded in control groups in large vaccine field trials with good laboratory support it has been estimated that approximately 17 million cases of typhoid fever and 600 000 associated deaths occur annually (2). However, the estimates have been biased because study populations have usually been in areas of high incidence. Furthermore, these estimates of burden relate to the clinical syndrome of typhoid fever but not to S. typhi exposure. Since the prevalence of bacteraemia in febrile children is quite high (2_3%) in areas of endemiCity it is suggested that exposure to the bacteria is higher than indicated by the figures that are based solely on the clinical syndrome of typhoid fever. The incidence of the disease in areas of endemiCity may resemble the incidences observed in control groups in large vaccine field trials, viz. between 45 per 100 000 per year and over 1000 per 100 000 per year(3). Preliminary results from recent studies conducted in Bangladesh by ICDDR,B show an incidence of approximately 2000 per 100 000 per year. Typhoid fever also has a very high social and economic impact because of the hospitalization of patients with acute disease and the complications and loss of income attributable to the duration of the clinical illness(4). It is important to note that reports from some provinces in China and Pakistan have indicated more cases of paratyphoid fever caused by S. para typhi A than by S. typhi(5).

In areas of endemicity and in large outbreaks, most cases occur in persons aged between 3 and 19 years. In 1997, for example, this age range was reported during an epidemic of the disease in Tajikistan. Nevertheless, clinically apparent bacteraemic S. typhi infection in children aged

under three years has been described in Bangladesh, India, Jordan, Nigeria, and elsewhere (6, 7). In Indonesia there is a mean of 900 000 cases per year with over 20 000 deaths. In Indonesia, people aged 3_19 years accounted for 91% of cases of typhoid fever and the attack rate of blood-culture-positive typhoid fever was 1026 per 100 000 per year. A similar situation was reported from Papua New Guinea.

When typhoid fever was highly endemic in certain countries in South America the incidence of clinical typhoid fever in children aged under 3 years was low. In Chile, however, single blood cultures for all children aged under 24 months who presented at health centers with fever, regardless of other clinical symptoms, showed that 3.5% had unrecognized bacteraemic infections caused by S. typhi or S. paratyphi *(8).* The incidence of typhoid rises at the end of the dry season when the rural water supply is lowest and people congregate at the source of water: The infection is more common from October to February when the rain helps spread already contaminated water supplies. Untreated, 10-25% of people with typhoid fever die, but mortality is much less with treatment(1).

To reduce the incidence of typhoid some control and prevention measures should be under taken like- Health education on personal hygiene and environmental sanitation, Community measures on sanitary disposal of human face, chlorinating or boiling of water, milk and food hygiene, Fly control, isolation (enteric precaution), treatment of patients and exclude carrier from handling food.

5.2 Rationale of the study

Ongoing analysis of surveillance data is important for detecting outbreaks and unexpected increases or decreases in disease occurrence, monitoring disease trends, and evaluating the effectiveness of disease control programs and policies

5**.3 Significance of the study**

The analysis of any data is the back bone in the interpretation of any public health raw data; and as being in the public domain typhoid fever data is also need to be interpreted as of other data as well since it is one the public health concerns.

5.4 .Objective

5. 4.1 General objective

To Described and analyze the magnitude of typhoid fever Surveillance data by person ,place and time .

5.4 .2 Specific objective

- To describe the magnitude of typhoid fever in Addis ketama Sub City 2013-2017 .
- To analyze and interpret the surveillance data in terms of time, person and place in Addis ketama Sub City ,2013-2017.
- To show trend analysis of typhoid fever of Addis ketama Sub City , 2013-2017.
- To show the report completeness of typhoid fever of Addis ketama Sub City ,

5.5 Materials and Methods

Case Definitions

5.5.1 Suspected

Any person with gradual onset of remittent fever (rising stepladder fashion) in the first week, head ache, arthralgia, anorexia, constipation and abdominal pain.

5.5.2 laboratory Confirmed cases

A patient with fever (38°C and above) that has lasted for at least three days, with a laboratory-confirmed positive culture (blood, bone marrow, bowel fluid and stool) of S. typhi.

and suspected case with reactive Widal test or ''O "titer of 1/160 and more, is very suggestive.

5.5.3 Probable case

A patient with fever (38°C and above) that has lasted for at least three days, with a positive sero diagnosis or antigen detection test but without S. typhi isolation.

5.6 study area

We conducted surveillance data analysis in Addis ketema sub City public health emergency management department.

5.7 Study period

We conducted the surveillance data analysis from march 7-18/ 2018

5.8 Study design

Descriptive cross-sectional study was used to analyze the five year surveillance data of typhoid fever in Addis ketema sub City

5.10 Population

5.10.1Target population

The target population was the total population found in Addis Ketama sub City, 2017

5.10.2 Study population

Typhoid fever cases reported from 2013- 2017 in Addis Ketama sub City.

5.10.3 Study subject

The study subjects were all suspected cases (all cases to collect from PHEM report

5.11 Data collection procedures

Secondary data from the last consecutive five years (2013-2017) were collected and reviewed by using structured check list. An observation of reports from the source and discussions with PHEM focal person was also undertaken in Addis ketema Sub City of Addis Ababa.

5.12 Data analysis procedures

The five years of data were analyzed by using Microsoft Office Excel to analyze the data appropriately.

5.13 Ethical consideration

The official letter were obtained from the Addis Ababa university school of public health and to Addis Ababa Health Bureau and Addis Ketama sub-City Health office . Data is collected from Addis ketama sub City PHEM department and Addis Ababa PHEM department report.

5.14. Results

A total of 44,908 cases were registered from 2013 to 2017. Among them, 23,352 were female.

The proportion of males and females among the cases reported for the period 2013 – 2017 was a 0.92:1 . In the last 5 years (2013 to 2017), sub City public health emergency management unit/ department received 44,908 reports concerning cases of typhoid fever among persons in Addis ketema sub City . The mean was 8,982 cases per year, ranges between 5,389 and 11,909 with a standard deviation of 22.4.

Table 30 : Number of Cases and Death typhoid fever by year in Addis Ketama sub City, Addis Ababa, Ethiopia, 2013 to 2017

Year	Population at risk	No. of Cases	No. of Deaths	Percent		Prevalence		CFR
				Case	death	Cases/10000	Death /1000000	0
2013	293732	8638	0	2.94%	0	294	0	0
2014	300032	9024	0	3%	0	301	0	0
2015	306468	9948	0	3.24%	0	325	0	0
2016	313042	5389	0	1.7%	0	172	0	0
2017	322120	11909	0	3.69	0	369	0	
Total	1,535,394	44,908	0	-	-	1,461	0	0

5.15 Report Completeness

In Sub City there was an increment on health service coverage by the mid 2017 (100%) compared to 2013 (90%). Furthermore, there were 10 H.Cs and 63 different private health .

As the number of expected Woredas to report increased, the completeness of reporting rate of the sub City also increased and the sub City completeness rate in 2017 was 89 %, which means it increased by 3 % compared to 2013 .

5.16 Water supply

According to sub city report the urban setting for safe water coverage and data obtained from Addis ketama sub City Water Resource Office, of the total Urban population of the sub City 87 % was supplied with potable water as of the UHEW was Reported.

5.17 Latrine Coverage and Utilization

Among 67,108 households, 55,957 of them has standard latrine in 2017/18. There is no clear data on utilization of latrine in the sub city .

5.18. Discussion

The prevalence rate of typhoid fever cases in outpatient departments increased through a year. The increment was not only in Addis ketema sub City but also as well as at Addis Ababa City administration level. The increment might be occurred because of the increasing of reporting health facilities, which was a total of 73 health facilities (the sum of 10 health centers and 63 private health facilities , 2017) (6).

In 2013, the report completeness from health center and private health facilities was 86 % and improved to 89 % , 2017 (7). The five years sub City report completeness rate was greater than national target of 85% . However, from 2013 to 2017 completeness rate was improved and it meets the national target of reporting completeness rate 85% (8) . On the other side, the average reporting completeness rate was 89%. Therefore, the improvement of reporting completeness rate also might be a reason for the increment of cases.

Finally, the case fatality is zero within these 5 years. If the patients treated with prompt antimicrobial therapy, case fatality rate will be less than 1% (12). There for, there is visible improvement in mortality rate.

5.19. Conclusion

In general, Majority of typhoid fever cases were treated at outpatients department and there is no cases were treated at inpatient department. In addition, when we see the reported cases by year,

the highest number of typhoid fever cases reported in 2017. The surveillance report completeness rate were increased to the expected range and early detection of cases was good.

5.20 Recommendations

- Portable and safe of the water supply systems must be strengthened for catchment population .
- To promoting safe food handling practices.
- Health education is paramount to raise public awareness and induce behavior change.
- Awareness creation activities on typhoid fever should be strengthened in the sub City
- Diagnosis of typhoid fever should be strengthened and appropriate measures should be taken.
- Continuous surveillance data analysis should be done and the findings distributed to the concerned bodies or stakeholders

5.21 Reference

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Chapter-VI Abstract for scientific presentation

6.1 Measles Outbreak Investigation in Jeldu Woreda, West Shoa Zone, Oromia, Ethiopia, February 2019

Abstract

Measles is a highly contagious respiratory tract infection caused by a morbillivirus. The disease causes high morbidity and mortality worldwide. In January, 2019, Jeldu Woreda health office informed to west shoa zone health office that there were 179 suspected measles cases identified in19 kebele of the Woreda. Hence Addis Ababa university EFETP residents were deployed to the epidemic site to confirm the existence outbreak, describe magnitude of the outbreak and identify risk factors associated with disease(1). Burden of measles was described by person, place and time.

Methods:- Unmatched 1:2 case-control study with simple random sampling selected 60 measles case-patients and 120 neighborhood controls was conducted from 27/2/2019-15/3/2019.We interviewed study participants using structured questionnaire. Epi info 7.2.1 and Microsoft Excel were used to enter and analyze the data.

Results:- A total of 179 measles cases and 2 deaths were reported from Jeldu Woreda during epidemic period. Five samples were collected for measles IgM confirmatory test and four of them are positive for IgM anti body. The case fatality rate of measles was 1.11%. Of the total of 179 cases, 91 (50.8%) were female. One hundred five (59%) and two deaths were not vaccinated for measles. Less than five years were more affected by the disease with age specific attack rate of 0.57 per 1000 population. Two health center and four health post of the Woreda did not have functional refrigerator for vaccine cold storage. Having vaccinated for measles had protective effect (AOR=:0.1852,95%CI(0.1897-0.7903). Presence of measles case in the family (AOR=5.7185,95%CI(2.1027-17.0781) Knowledge of prevention (AOR=0.1282,95%CI(0.0615-0.2573) were found to be significantly associated with measles outbreak.

Discussion:- Most of kebeles are low vaccine coverage that usually contributed for the occurrence and extent of measles outbreak. On the other hand some of measles cases inpatient admissions were developed pneumonia complication. Cross sectional retrospective study conducted in Philippines on risk factors associated with measles pneumonia identified that malnutrition was significantly contributed for measles pneumonia (11)

Low community awareness on measles treatment coupled with late detection of the outbreak may have contributed to increased cases and deaths from measles

Conclusion and Recommendation:- Low measles vaccination coverage, having contact with a person suspected to have measles, contact history of family with ill person and lack of knowledge of measles prevention were significant risk factors for contracting measles. We recommended enhance immunization programs, good cold chain system and increase community awareness on measles prevention and controls measures.

Keywords: Measles, Outbreak, Case-Control, Jeldu, Woreda, Ethiopia, 2019.

Chapter –VII Narrative Summary of Disasters Management

7.1 Narrative Summary of Disaster Situation Visited Humanitarian, Health and Nutrition assessment in Dawa zone Ethio Somali Region, Ethiopia, 2018.

7.1 INTRODUCTION

Ethio_somali region is one of the 9 regions of Ethiopia located to the Eastern part of the region with a total population **6,050,925** with in 11 zones and 103Woredas. The total area of the region estimated to be 279,252 km^2 which is 5.6% of the country. The population density of the region became 22 persons per sq.km, which makes the region one of the less populous parts of the country. In the region there are 2 zonal Hospitals, 8 district Hospitals, 206 health Centers & 1,011 health posts, totally 1227 health facilities are available in the region. The potential health service coverage of the region reaches 85% based on health center.

The internal displacement started on 2017 and 873,666 peoples were displaced from different sites of Somali region. Of those IDPs at Ethio_somali region, most of them were distributed to 69 Woredas of zone, all of them were still found in 362 IDP sites Ethio_somali region(1).

In Ethio_somali region 1053 (10 Hosp, 170 HCs and 873 HPs) of them are providing OTP and 141 give SC services. In addition to this, the above 10 hospitals and 131 HCs are ready to provide SAM with complication referred from IDP sites.

The Ethiopian public Health Institution (EPHI) in collaboration with Somali regional health bureau, Ministry of agriculture, National Metrology Agency and respective bureaus, WHO, UNICEF, OCHA, MSF-S conducted strengthen surveillance system and emergency health and nutrition need assessment in Somali region from August 25- September 10/2018 (2).

Internally displaced persons (IDPs) are "Persons or groups of persons who have been forced or obliged to leave their homes and places of usual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border" (Guiding Principles on Internal Displacement, 1998) (3).

Ethiopia has been exposed to redundant natural and humanitarian crisis that affect the normal life of the population. Due to these natural and human made humanitarian crises the population was obligated to leave their original residence and settle in camps and other governmental buildings such as schools, temporary house (mobile house) in the form of IDPs(4). The major public health emergencies in the country that could contribute to increased morbidity and mortality are disease

outbreaks of communicable diseases and related events such as measles, Acute Watery Diarrhea (AWD), malnutrition, malaria and flooding.

According to Displacement Tracking Matrix (DTM) SOMALI, ETHIOPIA ROUND 11: MAY /JUNE 2018 Summary of key findings Date of Publication: 15 JULY 2018 873,666 displaced individuals comprising 142,014 house hold in 362 displacements sites were identified in Somali region. 65.19% sites opened in 2017 and 5.80% opened in 2018 (1).

Conflict was the primary cause of displacement for an estimated 57% of the displaced population and 308 sites reported that over 25% of households were living in shelters that were below regional and cultural standards. Dawa, zones were the area's most affected by conflict during the assessment period. In Dawa zone's Moyale, and Hudat s active conflict continues between the Borena and Gare tribes, amongst others but Mubarek is now inactive conflict (5).

In Dawa zone 244,638 displaced individuals comprising from those 129,782 are female 38,473 children and 48,178 house hold and 43 displacements sites were identified in Dawa zone

7.2 OBJECTIVES

7.2.1 General Objective

- To identify areas where emergence health and nutrition assistance needed for the upcoming six months and to determent the gap in the capacity of the health system in addressing anticipated risks so as to develop response plan.

7.2.2 Specific Objectives

- To assess the extent, types, magnitude, severity and likelihood of different risks in the most "vulnerable "s (Hudet , Moyale and Mubarek) in Dawa zone
- To assess the existing capacity of the health system to address those risks in (Hudet, Moyale and Mubarek s) in Dawa zone.
- Based on the findings, to develop response plans.

7.3 METHODS

By the time of the assessment was conducted in Dawa zone.

From one zone three Woredas were selected based on emergency health and nutrition problems in consultations with the FMOH, EPHI and RHB and ZHDs. Cross sectional descriptive study was conducted. Selection of s was made based on the discussion with zonal multi sectorial task force committee during the briefing time. As the discussion, a total of three Woreda (Hudet , Moyale and Mubarek) were selected for field visit. Time constraint was the major problem

during the assessment. Because of that the team was forced to subdivide itself in to two groups at the beginning to achieve its objectives.

Before the assessment briefing was conducted for all zonal multi-sectorial task force committee at zonal level. Then Woredas were selected for the field visit based on potential risks. By using structured questioners interview method was conducted to collect data from zonal and Woredas health offices using zonal and Woreda level questionnaire. In addition to that, a review of documents and reports obtained from Woreda and zonal health offices, discussion with Woreda and zonal preparedness and response task force officials and program managers, and field visit in selected Woredas were conducted. Finally, Discussions were also conducted at both zonal and Woreda administration office.

7.3. 1 Study period : From August 25- September 20/2018

7.3.2 Study design : cross Sectional study was conducted

7.4 RESULTS

Dawa Zone

Coordination: In the zone there is no functional multi-sectorial committee and there is no meet quarterly however in the committee all relevant government, NGOs and UN Agencies are not well represented. In all Woreda (Hudet , Moyale and Mubarek) as well as at zonal level there is no emergency preparedness and response plan and also budget is not allocated for this plan

Table 31:Top five causes of morbidity by age group in Hudet , Dawa zone, Jan-May 2018

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

Table 32:Top five causes of morbidity in Moyale , by age group, Dawa zone, Jan-May 2018

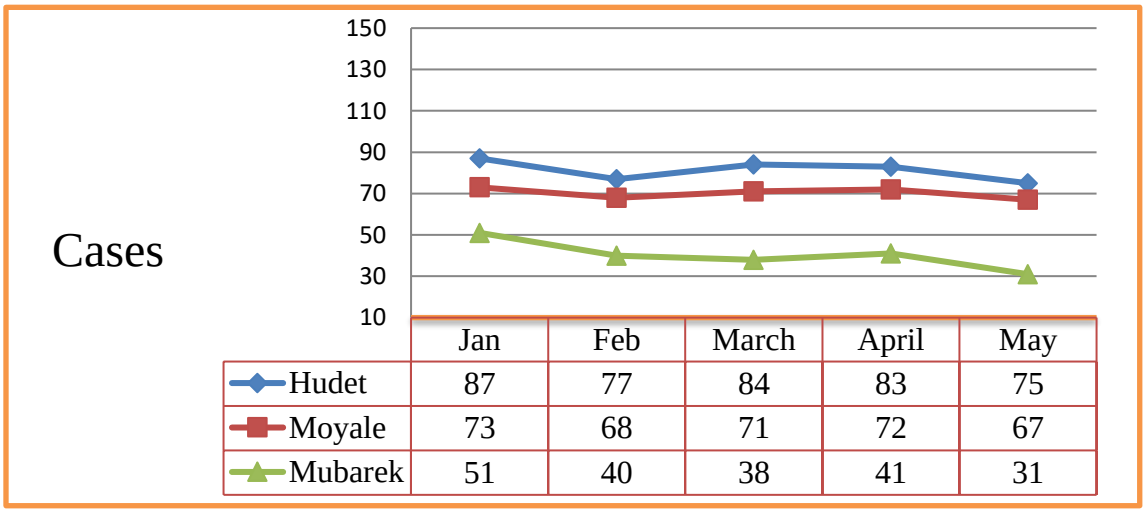
S/No	Below 5 years	Above 5 years
1	Pneumonia	Malaria
2	Diarrheal disease	Other infectious diseases
3	Upper respiratory infection	Trauma/injury
4	Helmenthiasis	Typhoid fever
5	Acute febrile illness (AFI)	UTI

Table 33:Top five causes of morbidity in Mubarek ,by age group, Dawa zone, Jan-May 2018

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

7.4.1 Major Epidemic prone diseases

In all assessed Woredas, zero cases and death of AWD was reported, but in all assessed Woredas are malaria endemic and a total of 958 malaria cases and zero deaths during three month report period and malaria cases is decreased in both Woredas between Jan to March but slight increase is observed .



	Jan	Feb	March	April	May
Hudet	87	77	84	83	75
Moyale	73	68	71	72	67
Mubarek	51	40	38	41	31

Figure 23: Trend of Malaria cases in Hudet , Moyale and Mubarek of Dawa zone, January -May 2018

A total of 12 suspected measles cases with zero death were reported from three Woreda and Sample were sent to EPHI and they wait for the result.

7.4.2 Outbreaks

In all assessment Woredas there is no outbreak was occurred.

7.4.3 Preparedness

Reviews of among Woredas drugs and supply stocks have shown that, there is no emergency stock specifically kept for emergency response. Shortage of emergency drugs and medical supplies for measles complication, nutrition, and malaria are common problem in both assessed Woredas as well as zonal level.

Regarding budget allocation for emergency rapid response, in Hudet , Moyale and Mubarek s the budget is not allocated. Availability of skilled /trained professionals in the s play a great role to adequately respond to public health emergencies, there is no trained rapid response team.

Table 34: Preparedness; drugs and medical supplies in Dawa zone, 2018

Drug and Medical supplies	Total requirement	Available	Gap
Drugs			
Coartem	10,538 does	2,100	8,433 dose
Artesunate (rectal)	7,109 does	0	7109 does
Artesunate (Inj)	11,000	0	11,000 dose
Artemether IM	12,431	0	12431dose
Quinine (PO)	46 tin	0	46tin
Quinine (IV)	8 box	0	8 box
Chloroquine	72box	0	72 box
Ceftriaxione	23,561 vial	0	23,561 vial
Oily CAF	-	0	-
Doxcycline	683 Pk	0	683 Pk
Supplies			
RDT (Malaria)	732 box	30box	702box
Pastorex (Meningitis)	0	0	0
LP set	0	0	0
CTC Kit (AWD)	18	0	18
Medical supplies			
Syringe	60 carton	10	50 carton
PPE			
Clinical Delivery Assistance kit PART	67	0	67
A: Reusable Equipment			
Mgt. of Complications of Abortion kit	45	0	45
(Manual Vacuum Asp. Set)			

7.4.4 Malaria

All assessed Woredas are malaria endemic. A total of 70,203 153,750 and 20,685 populations are identified as risk in Hudet ,Moyale and Mubarek s respectively.In all assessed Woredas ITNs coverage is below 80%. IRS coverage is below 50%, 65 % and below 73% in Hudet ,Moyale and Mubarek Woredas respectively. Malaria is the anticipated risk for epidemic to occur due to low IRS coverage, low ITN utilization coverage and depleted prevention and control activity.

7.4.5 Timeliness and Completeness

Timeliness and completeness of reports is one of the disease surveillance indicators used for early detection of disease and timely response. In all Woreda the completeness is below 85 % while timeliness in both is below 80%.

7.5 Risk factor

In Dawa zone malaria is the anticipated risk in Hudet, Moyale and Mubarek Woredas a total of 244,638 people are estimated to be at risk. In addition, Malnutrition is the anticipated risk and a total of 48,176 children are estimated to be at risk.

In Hudet Woredas the previously distributed ITN is expired /out dated need replacement, thus the ITN coverage of the current time data was not available.

Table 35: Distribution of different diseases to population at risk in Dawa zone, 2018

Name of Woreda	Measles	Malaria	Malnutrition	
			MAM	SAM
Hudet	6	406	1102	84
Moyale	4	351	891	54
Mubarek	2	201	720	79
Total	12	958	2713	217

7.5.1 Measles

There was no ongoing measles outbreak. Measles vaccination campaign was conducted in all assessed Woredas and the coverage all zone was more than 95%. In all assessed Woredas measles guideline is distributed to all health facility as well as health workers are trained on measles.

7.5.2 Malnutrition

Malnutrition problem is common in Dawa zone. On existing problem, additionally displaced population makes the situation worsened. The following data show nutritional problem in Dawa zone. A total of 12 OTP and 2 SC TFP sites in zone. All sites send report monthly to the immediate higher level. In all assessed Woredas there is shortage of therapeutic supplies like F100 for the last couple of months. During January- May the trend of SAM case increased in assessed zone.

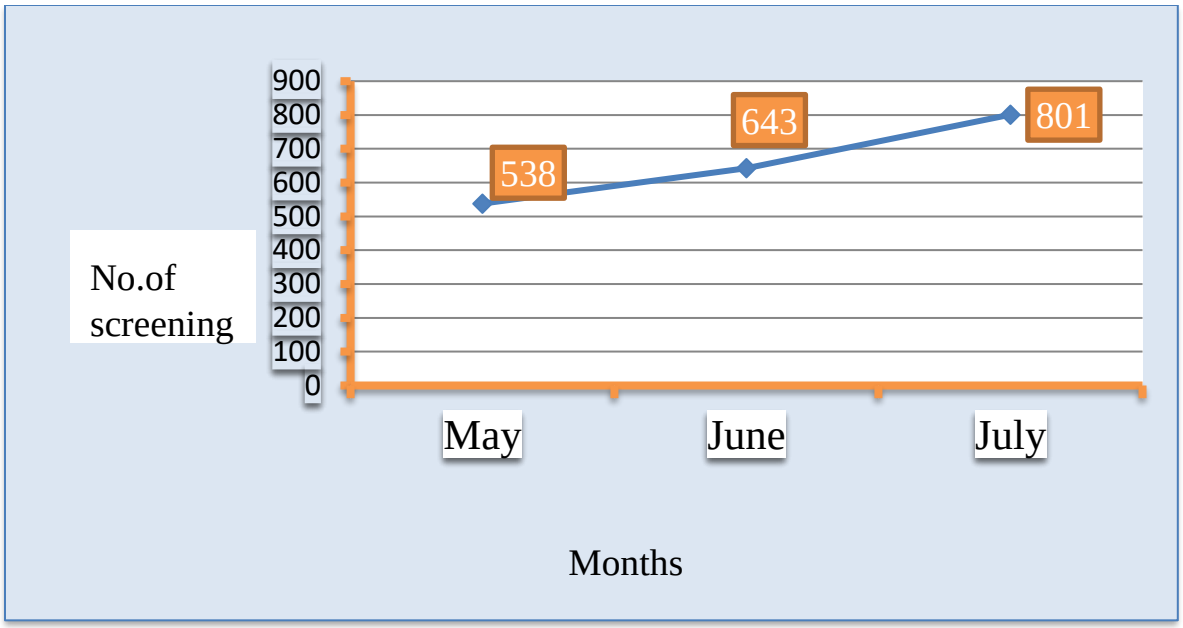


Figure 24: Nutritional screening result among displaced population in Dawa zone ,Somali region ,Ethiopia ,2018

Table 36 :- Malnutrition cases by year and months in Dawa Zone, 2016-2018

Month	2016		2017		2018	
	OTP	SC	OTP	SC	OTP	SC
Jan	251	9	321	13	367	39
Feb	345	6	293	28	530	41
March	296	11	381	31	698	57
April	392	17	410	39	467	34
May	901	29	688	43	651	46
Total	2185	72	2093	154	2713	217

7.6.Discussion

Lack coordination and integration between the region and NGOs on responding emergency situation which arise at IDP sites as alike of solving inadequate latrine coverage, supplies and logistics. Inadequate and no separate latrine and shower room by sex at IDP sites and Inadequate sanitary material like sanitary pad, diaper, soap, bed pan for children, clothes etc. Poor personal hygiene and environmental sanitation in the camp due to overcrowding.

The Federal government and Somali region has been conducting multi agency emergency health and nutrition assessment to address the emergency health and nutrition need of the country(4). The assessment is leaded by Federal Disaster Response Management and Food Security

Coordination office in collaboration with the Ethiopia Public Health institution(EPHI), Somali regional health bureau, Somali regional early warning, National Metrology Agency and respective bureaus, WHO, UNICEF, OCHA, IRC, Red-cross and World vision(6).

The assessment was conducted from August 25- September 20/2018. Our team was composed of FDRMFSS, Somali health bureau/ PHEM/, WFP, IRC, Red -cross, National Metrology agency and Somali EWR(3). We assessed Dawa zones and 3 selected Woredas (Hudet, Moyale and Mubarek) .From assessed zones only one have multi-sectoral coordination forum but all governmental and nongovernmental organization were not well represented. The forum has no schedule meeting in assessed zone. In assessed zone and Woredas there were no epidemic preparedness plan and Woredas are not allocated budget for anticipated emergency plan. Anticipated diseases that have potential to cause outbreaks were measles, AWD and malaria. The case load for malaria showed slightly increasing from January and April in, 2018 in Hudet ,Moyale and Mubarek malarious Woredas. ITN coverage was very low which is blow 80%. The available ITN was distributed before one year's which need replacement. The IRS coverage was below 75% because of chemical shortage. Safe drinking water supply is of the basic need and has a potential for reducing water born outbreaks. All Woredas have drinking water supply coverage below 32% which is very low and there was nutritional problem which is from nutritional screening those were MAM and SAM accounts 2713 and 217 respectively .

7.7. Recommendation

- Appropriate budget should be allocated for identified emergency situations
- Training should be given to all RRT team members and PHEM staffs at all level
- Strengthening the Multi sectorial PHEM coordination forum at all level
- Strengthening routine EPI to prevent measles outbrea
- Improving the water supply coverage and quality especially in areas there is no option to get safe water.
- Improve personal hygiene and environmental sanitation in the camp (IDPs)
- Timely should be distributed ITN at Woreda level for IDPs sites
- Improve nutritional availability for IDPs sits by regional and federal government

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Chapter - VIII Protocol/Proposal for Epidemiologic Research Project

8.1.Assessment of latrine utilization and factors associated with latrine utilization in Woreda Nine, Addis ketema sub City, Addis Ababa, Ethiopia, 2019.

Executive Summary

Background: In Woreda nine of Addis ketema sub City lack of sanitation is a serious health risk, affecting many of people in the Woreda . Lack of sanitation facilities compels people to practice open defecation and this increases the risk of transmission of communicable diseases.

Over 50 different infections are potentially transmitted from an infected person to a healthy one by various routes involving excreta. The use of sanitation facilities is known to interrupt the transmission of faeco-oral related disease(1).The construction of traditional pit latrine is relatively a simple technology that is available to control the spread of diarrhea that is prevalent in developing nations. Sanitation facilities are being constructed in Ethiopia so as to meet the sustainable development goal and due emphasis is given by Ethiopian ministry of health. However the coverage of latrine utilization and influencing factors on the utilization of latrine in the community is not widely assessed. Therefore, as there is wide spread and recurring epidemic of acute watery diarrhea in Addis ketema sub City of Addis Ababa City administration, assessing the proper utilization of latrine and other factors will enable us discuss the correlation between them.

Methods: Cross sectional study design will be used in Woreda nine of Addis ketema sub City from June 2019 to July 2019. A total of population 35,636 HH 7424 and 422, sample households with latrine will be included in the study. The sample size is determined by using single population proportion formula with estimated latrine utilization 50%, z/2= 1.96, precision of 0.035 and design effect 2 (2). $n= [(Z_{x/2})^2 P(1-P)] = 1.96^2 X0.5(1-0.5)/.05x0.05 = 0.9604/0.0025 =384 +10\% = 422$

Data collection instrument will be prepared and before data collection the questioner will be translated in to Amharic and then again changed back to English. Data will be entered and analyzed by using SPSS version 23, and Epi Info Version 7.2.1. Ethical clearance will be approved by Addis Ababa university of institutional review board committee.

Work plan: Data collection will be started June30,2019 and ends on July 30, 2019. The study will be completed in October, 2019.

Budget: The required cost for the study is estimated **73,321.5** ETH Birr.

8.1. INTRODUCTION

8.1.1.Back ground

Woreda nine of Addis ketema sub City lack of sanitation is a serious health risk, affecting many of people in the Woreda, particularly the poor and disadvantaged people around the Woreda . Lack of sanitation facilities compels people to practice open defecation and this increases the risk of transmission of diseases (1).

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces. Inadequate sanitation is a major cause of disease world-wide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and liquid waste disposal (2).

Over 50 different infections are potentially transmitted from an infected person to a healthy one by various routes involving excreta. The use of sanitation facilities is known to interrupt the transmission of faeco-oral related disease. The construction of traditional pit latrine is relatively a simple technology that is available to control the spread of diarrhea that is prevalent in developing nations (3).

The treatment and disposal of human waste is becoming increasing important as the world population increases. Each year two million children die from diarrheal diseases, making it the second most serious killer of children under the age of five. The main source of diarrheal infection is human excreta. It seems clear therefore, that human excreta should be managed as a potentially dangerous material. The construction of latrines is a relatively simple technology that may be used to control the spread of infectious diseases. Studies have shown that latrine coverage has to reach 90% of a population to have an impact on community health. However, 2.3 billion people, 40% of the world total population, lack improved sanitation and 80% of these people live in rural areas (WHO, 2000). Improvements in sanitation coverage are one of the key elements to ameliorate health around the world(4).

Despite the enormous potential benefits of improved sanitation, large-scale latrine promotion around the world has been very disappointing. The percent coverage of sanitation has increased by 5% during twenty years of sanitation promotion, however the number of people lacking sanitation services remains practically the same (WHO, 2000). Current sanitation promotion tactics needs to be re-evaluated in order to develop new techniques that meet with wider public

appeal. Considering the reasons behind the non-adoption and the results of case studies can provide the necessary information to create a successful sanitation program (4).

Lack of sanitation facilities forces people to defecate in the open, in rivers or near areas where children play or food is prepared. This increases the risk of transmitting disease. The Ganges River in India has 1.1 million liters of raw sewage dumped into it every minute, a startling figure considering that one gram of faeces may contain 10 million viruses, one million bacteria, 1000 parasite cysts and 100 worm eggs. Examples of diseases transmitted through water contaminated by human waste include diarrhea, cholera, dysentery, typhoid, and hepatitis A. In Africa, 115 people die every hour from diseases linked to poor sanitation, poor hygiene and contaminated water(5).

Health care facilities need proper sanitation and must practice good hygiene to control infection. Worldwide, between 5% and 30% of patients develop one or more avoidable infections during stays in health-care facilities. Each year more than 200 million people are affected by droughts, floods, tropical storms earthquakes, forest fires, and other hazards. Sanitation is an essential component in emergency response and rehabilitation efforts to stem the spread of diseases rebuild basic services in communities and help people return to normal daily activities (5).

8.1.2. Statement of the problem

Two point four billion People, 40% of the total world population, lack improved sanitation and 80% of these people live in rural areas of the developing world. In the WHO African Region, a total of 631 million people, (40%), had no access to any kind of improved sanitation facilities in 2000. This figure is about the same (36%) in 2002 for Sub-Saharan African nations. A very recent publication of WHO/UNICEF indicated Africa is lagging much behind to attain MDG goals in sanitation that aims to achieve improving coverage of 38% (in 2006) to a level of 66% in 2015. (6).

WHO estimates that diarrheal diseases are the third leading cause of infectious disease-related mortality, claiming approximately 2.2 million lives annually. Children under 5 years account for an estimated 2 million deaths and 1.5 billion bouts of diarrhea annually (6.). The disease burden associated with poor water, sanitation, and hygiene is estimated to account for 4.0% of all deaths and 5.7% of the total disease burden in disability-adjusted life year (DALYs) in worldwide, principally through diarrheal diseases. About 1.8 million people die every year due to diarrheal diseases, and children under the age of 5 years account for 90% of diarrheal deaths. Moreover,

88% of diarrheal diseases are attributed to unsafe water supply, inadequate sanitation, and poor hygiene (7).

In most developing countries, especially in Sub- Saharan Africa (SSA),the basic causes of more than 80% of the diseases are inadequate and unsafe water supply, and improper disposal of waste. Ethiopia is among the poorest countries in the world, ranking 170 out of 177 in the UN human development index and is the second most populous country in Africa (population estimated above 80 million among the least served with rural water supply and sanitation access at only 24% and 8% respectively(7).

Sanitation is one of the most basic services in human life. However, the provision of this service is very poor in developing countries, like Ethiopia. Only 54% of the households use pit latrines in Ethiopia, the rest being too poor to build their own toilets they use open fields. But the coverage in urban areas is expected to be < 54%. Rapid urbanization is occurring throughout the country, creating a demand for housing, infrastructure, sanitation and other socioeconomic services (8).

During health profile assessment in Woreda nine of Addis ketema sub city there is a low coverage of latrine and latrine utilization and the first priority problem identified .

8.1.3. Literature review

Human excreta (Faeces) are the source of many infectious disease agents. Diseases for which human excreta are the source are known as excreta borne diseases or faecal Oral Route Infections (9).

The excreta can affect human health through drinking water, improper sewerage system, indirect contact and food from various pathways. Thames river water contaminated with faecal matter killed more than 10,000 Londoners during the outbreak of cholera epidemic in 1831–1832, 1848–1849 and 1853–1854 (9, 10) .

The burial of excreta is an almost 100% safe practice of excreta disposal. This, in turn means the efficient use of latrines (9). Achieving both coverage and use, however, are essential in order to realize the health benefits associated with improved sanitation. Even a comparatively small number of non-users can contaminate the environment with faecal pathogens, causing direct exposure to faecal pathogens through contact and indirect exposure via mechanical vectors (flies) and contaminated drinking water. Microbiological evidence and modeling based on quantitative microbial risk assessment suggests that high levels of coverage and use are necessary to

minimize exposure and prevent disease (10).Nearly half of the world's population lacks protected against the contamination by human faeces .

A large fraction of the world's illness and Sixty-two percent and 31% of all deaths in Africa and Southeast Asia, respectively, are caused by infectious disease (11). This trend is especially notable in developing countries where acute respiratory and intestinal infections are the primary causes of morbidity and mortality among young children (12). Inadequate sanitary conditions and poor hygiene practices play major roles in the increased burden of communicable disease within these developing countries.

According to a study conducted by Meddings D.R. et al. in Kabul Afghanistan, 1238 cases and 625 controls were used. Logistic regression modeling was performed both for children <5 years and <11 years, and the parameter estimates were later used with results from a stratified cluster sample survey. Conditional logistic regression showed that patients were less likely than controls to live in households with revised latrines (odds ratio (OR) 0.57, 95% confidence interval (CI) = 0.42 –0.77 for children <5 years, and OR 0.53, 95% = CI 0.41 –0.67for children <11 years). The results from the survey of cause-specific mortality by verbal autopsy enabled estimation of the number of deaths averted over a 1-year period due to the intervention; these estimations were 235 (95% CI = 109 – 360) for children <5 years and 285 (95% CI = 180 – 397) for children <11 years. Estimates of cost effectiveness ranged from approximately US$ 1800 to US$ 4100 per death averted depending on age and payer perspective. They concluded that estimates are conservative because only 1 year of effectiveness is considered, yet they compare favorably with a review of other pediatric interventions. These results are important because funding for sanitation interventions is often limited by the belief that the interventions are not cost-effective (13).

In Tanzania, Kemal K. et al. conducted a cross- sectional study among 375 randomly selected households using a pre-tested questionnaire to determine whether the households owned improved ventilated latrines and how they utilized them. they found that About half (50.5%) of the households had an improved ventilated latrine and households with earnings of more than 50,000 Tanzanian Shillings were two times more likely to own an improved latrine than those that earned less (AOR 2.1, 95% CI=1.1-4.0, p= 0.034). The likelihood of owning an improved latrine was reduced by more than 60 percent for female-headed households (AOR=0.38; 95% CI=0.20-0.71; p=0.002). Furthermore, it was established that all members of a household were

more likely to use a latrine if it was an improved ventilated latrine (AOR=2.4; 95% CI=1.1-5.1; p= 0.024). The authors concluded that Findings suggest adoption of strategies to improve the wellbeing of households and deploying those who had acquired improved ventilated latrines as resource persons to help train others. Furthermore, efforts are needed to increase access to soft loans for disadvantaged members and increasing community participation (11).

A community-based cross-sectional study conducted on 608 households in district of Bahir Dar Zuria revealed that of the 608 households, 355 (58.4%) had pit latrines and only 220 (62.0%) were functional (providing services during data collection). One hundred eighty seven (52.7%) had been constructed two or more years prior to the time of the study and 202 (56.9%) latrines required maintenance. The availability of latrines was twice higher in households with an income of 5000 or more Ethiopian Birr (1USD = 17.5 Ethiopian Birr) per year than those who hand an income less than 5000 Birr per year; the availability of latrines was twofold higher in households visited by health professional at least three times a month than those that received no visits. The latrine coverage was about two times higher in households that were less than 30 minutes walk from a health institution than households that were over 3 lower in households located in distant areas than in households closer to the City. The author suggested that Latrine coverage in District of Bahirdar Zuria was far from the national target of 100%. The availability of latrines was affected by income level, frequency of visits by health workers, walking time from local health institutions, and distance from Bahir Dar. Therefore, it is recommended that the frequency of supportive visits be increased and that special attention be given to households in inaccessible areas (12). Regarding sanitation and hygiene information utilization, the overall findings of the study underlined the importance of communication and behavioral factors in the areas of sanitation and hygiene information access. and level of utilization. Therefore, policy and health interventions should give emphasis to improvement of information sources, which can address the rural households and more focuses should be given to adult education and behavioral change communication approaches (7).

8.1.4. Rationale

Sanitation facilities are being constructed in Ethiopia so as to meet the millennium development goal and due emphasis is given by Ethiopian ministry of health. However the impact of latrine utilization and other related factors on the health of the community are not widely assessed in a way to evaluate the trend of latrine usage . Especially in Woreda nine of Addis ketema sub City

faced cholera outbreak frequently starting from year 2010. For instance in 2016 there was an outbreak of cholera occurred in Addis ketema sub City. In this outbreak a total of 373 cholera cases and 4 cholera deaths were reported. Of these reported cholera cases and deaths, 294 (79%) of cases and 2 (79%) of deaths were reported from Woreda nine of Addis ketema sub City . The index case was also reported from this Woreda.

Therefore, as there is wide spread of faeco oral diseases in Woreda nine of Addis ketema sub City, assessing the proper utilization of latrine and other factors will enable us discuss the correlation between them.

Research questions

Is there a gap on latrine utilization? (What is the latrine utilization coverage in the ?)

What are major influencing factor for latrine utilization?

8.2. OBJECTIVES

8.2.1 General Objective

To assess latrine utilization and influencing factors for latrine utilization in Woreda nine, Addis ketema sub City, Addis Ababa, Ethiopia.

8.2.2 Specific objective

- Describe the current latrine utilization coverage of Woreda nine, Addis ketema sub City
- Find out factors associated with latrine utilization of Woreda nine, Addis ketema sub City
- Describe the knowledge on latrine utilization in Woreda nine, Addis ketema sub City
- Describe the attitude on latrine utilization in Woreda nine, Addis ketema sub City.
- Describe the practice of latrine utilization in Woreda nine, Addis ketema sub City

8.3. Methods

8.3.1 Study area

Woreda nine of Addis ketema sub city is one of the ten Woredas in the sub city. Woreda nine has total population of 35,636, HH 7424 and 422 sample households with latrine will be included in the study.

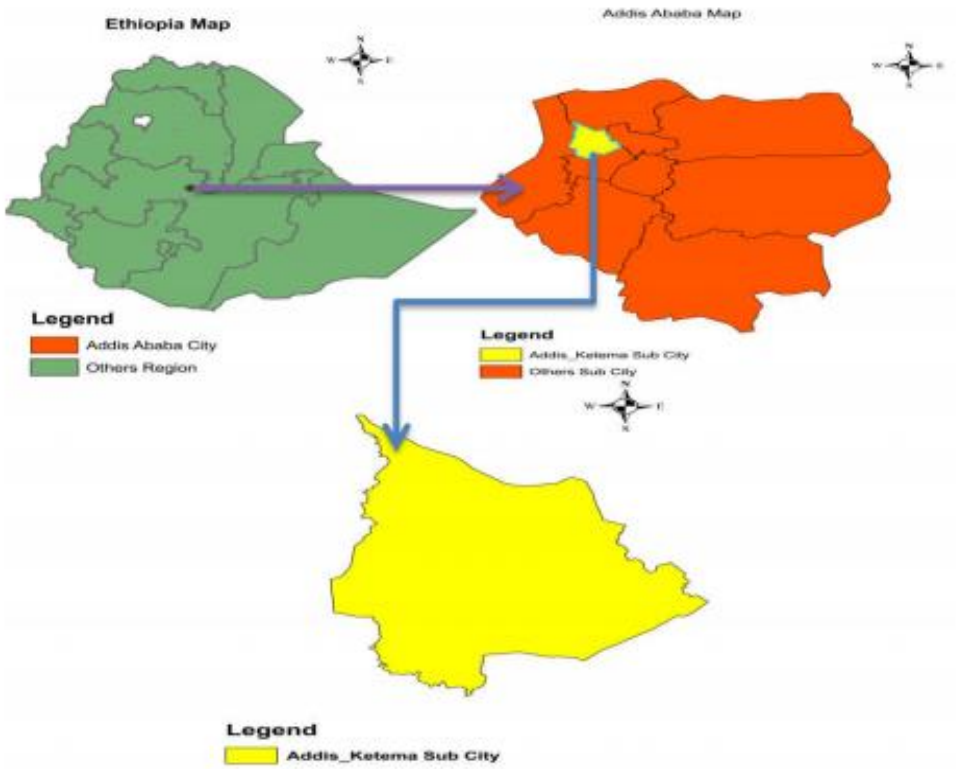

Figure 25: Administrative Map of Woreda Nine, Addis ketema Sub City, Addis Ababa ,Ethiopia, 2019

8.3.2 Study design

A descriptive community based cross-sectional study will be conducted in the town community of Woreda nine ,Addis ketema sub City.

8.3.3 study period

The study will conduct from June 2019 to July 2019

8.3.4 Source population

All households with latrine in the Woreda will be the source population for this study.

8.3.5 Study population

Selected households with latrine facilities among 3 urban "ketenes" in Woreda nine of Addis ketema sub City will be included in the study.

8.3.6 Sample size

The sample size (n) will be calculated using the following single population proportion formula based on the assumption of 50% proportion (p) that all latrine owners are utilizing latrines, 0.0025 marginal error (d) to maximize the size of the sample, a standard Z score of 1.96 corresponding to 95% confidence interval correction for the loss of sampling efficiency resulting

from the use of stratified sampling and 10% non-response rate:

n= $\mathbf{Z^2p(1-P)/d^2 = 1.96^2 X0.5(1-0.5)/.05x0.05 = 0.9604/0.0025 = 384 +10\% = 422}$

Accordingly the required sample size = 422 H.Hs with latrines.

8.3.7 Sampling procedures

The sampling will be carried out in two stages. Primarily, the "Ketenes" will be stratified as urban ketenes. Then 3 "ketenes" will be selected randomly by using lottery method .Secondly, the registered latrine owner households will be identified using registration list available at health office. Based on latrine owners' house prepared. Then, by using Systematic Sampling every sample at K^{th} -term will be incorporated in the sample. The numbers of households which included in the study from each "ketene" will be determined proportionally based on latrine coverage of each "ketene". A representative sample of 422 households will be selected.

8.3.8 Data collection procedures

Data will be collected quantitatively using pre-tested and standardized questionnaires. The questionnaires will be prepared in English and translated to local language"Amheric and later translated back to English to ensure reliable information. Trained data collectors, health workers will collect the data. Principal investigator will act as supervisor and follow up the data collection process. Based on sampling procedure in the households either the head of the house or mother or any person age of greater or equal to 18 years living in the selected houses will be interviewed. Prior to the interview verbal consent will be obtained from the study subject. Health workers that have diploma or above will be selected from health office and health center, for data collection.

8.3.9 Study variables

8.3.9.1 Dependent variables

- Latrine utilization

8.3.9.2 Independent variables

- Age
- Area of the latrine (width* length* height)
- Attitude about latrine utilization Cleanliness of the compound (human excreta)
- Cultural perception of the family distance of the H.F or school from the house
- Distance of the latrine from the living house
- Family size

- washing facilities and Hand washing practice
- Knowledge about latrine utilization and associated diseases
- Monthly income
- Occupational status
- Occurrences of diarrheal diseases in the previous time
- Presence of health extension workers in the area (frequently contact)
- Presence of H.F or school in the "ketenes "
- Religion
- Availability of water

8.3.10. Inclusion and exclusion criteria

- In one compound if there is more than one households with latrine only one house will be selected/included in the study
- Households in the area where there is a communal latrine will be excluded
- Households with latrine under construction will excluded**.**

8.3.11 Data Analysis procedures

Data will be entered in to Epi info. Data clearance and analysis will be conducted. Bivariate analysis of associations between risk factors and outcome variables will be conducted using chi square tests. Logistic regression then performed to examine the strength of association between covariates with a p value <0.05. To investigate the association between the covariates and latrine use, multivariable models will be built using a hierarchical conceptual framework. To avoid an excess number of variables and unstable estimates in the subsequent model, only variables with a p-value of <0.025 were kept in the subsequent model analysis.

8.3.12 Data quality management

Pre-testing will be conducted in "ketenes" of similar settings but which are not part of the study. Then needed adjustments will be made after the pre-test. Training will be conducted for the data collectors. During the training they will practice on how to complete the format/questionnaires. Close supervision will be carried out by the principal investigators during the data collection. Some of the collected data will be assessed daily for the completeness that will help for correction in the next days.

8.3.13 Ethical consideration

Ethical clearance will be obtained from the respective school of public health, Addis Ababa

University and Addis Ababa Regional Health Bureau ethical committees. A formal letter will also be submitted to all the concerned bodies to obtain their co-operation. All the participants will be asked their consent. Confidentiality will be assured and no personal details will be recorded or produced on any documentation related to the study.

8.3.14 Dissemination of findings

The findings of this study will be disseminated to Addis Ababa University ,Ministry of Health, Addis Ababa Regional Health Bureau, and Addis ketema sub City Health office. The findings will also be disseminated to different organizations that will have contributions to improve the health condition of the community. In addition, effort will be exerted to publish the paper and critiques that will be written based on the practical exposure

8.3.15. Work Plan

Table 37: Research project implementation work plan in Woreda Nine, Addis ketema sub City, Addis Ababa, Ethiopia, Jan to May , 2019

S/N	Planned activities	March				April				May				June			July		
1	Prepare proposal and submit																		
2	Review of Proposals and Approval of Projects																		
3	Select data collectors and research assistants																		
4	Conducting training for data collector and supervisor																		
5	Pre-testing of the survey instrument																		
6	Prepare for field work																		
7	Data collection																		
8	Data entering and cleaning																		
9	Data analyzing and interpretation																		
10	Report writing and submission																		

8.3.16. Budget

Table 38: Budget breakdown of latrine utilization and influencing factor assessment in Woreda nine ,Addis ketema sub City ,Addis Ababa , Ethiopia, 2019

S/N	Budget Category	Unit cost	Total	Total Days	Total Birr
1	**Training**				
	Principal Investigator	300	1	3	3*1*300=900
	Field supervisor	300	2	3	2*3*300=1800
	Data collector	210	8	3	8*3*210=5040
	Data entry clerk	300	1	1	1*1*300=300
	Sub Total				**8040**
2	**Supplies**				
	Flip chart	150	2		300
	1 pack pen	250	1		250
	1pack pencil	80	1		80
	Eraser	30	2		60
	Sharper	5	8		40
	Marker	95	4		380
	Printing paper	250	5		2500
	Printing Ink	4000	1		4000
	Sub total				**7,610**
3	**Field work**				
	Project coordinator	Person x days		1*21*300	6300

	Field supervisor	Person x days		2*21*300	12,600
	Data collectors	Person x days		8*21*210	35,280
				Sub Total	**54,180**
				Total	**69,830**
				Contingency 5%	**3,491.5**
				Grand Total	**73,321.5**

8.3.17. References

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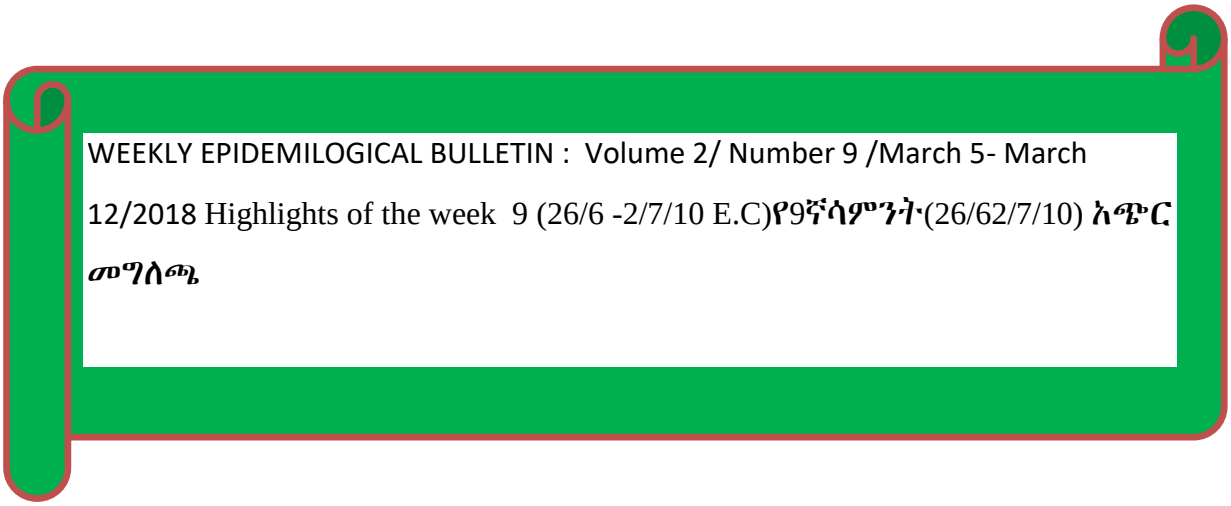
Chapter-IX:

Additional Out put

9.1 Addis ketema sub city health office health promotion and disease prevention core process public health emergency management case team



- In this week 98% of health facilities provided surveillance data. Zero report was sent by 74.7% of health extension professionals. Completeness and Timeliness for Woredas were both 98%
- Two MAM cases were reported in week 9 of 2018.
- From the total of 21 malaria suspected fever cases two were confirmed in week 9.
- One relapsing fever case was reported in week 9 of 2018.
- Number of typhoid cases were 254 in week 9.
- Number of epidemic typhus cases were 236 in week 9.

1. Introduction

This weekly epidemiological bulletins is prepared and distributed to stake holders to illustrate some highlights on public health emergency management activities, and summarizes surveillance data and performance on epidemic prone diseases and other public health emergencies. The bulletin mainly includes surveillance data of week 9 of 2018 received from Woredas through SMS and telephone call, surveillance completeness and timeliness across all Woredas, trends of diseases under surveillance, cluster of cases and events, ongoing outbreak and responses undertaken

- በዚህ ሳምንት 98% ያህሉየጤና ተቋማት ሪፖርት አድርገዋል:: ዜሮ ሪፖርት 74.7% በሚሆኑ የጤና ኤክስቴንሽን ባለሙያዎች ሪፖርት ተደርጓል፡፡የወረዳዎች የሪፖርት ምሉእነት እና ጊዜውን ጠብቆ የደረሰ የመረጃ መጠን በመቶኛ 98% ነው፡፡በዚህ ሳምንት ሁለት መካከለኛ የምግብ እጥረት ያለባቸው ግለሰቦች ሪፖርት ተደርገዋል::ከሃያ አንድ በወባ በሽታ ከተጠረጠሩት ግለሰቦች ውስጥ ሁለት በወባ በሽታ መያዙ ተረጋግጧል፡፡አንድ በግርሻ ትኩሳት በሽታ የተያዘ ግለሰብ በ9ኛው ሳምንት ሪፖርት ተደርገዋል ::በዚህ ሳምንት ውስጥ 254 የታይፎይድ ህመምተኞች ሪፖርት ተደርገዋል::በ9ኛው ሳምንት ውስጥ 236 የታይፈስ ህመምተኞች ሪፖርት ተደርገዋል::

I. መግቢያ

ይህ ሳምንታዊ መጽሄት በዋነኛነት የህብረተሰብ ጤና እና ጤና ነክ የሆኑ አደጋዎች ቁጥጥር ዙሪያ የተደረጉ እንቅስቃሴዎችን ፣የበሽታ ቅኝትና አሰሳማጠቃለያዎችን ይይዛል:: ይህ ሳምንታዊ መጽሄት በዋነኛነት የሚይዛቸው መረጃዎችበ9ኛው ሳምንት ውስጥ የተላኩ የበሽታቅኝትወረዳዎችላይ፣አጠቃላይየበሽታዎ ችስርጭት፣የበሽታዎችሂደት ምን ይመስላል የሚለውን ይዳስሳል ::

2.Surveillance report completeness and timeliness.

Completeness and Timeliness.

In week 9 the aggregated surveillance result of completeness rate for health facilities under each Woreda were 98%. It shows improvement as compared to week 8. The completeness in all Woredas were above the standard value . (see figure 1) Timeliness and completeness for Woredas were both 98%.

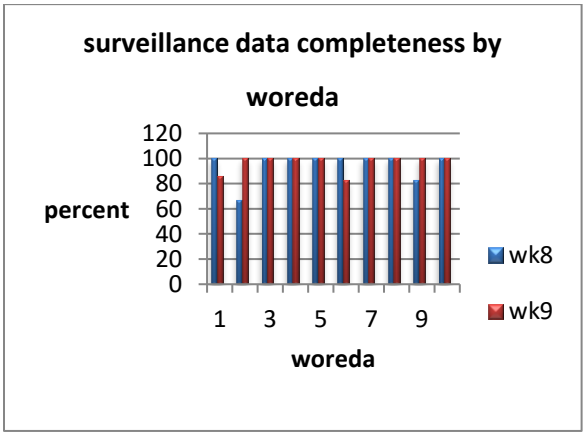


Figure 1: Week 8 and 9 surveillance data completeness by Woreda, Addis Ketema Sub City 2018.

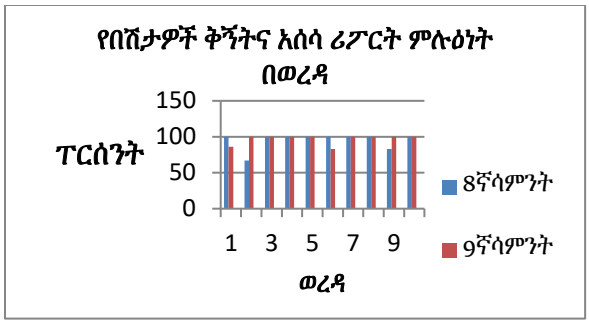
3. **Diseases and condition**

A. Malaria

From 21 suspected malaria cases two clients were confirmed by lab and were diagnosed as P. vivax in week 9.

B**. Meningitis**

No meningococcal meningitis case was in at all levels in the sub City week 9 of 2018



ምስል1. 8ኛ እና 9ኛ ሳምንት የበሽታ ቅኝት እና አሰሳ የሪፖርት ምሉእነት 2018

II.የበሽታዎች ሪፖርት ምሉእነት እና ወቅቱን ጠብቆ መድረስ በዚህ ሳምንት የበሽታ ቅኝት እና አሰሳ ሪፖርት ምሉእነት 98% ነው:: ከባለፈው ሳምንት ጋር ሲነጻጸር ጨምሯል። በዚህ ሳምንት የበሽታ ቅኝት እና አሰሳ ሪፖርት ምሉእነት እና ጊዜውን ጠብቆ የደረሰ የመረጃ መጠን በሁሉም ወረዳዎች ላይ ከWHO ማወዳደሪያው (80%) በላይ ነው። (ምስል፡1)

III. በሽታዎች እና የበሽታ ሁኔታዎች

ሀ. የወባ በሽታ በአጠቃላይ ተጠርጥረው ከተመረመሩት ሃያእና አሰሳ ሪፖርት በስልክ፣ በስልክ መልዕክት፣እንዲሁም በሳምንታዊ የመረጃመለዋወጫ ቅጽ የሚመጡትን መረጃዎች ነው:: ሳምንታዊው መጽሄት ከሚይዛቸው ነገሮች ዋናዎቹ የሪፖርት ምሉእነት እና ጊዜውን ጠብቆ የደረሰ የመረጃ መጠን በሁሉምአንድ ታማሚዎች ውስጥ ሁለት በወባ በሽታ በፕ.ቫይቫክስ የተያዘ መሆኑን በላብራቶሪ

C. Typhoid fever

A total of 254 typhoid fever cases with no death were reported from all Woredas in week 9. The number of cases were as increase compared to the previous week. When we try to see the distribution of these cases higher number of cases were reported from Woreda 1 and 9, both are 40(15.7%) and 41(16.1%) respectively , followed by Woreda 7 and 10, both are 31 cases (12.2%). (see figure 2)

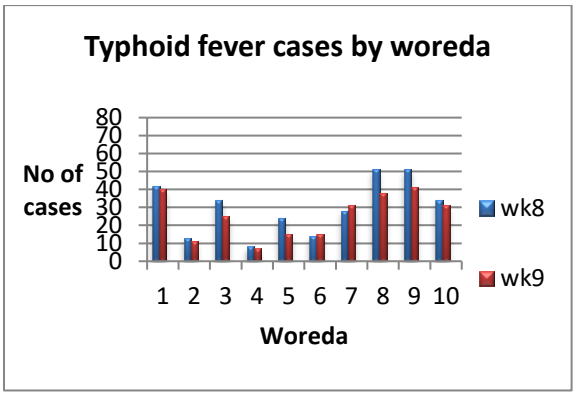


Figure 2: Trend of Typhoid fever cases by Woreda, Addis ketema sub City, week 8 and 9, 2018

D.**Dysentery**

A total of 25 dysentery cases were reported during week 9. Number of cases were increase as compared to the previous week. Woreda 3,5 and 8 have no dysentery cases for this weeks. Among Among the reported cases woreda 1 contributed 48% of cases. (see figure 3)

መረጋገጡንበ 9ኛው ሳምንት ሪፖርት ተደርገዋል::

ለ. ማጅራትገትር

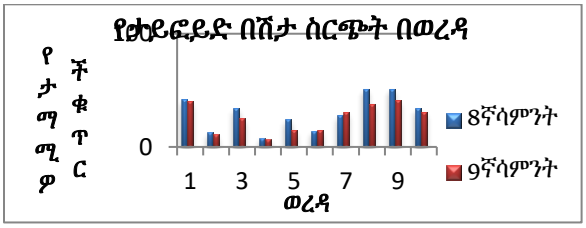
በ9ኛው ሳምንት ምንም የማጅራት ገትር ህመምተኛ ሪፖርት አልተደረገም።።

ሐ. ታይፎይድ

በአጠቃላይ 254 የታይፎይድ ታማሚዎች በ9ኛው ሳምንት ሪፖርት ተደርጓል::ምንም በዚህ በሽታ ተይዞ የሞተ የለም።።

በታይፎይድ በሽታ የተያዙ ሰዎች ቁጥር ከባለፈው ሳምንት ጋር ሲነጻጸር ቀንሶዋል።።

ከፍተኛየታይፎይድ ታማሚዎችን ሪፖርትያደረጉወረዳዎችንለማየትስንሞክርወ ረዳ1፣40ታማሚዎች(15.7%)፣ወረዳ 9,41ታማሚዎች(16.1%) ሪፖርት አድርገዋል።።



ምስል 2፣ በ8ኛ እና 9ኛ ሳምንት ላይ ያለ የታይፎይድ በሽታ ስርጭት 2018

መ. ደም እና መግል የቀላቀለበት ተቅማጥ

በአጠቃላይ 25 ደም እና መግል የቀላቀለበት ተቅማጥ በሽታ የተያዙ ታማሚዎች በ9ኛውሳምንት ሪፖርት ተደርጓል:: ወረዳ 3,5 እና 8 ሳምንት ጋር ሲነጻፀር ጨምሮዋል።። ሪፖርት ከተደረጉት ታማሚዎች48% ከወረዳአንድ በዚህ

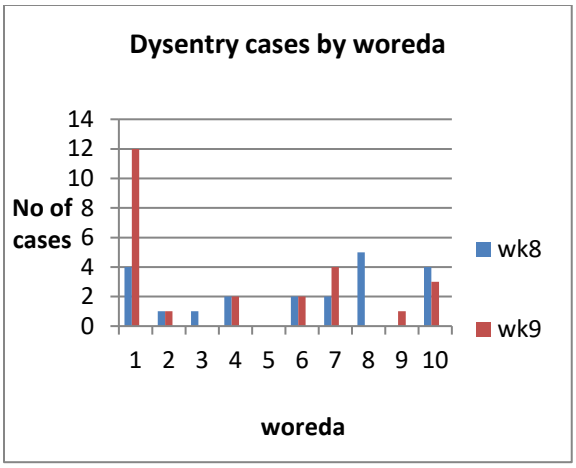


Figure3:Trend of Dysentery cases in Addis Ketema sub City, week 8 and 9, 2018

E.Relapsing Fever

One relapsing fever cases were reported in week 8 of 2018 by 29 cases as compared to the previous week. Woreda 8 and 9 have reported high number cases. (see figure 4)

F. Epidemic Typhus

A total of 236 Epidemic Typhus cases were reported during week 9. The number of cases were increase .

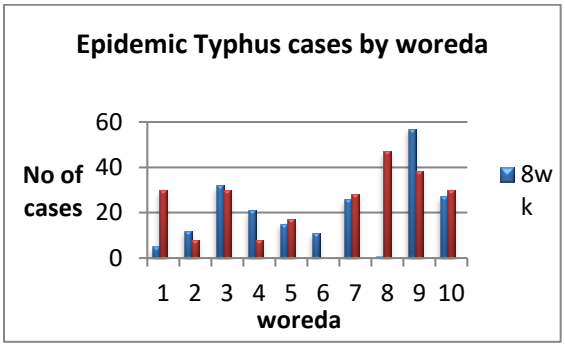
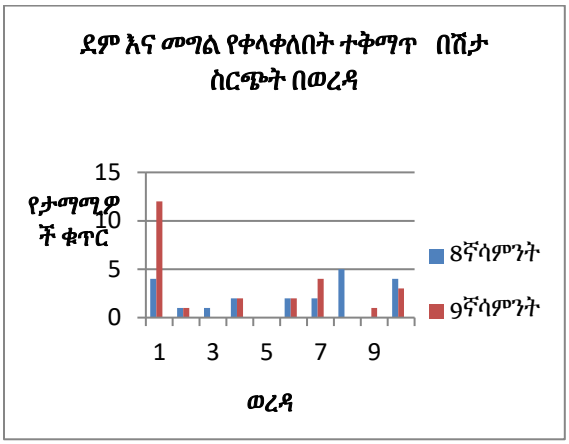


Figure 4-Trends of Epidemic typhus Cases by Woreda, Addis Ketema sub City, week 8 and 9, 2018.

G.**Malnutrition**

A total of two cases with nutritional

ሳምንት ምንም ህመምተኛ ሪፖርት አላደረጉም። የታማሚዎች ቁጥር ካለፈው ናቸው።



ምስል 3፣ 8ኛ እና 9ኛ ሳምንት ላይ ያለ ደም እና መግል የቀላቀለበት ተቅማጥ በሽታ ስርጭት በአዲስ ከተማ ክ/ከተማ፣2018.

ሠ. የግርሻ ትኩሳት

በዚህ ሳምንት አንድ የግርሻ ትኩሳት ህመምተኛ ሪፖርት ተደረገዋል።

ረ. ወረርሽኝ ሊያስነሳ የሚችል ታይፈስ

በአጠቃላይ 236 ወረርሽኝ ሊያስነሳ የሚችል ታይፈስ በሽታ የተያዙ ታማሚዎች በ9ኛው ሳምንት ሪፖርት ተደርገዋል።ወረርሽኝ ሊያስነሳ የሚችል ታይፈስ በሽታ የተያዙ ሰዎች ቁጥር ከባለፈው ሳምንት ጋር ሲነጻጸር በ29 ታማሚዎች ቁጥር ጨምሮዋል ።

deficiency were reported in this week. All were diagnosed as MAM.

H.**Maternal and perinatal Death**

No maternal and perinatal death was reported from Woreda in week 8 of 2018

I.**Measles** one measles suspected case was reported from Woreda 6 in this week.

J.**Dog bite:-** no dog bites were reported from Woreda .

K.**Scabies:-**Two scabies cases were reported from Woreda 4.

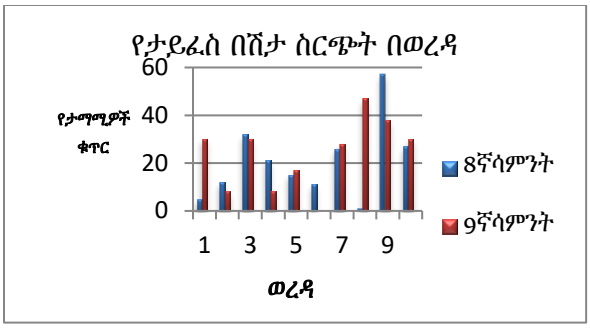
L.**Other disease conditions**

In the current epi week AFP, NNT, SARS, Anthrax, rabies, Guinea worm, VHF, Yellow fever and other immediately reportable diseases were reported 0.

4.**Recommendations**

In Addis Ababa unlike other rural areas the facility surveillance should be100% complete since the infrastructure we have allows us to do.The completeness of report in all Woredas were above the WHO target requirement of 80. This should strengthen and to be consistent some Woredas are reporting the three highly prevalent diseases for several weeks for instance Woreda1 contribute high number of dysentery cases, Woreda 8 and 9 contributed higher number of typhus cases.

Therefore the specific Woredas should investigate and take action accordingly.



ምስል 4፡ 8ኛ እና 9ኛ ሳምንት ላይ ያለ ታይፈስ በሽታ ስርጭት በአዲስ ከተማ ክ/ከተማ፣2018.

ሰ.የተመጣጠነ የምግብ እጥረት

በአጠቃላይ ሁለት በምግብ እጥረት በሽታ የተያዙ ሰዎች በ8ኛው ሳምንት ሪፖርት ተደርጓል::ሁለቱም በመካከለኛ የምግብ እጥረት የተያዙ ናቸው::

ሸ. የእናቶች እና የጨቅላ ህፃናት ሞት

በዚህ ሳምንት ውስጥ ምንም አይነት የእናት እናየጨቅላ ህፃን ሞት ሪፖርት ::

ቀ. የኩፍኝ በሽታ አንድ የኩፍኝ በሽታ ተጠርጣሪ ከወረዳ 6 በዚህ ሳምንት ሪፖርት ተደርጓል::

በ. የውሻ ንክሻ በዚህ ሳምንት ምንም ንክሻ ሪፖርት አልተደረገም ::

ተ. የእከክ በሽታ ሁለት በእከክ በሽታ የተጠቀ ሰዉ ከወረዳ 4 ሪፖርት ተርገዋል::

በአጣዳፊ የልጅነት ልምሻ፣መንጋጋ ቆልፍ፣ የከፋ መተንፈሻ አካል ችግር፣፣አባሰንጋ፣ የእብድ ውሻ በሽታ፣ ጊኒ ወርም፣ በቫይረስ የሚመጣ የመድማት ችግር፣ እና ሌሎች ወዲያው ሪፖርት የሚደረጉ በሽታዎች.

Active search should be strengthened.

- In week 9 the completeness of report of UHEPs were above the WHO cut off value. It should be consistent and strengthened.
- Active surveillance by involving women development army should be strengthened.
- Health extension professionals should encourage and remind women development armies about maternal death identification based on the community case definition.

Community Based Surveillance

In week 9 community based surveillance report completeness for all extension professionals under all Woredas were 74.7% that is out of 95 health extension professionals 71 reported weekly report.

In the current week based on the report from community surveillance all immediately and weekly reportable diseases were zero.

Recommendation for the community based surveillance In Addis Ababa context the completeness of report from community should be 100% like that of facility surveillance because there are lots of opportunities present for instance the women development army structure.

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Cell Phone: 0911353089

Email: ddtk2004@gmail.com

ምንም አይነት በበሽታው የተያዙ ህመምተኞች በዚ ህሳምንት ውስጥ አልነበሩም ::

IV.ትኩረት የሚሹ ጉዳዮች

ካለው ምቹ ሁኔታ አንፃር በአዲስ አበባ ከተማ ከሌሎች አካባቢዎች በተለየ ሁኔታ የሪፖርት ምሉዕነት መጠን 100% መሆን ይኖርበታል።በዚህ ሳምንት የበሽታ ቅኝትና አሰሳ ሪፖርት ምሉዕነት ብዙዎች ወረዳዎች ላይ ከWHO ማወዳደሪያው 80% በለይ ነው።ሪፖርት የማያደርጉ ተቋማት ተለይተው ድጋፍና ክትትል ማጠናከር ያስፈልጋል። አንዳንድ ወረዳዎች ላይ በክፍለ ከተማው ውስጥ በብዛት የሚታዩ ህመሞች ከሌሎች ወረዳዎች በተለየ መልኩ ሪፖርት እያደረጉ ነው ለምሳሌ ወረዳ 1 ደምና ምግል የቀላቀለ ተቅማጥ ፣ወረዳ 8 እና 9 ታይፈስ ህመሞችን ከሌሎች ወረዳዎች ጋር ሲነፃፀር የበለጠ ቁጥር ሪፖርት እያደረጉ ይገኛሉ በመሆኑም ወረዳዎቹ ያለውን ሁኔታ መርምረው አስፈላጊ እርምጃ ቢወስዱ የተሻለ ነው።

የማሃበረሰብ አቀፍ የበሽታዎች ቅኝትና አሰሳበዚህ ሳምንት የማሃበረሰብ አቀፍየበ ሽታዎች 74.7% ነው። ሪፖርት ያደረጉት 71 ያህል ብቻ ናቸው።ከባለፈው ሳምንት ጋር ሲነፃፀር ጥሩ ነዉ።ይህም ማለት ሪፖርት ማድረግ ከሚገባቸው95 የከተማጤና ኤክስቴንሽን ባለሙያዎች።

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በዚህ ሳምንት ከሪፖርቱ በመነሳት ምንም በሳምንት እንዲሁም ወዲያው ሪፖርት የሚደረጉ በሽታዎች በማሃበረሰብ ደረጃ አለመገኘታቸውን ማየት እንችላለን፡፡

የማሃበረሰብ አቀፍ የበሽታዎች ቅኝትና አሰሳ መፍትሄ የሚሹ ጉዳዮች፡-እንደ አዲስ አበባ ካለን ምቹ ሁኔታ አንፃር ለምሳሌ የሴት ልማት ቡድኑ መኖሩ የማሃበረሰብ አቀፍ የበሽታዎች ቅኝትና አሰሳ 100% መሆን ይኖርበታል፡፡በማህበረሰብ ደረጃ የበሽታቅኝትና አሰሳ የሴት ልማት ቡድን መሪዎችን በሰፊው በማሳተፍ መስራት አስፈላጊ ነው፡፡የጤና ኤክስቴንሽን ባለሙያዎች የሴት ልማት ቡድን መሪዎችን የማሃበረሰብ አቀፍ የእናቶች ሞት መግለጫን መነሻ በማድረግ ልየታውን እንዲሰሩ ማበረታታት ያስፈልጋል፡

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 duly acknowledged.

Name: **Dereje Diriba Tufa**

Signature _____

Place: **Addis Ababa University**

E.mail-ddtk2004@gmail.com

Mobile-0911353089

Date of submission: 28 June, 2019

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

Name of advisors:

1. _____

Signature:_____

Date _____

2 ._____

Signature_____

Date_____

ANNEXES:-

Annex1: Questionnaire for Case - control study on Measles outbreak in Jeldu Woreda ,West shoa zone ,Oromia, Ethiopia 2019

Consent form

My name is Dereje Diriba. I am second year field epidemiology resident in Addis Ababa University School of public health and I interested to investigate Measles outbreak in Jeldu Woreda of west shoa zone by identifying predisposing factors. This study, after investigation, will provide recommendation on the place of control method and concerned body will intervene to control further infection. Therefore, your participation has a great role for the success of controlling measles.

While collecting data no one will be wanted to specify her name on the questionnaire paper and no one will be forced to participate in the study. Through all process the confidentiality of interviewee is highly kept. Hence, no one can enforce you to answer the questioners & you can stop at anywhere even after answering some of questions.

Do you agree?

- Yes
- No

If yes proceed to the question on the next page. Since your answer has great value on my study, while answering the question, please, answer as per your feeling.

Thank you for your willingness!!!!!

Principal investigators Name Dereje Diriba

Phone Number: 0911353089

Instructions:

1. Data collector information: Name: _____ Phone number: _____

2. Date of Data collection: _____

Region_____ Zone_____ _____ Kebele _____ Got _____ House: Longitude: _____ Latitude: _____

3. Who is answering the questionnaire?:

□ Parent/ guardian of sick person □ Sick person □ other (please specify) _____

4. Respondent category: □ case □ control Active case: Yes□ No

II. Socio-demographic information

1. Patient Name_____

2. Patient phone number: _____ (whose phone#?) _____

3. How old are you? : _____months ____ years

4. Sex: □ Male □ Female

5. What is your occupation?

□ Farmer □ Merchant □ Housewife □ Unemployed □ Government □ Pastoralist □ Student □ Not applicable □ Other _____

6. What is your ethnicity? □ Oromo □ Tigre □ Amahara □ Garage □ other (specify) _____

7. What is your religion?: □ Orthodox □ Protestant □ Muslim □ Catholic □ other_____

8. What is your marital status?: □ Single □ Married □Widowed □ Divorced □ Not applicable

9. Have you ever attended school?: □ yes (go to question 10) □ No (go to question 11)

10. What is the highest level of education you have completed? (read answers): □KG □ Primary □ Secondary □ Tertiary □ Not applicable

11. Father's occupation: □ Farmer □ Merchant □ Unemployed □ Government □ Student □ Pastoralist □ Other _____

12. Parents' of case/control's education:

Mother: □ Illiterate □ Primary □ Secondary □ Tertiary

Father: □ Illiterate □ Primary □ Secondary □ Tertiary

13. What is the main material of the roof?

RECORD OBSERVATION _____

14. Does your household have Electricity? □ Yes □ No

A watch/clock? □ Yes □ No A radio? □ Yes □ No

A television? □ Yes □ No A mobile telephone? □ Yes □ No

A non-mobile telephone? □ Yes □ No A refrigerator? □ Yes □ No

A table? □ Yes □ No A chair? □ Yes □ No

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

I. Knowledge Questions

1. What is measles, or are you not sure? _____

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

□ through the air □ Fecal/oral □ Food □ Close contact with an ill person □ other _____

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

□ Vaccination, □ there is no prevention □ local healing □ other _____

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

□ Children less than 5 years old □ Children between 5-18 years

□ People over 18 years old □ any age groups of both male and women

□ don't know □ other (specify):_____

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

□ To prevent measles □ Other _____

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

□3 month's □ 6 months □ 9 months □Other □ Don't know

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

II. Clinical presentations (for case ONLY)

8. What were the symptoms?

a) rash: □ Yes □ No b) fever: □ yes □ No

c) runny nose: □ yes □ No d) red eyes: □ yes □ No

e) cough : □ yes □ No f) Tiny white spots or sores inside the mouth□ yes □ No

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

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

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

11. Where were you when the illness started?

District; _____Kebele; _____

12. How long have you had a rash? _____days

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

14. Did you visit health facility for this illness?

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

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

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

a. Treatment given? □ yes □ No, If yes □ ORS □ Antibiotics □ Vitamin A □ Supplementary food □ TTC ointment □ Anti pyretic □ Other _____

b. Outcome: □Alive □ death

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

a. Pneumonia:□ yes □ No
b. Diarrhea: □ yes □ No
c. Ear infection: □ yes □ No
d. Convulsions □ yes □ No
e. Change in vision: □ yes □ No
f. Blindness: □ yes □ No

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

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

19. Where did you travel to? _____

III. Risk factors

VACCINATION STATUS

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

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

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

Age of first dose _____ Age of second dose _____ Age of third dose _____

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

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

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

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

EXPOSURE

26. Did you have contact with a person with measles symptoms the 2-3 weeks before onset of illness? □ yes □ No □ don't know

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

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

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

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

a. If yes, on OTP:□ Yes, □ No

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

□ Less than 10 minutes □ 10-30 minutes' □31 minutes – 1 hour □ more than 1 hour

□ More than 2 hours

31. How many windows does the house have?

□ Two or more windows or doors □less than two windows or doors

Illumination □yes □No

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

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

Annex 2:Questionnaire for Louse Born Relapsing Fever Outbreak Investigation in Woreda three of Bole sub City , 2018

Code ----------Date of data collection----------MRN ----------

Data collector name ----------Signature----------

Name of principal investigator----------

Data collection Place (Name of HF) ---------- Location of Woreda HF ----------

S/n	Questions	Multiple choice	Skip
	Part I. Socio demographic data		
	Age	----------	
	Sex	Male Female	
	Former address		
	Woreda(Current)		
	Kebele(ketena) - specific name		
	Residency	Home Homeless(street) Bed room (daily)	
	House Nº (if any)	----------	Skip if homeless
	Phone number	_____	Optional
	How long you live in your current address?	----------	
.	If you are living on street, Mention the specific area	----------	
S/n	**Questions**	**Multiple choice**	**Skip**
.	Religion	Orthodox Muslim Protestant Catholic Others	
.	Ethnic group	Amahara Oromo Tigray SNNP Other(specify)-	

.	Respondent's educational status	1.Illiterate 2.Element 3.Secondary 4.Preparator 5.Highereducation	
.	Respondent's occupation	1.Employed 2.Private owner 3.Daily laborer 4.House wife 5.Student 6.No Occupation	If Student or No occupation skip Q 15 & 16
.	Working place	----------	
.	Respondent's monthly in come	----------	
.	Respondent category	Case Control	
Part II Participant status and clinical description			
.	Referral information	1.Self-referral 2.Private 3.Hospital/clinic 4.Government Health facility	

S/n	Questions	Multiple choice	Skip
.	Patients status at arrival	1.Walking by him/her self 2.Supported by others 3.ByAmbulance/ any car	
.	Patient first seen in	1.Emergency OPD 2.OPD (normal OPD)	
.	Date of Onset of illness	----------	
.	Date visit Health facility	----------	
.	Duration of illness	----------	
.	Was the patient admitted (treated as IP)?	YES NO	If No Skip to Q Nº 29

.	If YES, which hospital (HF)?	----------	
.	Date of admission:	----------	
.	Date of discharge	----------	
.	Discharge diagnosis	1.No improvement 2.Recovered 3.Died 4.Referred	
.	Does the patient deloused before discharge	Yes No	NA for Controls
.	What is the symptoms that the patient experiencing? (History + PE) **(Circle all that applies)**	Fever Chills Headache Nausea or Vomiting Malaise Myalgia Joint Pain Enlarged Liver Enlarged Spleen Jaundice . Photophobia . Nosebleeds . Sweating	

		1.Blood in urine 2.Skin Rash	
.	Did the patient experience rash	Yes No	If No Skip Q 33
.	Describe the rash	----------	
	Part III Laboratory test and Treatment		
.	Did the Patient tested for blood film	Yes No	If No Skip to Q no 37
.	If yes, Date of specimen taken	----------	
.	What was the result?	1.No hemo parasite seen 2.Borrella species seen	
.	Laboratory Name	----------	

.	Did the patient got medication?	Yes No	If no go to Q. Nº 39
.	Types of Drug given for the patient	---------- -	
Part IV Knowledge questions			
.	Do you know RF?	Yes No	
.	How RF can be transmitted?	Through body louse Sleeping with RF ill person Sleeping in overcrowded house(place) Other(specify)____ __ I don't know	
.	How RF can be prevented	Keeping personal hygiene Keeping environment clean I don't know Other ___	
.	Who can be more affected by RF?	Poor people Street /orphans Other I don't know	
S/n	**Questions**	**Multiple choice**	**Skip**
.	Do you think personal hygiene can prevent RF?	Yes No I Don't know	
.	Where did you go first when you get ill?	Health facility Traditional healer Holy water stays at home Other(Specify)_____	

.	Which method do you think is best for RF treatment?	Modern medicine Traditional medicine Holly water Nutritious food Stays indoor Delousing
Part V EXPOSURE: - Risk or exposure of louse born relapsing fever		
.	How many people's sleep together?	----------
.	How frequent do you groom your hair?	Every two week Every month Every two to three month More than three month
.	How frequent do you take body bath?	At least once a week Twice a week Every two to three weeks Other ---------
.	How frequent you wash your clothes	Once a week Every two week Every three week Once a month Not wash at all
.	Do you change your cloths at night?	Yes No
.	Have you Contact with LBRF ill person	Yes No

Annex 3: Typhoid fever Surveillance Data collection tool in Addis ketema sub city ,2018

1.Name of sub-City_____

2.Total population_____ Male _____ Female _____

3.Water and sanitation coverage _____

4.Number of typhoid fever cases in the Addis sub City report in 2013-2017 G.C

Table 1. Distribution of Cases and Death typhoid fever in Addis sub ketema City, Addis Ababa 2013 to 2017

Year	Population	Cases	Death	Remark
2013				
2014				
2015				
2016				
2017				
Total				

Table2:Sub City Surveillance report completeness rate by year in Addis Ketema Sub City from 2013 to 2017 G.C

S/N	Year	No of expected	No of reported	Completeness (%)
1	2013			
2	2014			
3	2015			
4	2016			
5	2017			
	Total			

Annex 4: Data collection tool to surveillance system evaluation of Addis ketema sub city ,Addis Ababa ,2018

1.1 Regional/Sub City Level Questionnaire

Respondent_____

Interviewer: _____

Date_____

General

1. Is there a national manual for surveillance? Yes/ No

2. ***If yes***, describe (last update, diseases included, case definitions, surveillance and control, Integrated or different for each disease):_____.

3. Do you have standard case definitions for the Country's priority diseases like AWD, AFP polio), malaria, RF, typhoid fever, Epidemic fever and measles? Yes / No

4. If yes, **Obs** [1 to n priority diseases] is the standard case definition for each Priority disease_____

5. Is the central level responsible for providing surveillance forms to the health facilities? Yes/No

6. ***If yes***, have you lacked appropriate surveillance forms at any time during the last 6 months? Yes / No

7. What are the reporting health facilities for the surveillance system?

a. Public health facilities b. NGO health facilities

c. Military health facilities d. Private health facilities

e. Others_____

8. Number of reports in the last 3 months compared to expected number

Weekly: ___/12 times the number of s

Immediately**:** -------/times the number of s

9. Number of weekly reports received on time: ____/12 times the number of s

10. Was there any report of the immediately reportable diseases in the past 1 month? Yes/ No

11. If yes, with in what time is the report received after detection of the case/diseases? a. Less than 1 hour b. 2-24 hour c. 1- 2 days d. 3- 7 days e. After 1 week

12. How do you report to the next high level? a. Mail b. Fax C. telephone d. Radio e. Electronic f. Other

13. Does the sub City level describe data by person (case based, outbreaks, and sentinel)? Yes/No

If yes, (Obs) Observed description of data by age and sex

14. Describe data by place, time and person? Yes/No

15. Perform trend analysis? Yes/ No

If yes, Obs , line graph of cases by time and list disease(s) for which line graph is

16. Observed a._____ b._____ c._____ d._____ e._____

17. Do the sub City have an action threshold defined for Measles and typhoid fever ? Yes / No

18. Who is responsible for the analysis of the collected data? _____

19. How often do you analyze the collected data?

a. Daily b. Weekly c. Every 2 weeks d. Monthly e. Quarterly f. As needed

20. Do you have an appropriate denominators establish the threshold? Yes / No

21. **If yes, Obs** presence of demographic data (E.g. population by and hard to reach groups)

Outbreak Investigation

22. Is there any outbreak in the sub City in the last year? Yes/No

If yes, number of outbreaks investigated:_____

23. List of diseases:_____.

24. Number of outbreaks investigated and in which risk factors were looked for:___.

25. Number of outbreaks in which findings were used for action [Observe report] _____

26. Number of s that looked for risk factors [observe in reports]

27. Number of s that used the data for action [observe in final report] _____

Epidemic preparedness (relevant for epidemic prone diseases

28. Dose the sub City established epidemic management committee? Yes/No

29. Do you have plan for epidemic preparedness and response? Yes/No

If yes, Obs, a written plan of epidemic preparedness and response

30. Has the sub City had emergency stocks of drugs, vaccines, and supplies at all times in past 1 year? Yes/ No

31. Has the sub City experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? Yes/ No

32. Doses the standard case management protocol for malaria and measles exists in all health facilities? Yes/No

33. Is there a budget line for epidemic response? Yes / No

If **yes, Obs**. minutes (or report) of meetings of epidemic management committee

34. Does the sub City have a rapid response team for epidemic? Yes/No

Response to epidemics

35. Dose the epidemic responded within 48 hours of notification from sub City level? Yes/No

If yes, Obs (from written reports with trend and intervention)

Feedback

36. Dose a report is regularly produced to disseminate surveillance data from the sub City? Yes/No **If, yes Obs:** the presence of a report of **s**urveillance data

37. How many feedback reports has the sub City level produced in the last year?_____

Supervision

38. Did you conduct supervision last 6month? Yes/No

39. If yes, how many supervisory visits have you made in the last 6 months? ____

40. If no, what are reasons for not making all required supervisory visits?

(Text)_____

Training

41. Have you received any post-basic training in epidemic management? Yes/No

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

42. How many of your staffs trained in surveillance? _____

Resources

43. for data management

a) Computer & Printer Yes/No

b) Photocopier Yes/No

c) Data manager Yes/No

d) Statistical package Yes/No

44. Communications availability

a) Telephone service Yes/No b) Fax yes/No c) Radio call Yes/No d) Internet Yes/No

Surveillance

45. Is there a budget line for surveillance in at sub City? Yes/No

If yes, is it sufficient Yes/No

46. If No, what option did you use at sub City level? _____

How could surveillance be improved? _____

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

a._____

b._____

c. _____

Attributes and level of

a) Usefulness:

48. Total population under surveillance in the sub City _____

49. How many cases and deaths reported in the sub City last year? Typhoid fever cases _____Deaths _____

Measles cases _____Deaths _____

50. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early? Yes / No

b) To estimate the magnitude of morbidity, mortality and factors related to these diseases? Yes/ No

c) Permit assessment of the effect of prevention and control programs? Yes/ No

b) Simplicity:

51. Do you feel that additional data collected on a case are time consuming? Yes/No

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

c) Flexibility:

53. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

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

If yes, how?_____

d) Data Quality:

55. Are the data collection formats for these priority diseases clear and easy to fill for all the data? Collectors/ reporting sites? Yes/ No

56. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, **Obv:** Review the last months report of these diseases

57. Average number of ***unknown or blank responses*** to variables in each of the reported forms _____

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

e) Acceptability:

59. Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes/No

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

60. **If no**, what is the reason for their poor participation in the surveillance activity?

a) Lack of understanding of the relevance of the data to be collected

b) No feedback / or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities

c) Reporting formats are difficult to understand

d) Report formats are time consuming e) If Others: _____.

f) Representativeness:

61. What is the health service coverage of the sub City ? _____%

62. Do you think, the populations under surveillance have good health seeking behavior for these diseases? Yes/ No

63. Who do you think is well represented by the surveillance data? Urban / rural

g) Timeliness:

64. What proportion of s reports in acceptable time? ----------%

h) Stability

65. Was the new BPR restructuring affected the procedures and activities of the surveillance of these diseases? Yes/No

66. Was there lack of resources that interrupt the surveillance system? Yes/No

Addis Ababa University, College of Health Sciences, School of Public Health, 2019

***Health office level (Intermediate Level) Questionnaire*_____**

Respondent_____

Date _____

Interviewer _____

General Information

1. Is there a national PHEM Guide line Or manual at this site? Yes/No

If yes, **Obs** national PHEM Guide line/manual:_____

2. Does the have the **capaCity** to transport specimens to a higher level lab? Yes/No

If No, Reason _____

3. Does the have guidelines Or SOP for specimen collection, handling and transportation to the next level? Yes / No

4. Have you lacked forms recommended for the country at any time during the last 6 months? Yes/ No

5. Number of reports received in the last 3 months compared to expected number

Weekly: _____ /12 times the number of health facilities

Immediately: _____/ times the number of health facilities

6. Number of weekly reports submitted on time: ____/12 times the number of health facilities (**On Monday)**

7. Number of immediately reports submitted on time: _____/3 times the number of health facilities (within **30minutes of events)**

8. How do you report Weekly or immediately to the next level?

a/ Mail b/Telephone c/ Fax d/Radio e/ Electronic f/ Other

9. How can reporting system be improved?

_____

10. Did you analysis PHEM data? Yes/No

a) If yes, Is data describe by person for any case based, outbreaks or sentinel? Yes/No

If yes, Obs description of data by age and sex

i) Is description of data by place (locality, village, work site etc)? Yes / No

If yes, Obs. description of data by Place

j) Is the description of data by time? Yes/ No

If yes, **Obs** observed description of data by time?

11. Is there a trend analysis for the following disease?

a) Typhoid Yes/ No

b) Measles Yes/No

If yes, **Obs**. line graph of cases by time

12. Do you have an action threshold for any of the country priority diseases? Yes/ No

If yes, what is it? _____cases _____% increase _____rate

(Obs for 2 priority diseases)_____

13. Did you have appropriate denominators? Yes/ No

If yes, Obs. demographic data at site (E.g. total population by village, <5 yrs,---)

14. Who is responsible for PHEM data analysis? _____ ___

15. How often do you analyze the PHEM data?

a. Daily b. Weekly c. Every 2 weeks

d. Monthly e. Quarterly f. As needed……..

Outbreak investigation

16. is there any Outbreak or suspected in the in the past year 6 months? Yes/No

If yes, number investigated_____ (Observe reports and take copies if possible)

Epidemic preparedness

17. Dose the epidemic preparedness plan? Yes/No

If, yes,(**Obs)** a written plan of epidemic preparedness and response.

18. Has the had emergency stocks of drugs and supplies at all times in past 1 year?

Yes/No **If yes, Obs,** Observed the stocks of drugs and supplies at time of assessment

19. Has the experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? Yes/ No

20. Is there a budget line or access of funds for epidemic response? Yes/ No

21. Does the have a rapid response team for epidemics? Yes/No

If yes, **Obs** Observed minutes (or report) of meetings of epidemic management

22. Did epidemic response team evaluate their preparedness and response activities during the past year? Yes/ No **If yes,** (observe written report to confirm)

Responses

23. Has the implemented prevention and control measures based on local data for at least one reportable disease or syndrome? Yes/No

24. Present of epidemic that responded by s within 48 hours of notification of most recently reported outbreak?_____

Feedback

25. How many feedback written reports has the produced in the last year? _____

Obs Observed the presence of a written report that is regularly produced to disseminate

Supervision

26. Did you supervise the health facilities in the last 6 month? Yes/No

If yes, how many times have you been supervised in the last 6 months?_____

(Obs supervision report)

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

(Text)

Reason 1_____

Reason 2_____

Reason 3_____

Training

28. Have you trained on PHEM disease surveillance? Yes/No

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

29. What percent of your staffs in the trained on PHEM/IDSR surveillance? ____%

Resources

30. Logistics Available

a) Bicycles Yes/No

b) Motor cycles Yes/No

c) Vehicles Yes/No

d) Stationery Yes/No)

e) Computer & Printer Yes/No

31. Communication available

a) Telephone service Yes/No

b) Fax Yes/No

c) Radio Yes/No

d) Computers that have modems Yes/No

32. Information education and communication materials

a) Posters Yes/No

b) Megaphone Yes/No

c) TV Screen Yes/No

d) Projector (Movie) Yes/No

33. Availability of hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

Surveillance

34. Is there a IDSR focal person in the epidemic management committee? Yes/ No

35. Are you satisfied with the current surveillance system? Yes /No ***If no***, why? _____.

Attributes

a) Usefulness

36. Total population of the under surveillance_____

37. How many cases and deaths reported in the from the following disease past 6 months?

a) Typhoid cases _____Deaths _____

b) Measles cases _____Deaths _____

38. 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**:

39. Do you feel that data collections on a case report form are time consuming? Yes/No

40. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) Flexibility:

41. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

42. 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:

43. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

44. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, **Obe:** Review the last months report of these diseases

45. Average number of ***unknown or blank responses*** to variables in each of the reported forms _____

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

e) Acceptability:

47. Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes/No **If yes**, how many are active participants (of the expected to)? _____

48. **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:

49. What is the health service coverage of the ? _____%

50. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes/ No

51. Who do you think is well represented by the surveillance data? Urban / rural

g) Timeliness:

52. What proportion of health facilities reports in acceptable time? ----------%

h) Stability:

53. Was there lack of resources that interrupt the surveillance system? Yes/No

If yes, how did you manage it?_____

54. What do you suggest to overcome such problems?_____.

Addis Ababa University, College of Health Sciences, School of Public Health, 2019

Health facility level Questionnaire (Hospital /Health center)

Identifier_____

Name of health facility_____

Type of health facility _____

Respondent_____

Date _____

Interviewer: _____

General Information

1. Is there PHEM national Guide line or manual at this site? Yes / No

If yes, Obs; for the existence **PHEM** national guide line or manual

2. Is there a clinical register in health facilities? Yes/ No

If yes, **Obs** the existence of a clinical register

3. Is there the health facilities correctly register cases during the previous 30 days Yes/No

If yes, **Obs**; the clinical register

Do you have a standard case definition for: (each priority disease?)

a) Measles Yes/No b) typhoid Yes/No

If yes, Obs the standard case definition for: (each priority disease)

4. Dose of health facilities use standardized case definitions for the country's priority diseases Yes/ No

If yes, Obs; the respondent correctly diagnosing one of the country's priority diseases using a standard case definition (Interview about of these)

5. Dose the health facilities have the capacity to collect the following specimens?

a) sputum Y N N/A b) Stool Y N N/A

c) Blood Y N N/A d) CSF Y N N/A

6. 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

7. Do you have the capaCity to handle sputum, stool, blood/serum and CSF until shipment at this facility? Yes No N/A

If yes, Obs the presence of status cold chain at health facility

8. Dose the health facility that has the capaCity to ship specimens to a higher level lab? Yes No N/A **If yes, Obs** presence of transport media for stool at health facility.

9. Have you lacked appropriate surveillance forms at any time during the last 6 months? Yes No N/A **If yes**, what the reason? _____

10. Observed that the last monthly report agreed with the register for 4 diseases (1 for each Targeted group [eradication; elimination; epidemic prone; major public health importance]

a. **Obs** Measles Yes No N/A b. **Obs** Malaria Yes No N/A

11. Number of reports in the last 3 months compared to expected number

Obs Weekly: _____ /12 times the number of health post sites

`Obs immediately: _____/--- times the number of health post sites

12. **on time (use national deadlines)**

Obs Number of weekly reports submitted on time:-_____ /12 times the number of sites

Obs Number of immediately reports submitted on time: ___/-- times the number of sites

13. How do you report?

a/Telephone b/ Fax c/ Mail d/ Radio e/ Electronic f/ Other

14. How can reporting be improved? Your suggestion_____

15. Describe data by person, place and time (outbreaks, sentinel) Yes No N/A

If yes, Obs data

16. Is there trend analysis Performed? Yes No N/A

If yes, Obs line graph of cases by time

17. 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)?

Typhoid cases ____ % increase

Measles cases____ % increase

18. Who is responsible for data analysis? _____

19. How often do you analyze the collected data?

a) Daily b) Weekly c) Every 2 weeks d) Monthly e) Quarterly f) As needed……..

20. Presence of demographic data at site (E.g. population <5 yr., population by village, total Population) Yes / No

Epidemic preparedness

21. Is there standard case management protocol for epidemic prone diseases at health facilities? Yes No N/A

If yes, Obs the existence of a written case management protocol for 1 epidemic prone disease

Epidemic response

22. 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

23. Have you received feedback report in the last year from higher level? Yes /No

If yes, how many feedback reports has the health facility received in the last year? ___

Obs; at least 1 report received

24. Have you conduct meeting with community in the last 6 month? Yes No N/A

If yes, how often? a) Weekly b) every two weeks c) monthly d) quarterly e) as needed

Supervision

25. Did you supervise health posts in the last 6months? Yes No N/A

26. 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

27. Did you get any supportive supervision from higher level in the last 6 months? Yes/ No N/A

If yes, Obs; supervision report or any evidence for appropriate review of surveillance

Training

28. Have you trained in disease surveillance and epidemic management? Yes No N/A

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

_____.

29. Number of Staffs trained in disease surveillance and epidemic management_____.

Resources

30. Logistics

a) Electricity Yes/No b) Bicycles Yes /No

c) Motor cycles Yes/No d) Vehicles Yes /No

31. for data management

a) Stationery Yes/No b) Calculator Yes/No

c) Computer Yes/No d) Software Yes/No e) Printer Yes/No

32. Communications available

a) Telephone service Yes/No b) Fax Yes/No c) Radio call Yes/No d) Computers Yes/No

33. Information education and communication materials

a) Posters Yes/No b) Megaphone Yes/No

c) TV Yes/No d) Other: Yes/No

34. Hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

35. List Personal Protection materials (PPE) available in health facility

_____ _____ _____

Attributes

a) Usefulness

36. Total population of the under surveillance_____

37. How many cases and deaths reported in the from the following disease past 6 month?

a) Typhoid cases _____Deaths _____

b) Measles cases _____Deaths _____

38. Does the surveillance system help?

d) To detect outbreaks of these selected priority diseases early? Yes / No

e) To estimate the magnitude of morbidity, mortality and factors related to these diseases? Yes/No

f) Permit assessment of the effect of prevention and control programs? Yes/ No

b) SimpliCity

39. Do you feel that data collections on a case report form are time consuming? Yes/No

40. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) Flexibility

41. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

42. 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

43. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

44. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, yes **Obe:** Review the last month's report of these diseases

45. Average number of ***unknown or blank responses*** to variables in each of the reported forms _____

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

e) Acceptability

47. Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes/No

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

48. **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

49. What is the health service coverage of the ? _____%

50. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes/ No

51. Who do you think is well represented by the surveillance data? Urban / rural

g) Timeliness

52. What proportion of health facilities reports in acceptable time? ----------%

h) Stability

53. Was there lack of resources that interrupt the surveillance system? Yes/No

If yes, how did you manage it?_____

54. What do you suggest to overcome such problems?_____

Laboratory Assessment Tool

General information

Name of the laboratory		
Address of the laboratory	***Telephone***_____ ***Fax***_____ ***e-mail***_____	

Level of the Laboratory :	Community Health Facility Regional National	
Affiliation of the Laboratory :	**Public**/Private/Academic/Religious Institution / NGO	
Building Facilities and utility services		
Is the laboratory in a free-standing building or part of larger structure?		
How many rooms with bench space are there in the laboratory Does the Laboratory have the following services available? Electricity/Running water		
Is there a back-up power source in case of power failure(E.g. emergency generator)?	Yes No	
If yes, what systems are protected?		
Refrigerators/freezers	Yes No	
Computers	Yes No	
Other(specify)	Yes No	
What types of communications systems are available?		
Post	Yes No	
Telephone	Yes No	
Fax	Yes No	
Satellite phone	Yes No	
E-mail (no. computers)	Yes No	
Internet (no. computer)	Yes No	
Laboratory staff		
1. Medical Laboratory Professionals		

Number a. MSc /MPH b. Bsc c. Dipoma		
2. Assistants (not doing tests)		
3. Clerical/Cleaner		
Has training been conducted for the laboratory staff on		
Malaria		
Other epidemic prone diseases (briefly describe)		
If yes when was the last training been conducted for your laboratory staff?		

Reagents & kits

Where you are getting your reagents?	From a commercial supplier
	From another laboratory
	Supplied by Regional/ sub City / / health center
Was there shortage of reagents in the last six month which are used for identifying diseases	Yes No
If Yes, What Are the most important reasons?	
What type of water is used for preparation of media and reagents?	
De ionized Distilled	Yes No
Distilled	Yes No
Tap water	Yes No

Tests performed at the laboratory

Disease	Specimen Type	Assay Performed	Yes	No	Number/ Month
Meningitis	***CSF***	a. Cell count b. Latex agglutination			

		c. Gram stain d. Culture e. Identification tests f. A-M susceptibility			
Acute watery diarrhea (cholera)	***Faeces***	Microscopy of wet preparation Culture-TCBS Culture-Alk. Peptone Sero typing			
Malaria	***Blood***	Thick/Thin film microscopy			
Measles	Serum Throat swab, conjunctivas swab	IgM by EIA Other serological test Virus isolation			
Yellow fever	Blood, postmortem liver	IgM Virus isolation			
suspect typhoid or brucellosis	Blood, faeces serum	Culture Identification tests A-M susceptibility Serological tests (Widal, rubella agglutinins)			
Hepatitis	Serum	Anti-HAV IgM Anti-HbsAg Anti-HCV IgM			
Viral hemorrhagic fevers (any)	Serum, other Tissue specimens	IgM Virus detection			

Specimen collection, labeling and handling

Do request forms contain **ALL** of the following patient information: Specimen source, date and time of collection, type of test requested?	Yes No
Are specimens that are received labeled with the patient's name and unique identifiers?	Yes No
Does the laboratory have a logbook/electronic record of all specimens sent for diagnostic testing?	Yes No
Are specimens discarded after testing, or are they stored?	Discarded Stored
Does you laboratory refer bacteriology isolates or serum samples to a reference laboratory?	
If yes, reason for referral (all)	
Confirmation	Yes No
Identification of unknown organism	Yes No
Test not performed on site	Yes No
Number of sample referred in the last six month?	
Types of transport media used (□ □all that apply)	
Trans-isolate	Yes No
Cary and Blair	Yes No
Viral transport medium	Yes No
Other (describe):	

Reporting procedures

Are records kept of the number and type of tests performed and results?	Yes No
Does the laboratory have a list of diseases that are supposed to be reported to the Ministry of Health?	Yes No
Does the lab staff know what diseases should be reported?	Yes No
Does the lab provide regular reports of patients with reportable diseases to any of the following Ministry of Health offices/institutions?	
Health Office	Yes No
Sub City Health Office	Ye No
Regional Health Office	Yes No
National / MOH level	Yes No

If reports are submitted, how frequently?		
Weekly	Yes	No
Monthly	Yes	No
Quarterly	Yes	No
Other	Yes	No
Quality control procedures and programs		
Does the laboratory use any system for internal quality control?	Yes	No

Annex 5 :Data collection tool for health profile assessment in Woreda 9 , Addis sub City Addis Ababa ,Ethiopia, 2018

1. Historical Aspects of the area (Culture & Truism office).

1.1. At a glance: where it is_____

1.2. The name (how& why) _____

1.3. How the was formed_____

1.4. Any other historical aspect_____

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

2.1. map_____

2.2. Location (distance and direction) _____ _____

2.3. Altitude _____

2.4. Annual rain fall (average)_____ Max_____Min_____

2.5. Annual temp (average)_____High _____Low_____

2.6. Climatic zones Highland_____% Midland _____% Lowland _____%

2.7. Accessibility to main roads_____

3. Administrative setup

3.1. Total no. of kebeles: Urban_____

3.2. boundaries North_____South_____East____ West___

4.1. Population: Total_____ urban_____

4.2. Male Popn _____Female Popn _____ sex ratio_____

4.3. < 1yrs_ , < 5 yrs____, < 15 years__, >64 years____Women 15-49 yrs of age_____.

1 Total population by s(each s pop)

S. No	Kebele	Sex		Total
		Male	Female	
1				
2				
3				
4				
5				
6				

7				
8				
9				
10				

4.5 Ethnic composition /language _____ _____

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

5.1. Main source of the economy_____

5.1.1. Land density _____

5.1.2. Cultivated _____

5.1.3. Farming _____

5.1.4. Grazing _____

5.1.5. Main crops _____, _____

5.1.6. Fertilizer utilization _____

5.2. House hold income source (average)

5.2.1. Agriculture_____ (No.)

5.2.2. Different business_____(No.)

5.2.3. Employee_____(No.)

5.2.4. Jobless _____(No.)

5.2.5. Average income per HH/year_____

6. Education and school Health

6.1. Distribution of Schools:

6.1.1. Primary (1-8) ____1st Cycle(1-4)_____ 2ndCycle (5-8)____

6.1.2. Secondary (9-10)_____

6.1.3. Preparatory schools (11-12)_____,

6.1.4. TVET/colleges_____

6.1.5. K.G _____

6.2. Educational status of the community

6.2.1. Total School Age Children (target)_____

6.2.2. Total Enrolment _____(_____%)

6.2.3. School dropout in 6 months or year 2009 _____

6.2.4. If there is school dropout ,why _____

6.2.5. Total educated people as a whole, _____ Male _____ Female _____

6.3. School health activities:

6.3.1. Water supply: schools with water supply_____

6.3.2. Toilets: schools with functional latrines (Male& Female)_____

6.3.3. Schools with HIV/other Health clubs_____

7. Facilities (Transport, Telecommunication, Power supply, Water supply…)

7.1. How many of the health centers have access to transportation_____(_____%) , Telecommunication_____(_____%) ,Electric power_____(_____%) , Water supply _____(_____%)

2. Health delivery system (Health Structure/organ gram)

2: Health Facility

Type	Number	Total No. of beds	Gov	private
Hospital				
Health center				
Private HFs (clinic /Dx.Lab/Drug				

8.2. Health institution to pop ratio:

8.3. Hospital: Pop _____. HC: Pop _____

8.4. Health service coverage by HC_____

3 : Human resource for health office (all type)

Type	No	Remark
Physician		
Health officer		
Nurses		
Lab		
Pharmacy		
Env. Health		
UHEWs		
Others		

Doctor: pop ratio_____, Nurse: pop ratio_____ UHEW: pop ratio_____

8.6. Top ten causes of morbidity and mortality:

	Adult	Pediatrics
1		

2		
3		
4		
5		
6		
7		
8		
9		
10		

5 : Top ten causes of admissions

	Adult	Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

6 : Top ten causes of deaths (mortality).

	Adult	Pediatrics
1		
2		
3		
4		
5		
6		
7		

8		
9		
10		

8.7. Vital Statistics and Health Indicators

8.7.1. Infant Mortality Rate (IMR) _____(total <1 yr deaths in 2009 yr_____)

8.7.2. Total live births_____

8.7.3. Total still births_____

8.7.4. Total neonatal deaths_____

8.7.5. Child Mortality Rate_____(total <15 yr deaths in 2009 yr_____)

8.7.6. Crude Birth Rate_____

8.7.8. Crude Death Rate_____ (total deaths 2009 yr____)

8.7.9. Maternal Mortality Rate_____(total maternal deaths in 2009_____)

8.7.10. Contraceptive Prevalence rate_____

8.7.11. Contraceptive acceptance rate _____

8.7.12. ANC rate (how many of the total expected pregnancies attended 1st ANC) _____

8.7.13. ANC rate (how many of the total expected pregnancies attended 4th ANC) _____

8.7.14. Percentage of deliveries attended by skilled birth attendants_____

8.7.15. Percentage of deliveries attended by UHEWs_____

9. Immunization Coverage (for children):

9.1. BCG _____

9.2. OPV-0 _____OPV -1 _____ OPV-3 _____

9.3. Penta-1_____ Penta-3 _____

9.4. PCV -1 _____PCV -3 _____

9.5 Rota 1_____Rota 2_____

9.6. Measles _____

9.7. Fully immunized_____

9.8. PW TT2+ _____, NPW TT2+ _____

10. Health budget allocation:

10.1. Government

10.1.1. Total budget allocated for the _____

10.1.2. Total budget allocated for health _____ (____ %)

10.2. Funds from NGO

10.2.1. Total _____ (purpose/programs)_____

11. Disaster situation in the

11.1. Was there any disaster (natural or man-made) in the in the last one year?_____

11.2. Any recent disease outbreak/other public health emergency_____

11.3. If yes, cases_____ and deaths_____

12. Community Health Services:

12.1. Status of services provided by community health workers namely

12.1.1. Responsibility of UHEWs_____

12.1.2. Others_____

12.2. Status of Primary Health Care Components – with focus on the eight PHC elements

12.2.1. MCH (Delivery, ANC, PNC) _____

12.2.2. FP (Methods)_____

12.2.3. EPI (outreach service, cold chain, vaccine)_____

12.3. Environmental Health, Sanitation Hygiene . (WASH)

12.3.1. Latrine coverage_____(____%) & utilization rate_____(_____%)

12.3.2. Total safe water supply coverage_____ (_____%

12.3.3. Safe water supply coverage by kebele with its popn _____

12.3.4. Main source of water supply _____

12.3.5. Others_____

12.4. Health education_____

13. Endemic diseases; (in No & % for all questions)

13.1. Malaria:

13.1.1. Total malarious kebeles_____

13.1.2. Pop at risk_____

13.1.3. ITNs coverage (including current distn) _____

13.1.4. Is there IRS this year (No of kebeles) _____

13.1.5. If yes, No of kebeles undertaking IRS_____

13.1.6. Popn covered _____

13.1.7. HHs covered_____

13.1.8. Total malaria cases/yr_____ Deaths/yr_____,

13.1.9. <5yr cases_____ deaths_____

13.1.10. Malaria supplies (Coartem, RDT, etc) shortage _____(month)

13.1.11. If, Other issues_____

13.2. TB/Leprosy:

13.2.1. Total TB cases (all forms)_____

13.2.2. PTB Positive_____

13.2.3. PTB negative _____

13.2.4. Extra PTB _____

13.2.5. TB detection rate _____

13.2.6. TB Rx completion rate _____

13.2.7. TB cure rate _____

13.2.8. TB Rx success rate _____

13.2.9. TB defaulter_____

13.2.10. TB Death Rate _____

13.2.11. Total TB patients screened for HIV_____

13.2.12. Total Leprosy cases_____ on Rx_____

13.3. HIV/AIDS:

13.3.1. Total people screened for

HIV (last one year)_____

13.3.2. VCT_____

13.3.3. PITC_____

13.3.4. PMTCT_____

13.3.5. HIV prevalence (Positivity rate ___

13.3.6. HIV Incidence (new cases/yr)___

13.3.7. Total PLHIV_____

13.3.8. On Pre-ART _____

13.3.9. On ART_____

13.3.10. Other HIV prevention activities__

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

13.5. Total OTP sites_____,

13.6. Total admissions to OTP/yr_____

13.7. Total SC sites,_____

13.8. Newly opened/yr_____

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

13.5. Total OTP sites_____,

13.6. Total admissions to OTP/yr_____

13.7. Total SC sites,_____

13.8. Newly opened/yr_____

13.9. Total admissions to SC/yr_____

13.10. Is there TSF (Targeted Supplementary Feeding) program in the ? ____

13.11. If yes children in the program, _____ (No & %)

13.12. CBN program_____

13.13. If yes children in the program, _____ (No & %)

13.14. PSNP_____ other_____

13.15. If yes children in the program, _____ (No & %)

13.16. General food security condition_____

_____

13.17. Shortage of Essential drugs

_____

13.18. What do you think the major Health problem/s of the _____

_____

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

_____

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

1_____

2_____

3._____

4._____

Annex 6: Questionnaire Rapid disaster situation assessment:- Health and Nutrition Sector Region/Zone ,Ethio Somali Region ,2018

<table>
<tr><td colspan="3">Interviewer name _____</td><td colspan="3">Institution:_____</td></tr>
<tr><td colspan="3">Interview Date: (dd) ____/(mm)_____/2018_____</td><td colspan="3">Region:_____
Zone:_____</td></tr>
<tr><td>Main contact at this location:</td><td>Name:_____
____</td><td colspan="2">Position:_____
__</td><td>Tel:____
___</td></tr>
<tr><td colspan="5">SECTION I: SOCIO- DEMOGRAPHIC PROFILE</td></tr>
<tr><td rowspan="3">Population: Woreda total population</td><td>M:_____F:_____</td><td colspan="2">Under 5____</td><td>Total:__
_</td></tr>
<tr><td colspan="4">No. of women of reproductive age (age 15-49 yrs.) _____</td></tr>
<tr><td colspan="4">No. of pregnant women :_____</td></tr>
<tr><td>Special Population (if any)</td><td>Pastorals____</td><td>Refugees__
__</td><td>IDPs___
_</td><td>Migrant Workers
___</td></tr>
<tr><td colspan="5">Number of HCs_____Number of HPs_____Number of Mobile health and Nutrition teams _____
Number of HEWs_____</td></tr>
<tr><td>Water availability at health centers (HC)</td><td>No. of health centers
_____</td><td colspan="2">No. of HC with water access_____</td><td>No. of HC without water access_____
_____</td></tr>
<tr><td colspan="5">SECTION II: HEALTH PROFILE</td></tr>
<tr><td colspan="5">2.1. Coordination and management systems</td></tr>
<tr><td colspan="4">Is there a PHEM Officers at Regional level?
If yes how money_____</td><td>Yes□
No□</td></tr>
<tr><td colspan="4">Does the RHB/Zone Health Office regularly report PHEM report as scheduled dates?
Observe copies and comment _____</td><td>Yes□
No□</td></tr>
</table>

Are there PHEM Officers/focal persons at Woreda and HC levels? If yes how money are there in the Woreda level_____ If yes how money are there in the HC level_____	Yes□ No□
Do the Woredas, health facilities and HEWs regularly report PHEM report as scheduled dates? Observe copies and comment _____	Yes□ No□
Are all relevant government, NGOs and UN agencies represented at Regional PHEM?	Yes□ No□
Is there a multi sector health coordination forum? If yes how frequently meet? ----------	Yes□ No□
Is there a Public Health Emergency preparedness and response plan? Does it include reproductive health? Yes□ No□	Yes□ No□
Is there accessible emergency response fund for PHEM at regional level? If yes how much allocated----------	Yes□ No□
2.3. Mention anticipated epidemics (If yes please indicate Zone/Woreda at risk and risk population per anticipated risk: *(Use the back side)* _____,_____,_____ _____ 2.4. Public Health emergency Management	Yes□ No□
Is there a Public Health and Nutrition Emergency Preparedness and Response plan?	Yes□ No□
If yes, is the plan budgeted/ funded?	Yes□ No□
Is there a trained staff on PHEM basic level (Regional/Zonal/Woreda/HFs)	Yes□ No□
If yes specify number of trained personnel per level: Region/Total: Female _____Male_____, Zone: Female_____Male_____, Woreda: Female_____Male_____	Yes□ No□
there a Regional/zonal trained Rapid Response team (RRT)?	Yes□ No□
there a trained staff on Emergency nutrition management at all level? yes specify the no. : Total___ Male : ____Female :-___	Yes□ No□
2.5. Disease outbreaks	
Was there any outbreak in the last 3 months? YES_____ NO_____	
If yes, specify the type of disease Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____	
Type of outbreak _____Number of cases _____Deaths __(specify the time	

period)_____				
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____				
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____				
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____				
Is there any ongoing outbreak of any disease? YES_____ NO_____				
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____				
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____				
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____				
Drugs and medical supplies				
Description		Total requirement	Available	Gap
Vaccines	Meningitis vaccine			
Drugs	Coartem			
	Artesunate (rectal)			
	Artesunate (Inj)			
	Artemether IM			
	Quinine (PO)			
	Quinine (IV)			
	Chloroquine			
	Ceftriaxione			
	Oily CAF			
	Doxcycline			
	Ringer lactate			
	ORS			
	Vit A.			
Nutrition supplies	F100			
	F75			

	RUTF			
	Resomal			
	Routine antibiotics at SC/OTP (the list can be annexed)			
Laboratory supplies	RDT (Malaria)			
	Pastorex (Meningitis)			
	LP set			
	TI bottle			
Kits	CTC Kit (AWD)			
Medical supplies	Gloves,			
	Syringe			
	PPE			
RH medical supplies/drugs	Individual Clean Delivery Kits			
	Emergency medicines and supplies to support care of rape survivors? (Main shortage (if any): Specify)			
SECTION III: RISK FACTORS				
Diseases	Risk factors for epidemics to occur			Yes No
Malaria	Malaria endemic area			Yes□ No□
	Presence of malaria breeding site			Yes□ No□
	Interrupted or potentially interrupting rivers			Yes□ No□
	Unprotected irrigation in the area			Yes□ No□

	LLINs coverage <80 No_____%_____	
	Indicate the coverage of IRS 2010 No_____%_____	
	Was there any prevention and control activities	Yes□ No□
	Number of malarious kebeles and total population in these Kebeles	Keb_____ Pop_____
Meningitis	Was there Meningitis epidemic in the last 3 years (If yes specify date)	Yes□ No□
	Has vaccination been conducted in the past 3 years	Yes□ No□
	If yes : Indicate the date and number of people vaccinated Date_____ No_____	
AWD	Was there AWD epidemic in the last three years (If yes specify date)_____	
	Latrine coverage number and percentage. No_____%_____	
	Latrine utilization No_____%_____	
	Safe water coverage No_____%_____	
Measles	Is there ongoing measles outbreak	Yes□ No□
	What is the measles vaccination No and % coverage of 2010, less than one year No_____ Percentage of	

	coverage_____	
	Has SIA been conducted in 2010 EFY	Yes□ No□
	If yes, Indicate the month and number of children vaccinated including the age group Month---------- No----------Age group----------	

Any other observations you made on health emergencies or any risks of epidemics?

_____

What were the major challenges in your Epidemic response experience?

_____

SECTION IV: NUTRITION – SAM and MAM Management in Region/Zone January to June, 2018

SAM Management

4.1 Facilities with SAM management in Region/Zone

Month	Total No of hospitals	Total No of H.C	Total No of H. posts	No of SC.	Number of OTP.	Total No. of OTP/SC reported
January						
Febuerary						
March						
April						
May						
June						

4.2 Admission and performance of the therapeutic feeding program me for SAM management

Month	Total cases		% of SAM children		% of SAM children defaulted		% of SAM children Died		% of SAM children Non respondent		% of SAM children other	
	2008	2009	200	2009	2008	200	200	200	2008	200	200	2

	E.C	E.C	8E.C	E.C	E.C	9E.C	8E.C	9E.C	E.C	9E.C	8E.C	009E.C
January												
February												
March												
Month	2009 E.C	2010 E.C	2009E.C	2010 E.C	2009 E.C	2010E.C	2009E.C	2010E.C	2009 E.C	2010E.C	2009E.C	2010E.C
April												
May												
June												

4.3. Availability of therapeutic supplies

	Yes	No
Is there sufficient supplies for 3 months of :		
RUTF		
F100		
F75		
2nd line drugs		
Is there sufficient Woreda level storage for SAM treatment at Woreda level?		
Water availability at stabilization center (SC)		
Others		

4.4. Reporting

Is there weekly SAM report? yes _____ No_____ (if yes observe)

4.5. Training

How many HWs have been trained on SAM management in Region/Zone? _____,_____%

How many HEWs have been trained in SAM management? Number _____, _____%

MAM Management

4.6. TSFP programme in the Woreda

Questions	Yes	No
Is this a priority 1 Woreda?		
Was there a TSFP distribution last month?		
Is there sufficient TSFP supplies for the next 1 month (RUSF, CSB+/oil or CSB++) ?		
Is there Woreda level storage of TSFP supplies for at least 2 months of supplies?		
Are children discharged from OTP referred to TSFP		
Is this a pilot (2nd generation) TSFP Woreda?		
Has the Woreda been supported by an NGO in the last 3 months?		

4.7. MAM admission

Month	Priority 1 Woreda Y/N		Total MAM Cases		Total Number of Food Distribution point in the Woreda
	2008 E.C.	2009 E.C.	2008 E.C.	2009 E.C.	
January					
February					
March					
	2009 E.C.	2010 E.C.	2009 E.C.	2010 E.C.	
April					
May					
June					

4.8. Screening

4.8.1. When was the last screening conducted in the Woreda? _____

4.8.2. What screening modality is used in the Woredas? EOS _____, CHD _____, Routine_____

4.8.3. Vitamin A coverage _____ De-worming coverage _____

4.9. Screening performance for children in the Woreda

Month	Target Children 6-59 months	#of screened children	Screening Coverage (%	# of Children with no edema and MUAC <11 cm			# of children with no edema and MUAC 11 to 11.9CM	% Proxy GAM for children	% Proxy SAM for children
				#SAM			#MAM		
				MUAC <11 cm	edema	Total			
January 2009E.C									
February 2009E.C									
Marc2009E.C									
April2010E.C									
May2010 E.C									
June 2010E.C									

4.10. Screening performance for Pregnant and lactating Women (PLW) in the Woreda

Month	Target PLW	# of screened PLW	Screening Coverage (%)	# of PLW MUAC below 23.0 cm*	% Proxy GAM for PLW
January 2010 E.C					
February2010 E.C					
March2010 E.C					

April2010 E.C					
May2010 E.C					
Jun2010 E.C					

4.11 Any other observations you made or any risks of emergency nutrition?

_____

4.12 What were the major challenges in your emergency nutrition response experience?_____

SECTION V: FLOODING

1. Was there flood disaster in the last 6 months in the Region /Zone? Yes□ No□

1.1.If yes, How many Woredas affected _____,

1.2.Mention the names of Woredas affected with flood_____,_____,

_____,_____,_____,_____,

1.3.If yes, No of population affected_____

1.4.Human Death due to flooding_____ Yes□ No□,

1.4.1 If yes how many in number_____

1.5.Are there displaced people due to flooding? Yes□ No□

1.5.1 If Yes , how many_____ PLW _____

1.5.2 Children <5 yrs_____<2 yrs) _____<6months_____6-23months_____

Was there outbreak in the flood affected area Yes□ No□

If yes , Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Any comment

_____

Addis Ababa University, College of Health Sciences, School of Public Health, 2019

Annex 7: Questionnaire for the assessment of latrine coverage, utilization and factors associated with latrine utilization in Woreda Nine of Addis ketema sub city ,Addis Ababa , Ethiopia, 2019.

No	Questions	Possible responses
Socio Demographic Factors		
001	Sex the responder?	1.Male 2. Female
002	Age of the responder?	_____
003	Responsibility of the responder in house?	1. House hold head 2. House wife 3. Son/daughter 4. Relative 99. other specify
004	Marital status of the responder?	1.Single 2. Married 3. Divorced 4. Widowed 5. Separated 99. Others
005	How many family members do you have?	_____
006	What is your religion?	1.Orthodox 2. Muslim 3. Protestant 99. Others/specify__
007	What is your ethnicity	
008	What is your educational level(interviewee)? If the interviewee is mother or father skip Q005 of	
009	What is the educational level of the house hold head (father)?	1.Illiterate 2.Able read and write 3.Primary 4. secondary and above

010	What is the educational level of the household head (mother)?	1.Illiterate 2.Able read and write 3.Primary 4. secondary and above
011	What is your children level of education? (write the numbers of children in the space provided)	1.Illiterate ___ 2.Able read and write___ 3. primary(grade1-8)____ 4.Secondary & above___
012	Who is the head of the family?	1.Husband2.Wife 99.Other/specify__
013	What is the occupation of the father?	1.Farmer 2.Dailylaborer3. Merchant 99.Other/specify _____
014	What is the occupation of the mother?	1.Housewife 2.Farmer 3. Merchant 4. Daily laborer
015	Marital status of the house owner?	1.Married 2. Widowed 3.Unmarried 4. Separated 5.Divorced
016	Did any of the household member graduated or participated on Model Family training?	1.Yes 2. No
017	If yes for Q16 who?	1.Husband 2. Housewife 3. other specify
018	If yes for Q16 when?	specify the time (month & year)_____
019	If yes for Q16 did take the refreshment training?	1.Yes 2. No
020	If yes for Q19 When was that?	specify the time (month &

		year)_____
021	Is there CC session in this area?	1. Yes 2. No 3. I d
022	If yes for Q#021 did your family member participate?	
Economic Indicator		
101	Do you have domestic animals?	
102	Which one of the following do you have? And how much?	1.Cattle___ 4. Donkey___ 2.Goat ___ 5. Hen ___ 3.Sheep___ 99. Other /specify__
103	Monthly income/ yearly (in cash)	_____
104	Do you have other source of income?	Specify in birr
Excreta disposal system		
201	What type of latrine do you have?	1.Pit latrine 2. VIP latrine 99. others/specify
202	How many years since latrine is constructed	Specify in month/ year____/____
		1.Advice from health workers
		2.Self-initiation
203	What are your reasons to construct latrines?	3.Seeing others
		4.Imposition from others
		99.Others/specify___
204	Is the latrine functional?	1.Yes 2. No
	What is the status of supper structure?	1.Good 2. Fair 3. Bad
205	Generally What is the status of latrine?	1.Maintained 2.NeedMaintenance
206	If the answer for Q#205 is #2 then Which parts of the latrine need maintenance?	1.Superstructure 2. Slab 3. Roof 4. pit 99. others/specify
207	Do you have water well in the compound?	1.Yes 2. No
208	Where is the location of latrine from well (if only well is available)? (observation)	1.Downward 2. on the same level 3.Uphill

209	How far is the distance between latrine and well? (in meters) (observation)	1.<15 2. 15-30 3.>30
210	What is the condition of latrine superstructure (observation)?	2. Only with wood 3. Wood plastered with mud **99. Others/ specify**
211	Is the slab sealed with mud or cemented (observation)?	1. yes 2.No
212	Is the latrine drop-hole covered (observation)?	1. yes 2.No
213	Are there any excreta smears or urine in the pan, on the floor or in the surroundings?	1. yes 2.No
214	Are there visible signs of flies in or around the latrine?	1. yes 2.No
215	Does the latrine have hand washing facilities?	1. yes 2.No
216	If yes for Q214 is there water in the hand washing facility? (observation)	1. yes 2.No
	If yes for Q215 is there soap or ash for hand washing? (observation)	
218	How close are hand-washing facilities to the latrine (Observation)?	1. next to the latrine 3. inside the house 2. Within walking distance 4.No facilities
219	How far is the distance between the latrine and the house?	
220	In which direction is constructed the latrine from the house? (observe)	1.At the back of the house 2. In front of the house 3.Next to the house 99. Other specify

	How often is the latrine cleaned?	1. Once a day 2. Once a week 3. Monthly 4.Never 99. Other specify
Utilization of latrines by family members above 5 years old		
	Does everyone in your family use the latrine?	1. Yes 2. No
301	If not for Q#301 then Who use the latrine?	1 .Males only 2.Females only 3. All family members
	If users are males or females only, why?	1 .Both sexes do not share 2.Males can go for open defecation 3.Males stay out for work 4. No reason 99.Others/specify
303	How frequently is the latrine used?	1 .Rarely 2.Mostly 3.Always
304	If latrine is used always, why?	1 .Excreta are dangerous to health 2.Convenient/privacy 3.No other place to defecate 99. Others /specify____
305	If latrine is used rarely, why?	1. No superstructure 2. Bad smell 3. Open field is convenient 4. Stay out for work 99. Other/specify____
306	Does the track to the latrine indicate its being used or uncovered with grass (observation)?	1. yes 2.No
307	Is there fresh faeces seen through the latrine squat hole (observation)?	1. yes 2.No

308	Are there observable faeces in the compound?	1. yes 2.No
Utilization of latrines by under 5 children		
401	Do you have under 5 children in the house?	1. Yes 2. No Age group M F
402	If the answer in Q 401 is yes, how many?	1 .0-5 months __ __ 2.6-11 months __ __ 3. 12-23 months __ __ 4.24-35 months __ __ 5..36-47 months __ __ 6.48-59 months __ __
403	Do <5 children use latrine?	1. Yes 2. No
404	At what age do children start using latrine?	Specify in years_____
405	What are the reasons for not using the latrine by <5 children?	1 .Floor not safe to stand on 2.Large squat hole 3.Latrine not clean 4.Unreasonable bad smell 99. Others/specify
	Where do you dispose faeces of children who do not start using latrines?	1.Left in the house 2.Disposal in the compound 3.Disposal outside the compound4.Pit latrine disposal 99. Others/specify
Water supply		
701	What is the main source of water for the household?	1.Protected well /spring 2.Unprotected well/spring 3.River water 4.Rain water 5.Protected and unprotected
702	How much minutes are needed to collect water(to go back and forth)?	1.<15 2. 15-30

		3. 30 and more
	What is the volume of the container used to fetch water?	1. <5 liters 4. 16-20 liters 2. 5-10 liters 5. >20 liters 3.11-15 liters
	How frequent do you fetch water each day for the family?	1.Once 3. Three times 2. Twice 4. >3 times
	How much water is consumed per day on average for the family?	In pots or 20liters jerrican__

Hand washing practices		
901	When do you wash your hand?	1 .After defecation 2. After cleaning children 3.Before handling food 4.Before feeding children (including breast feeding) 99. other/specify____
902	What do you usually use during hand washing especially after defecation bottom, before feeding children and before handling food?	1 .Only water 2.With soap 3. With ash 99. Others/specify____
Community Sanitation		
1001	Are you keeping domestic animals with you in the same house?(observation)	1.Yes 2. No
1002	If the answer of Q1001 is no, how far from the house (in meters)?(observation)	1.<10 2. 10 and above
1004	Where do you dispose house hold/solid wastes?	1.Open field 2. Burning 3. Dumping 4.composting 99.Other/specify_

1005	Are there observable faeces in the neighborhood yard (observation)?	1.Yes 2. No
Knowledge, Attitude and Practice		
2001	Do you know that human excreta can createhealth problem on human health?	1.Yes 2. No
2002	If yes for Q2001 what kind of diseases?	1.Diarrheal Disease 2.Chronic Diseases 99. other specify
	If yes for Q#2001 where did you get the information?	1.HEWs 2. Students in the house 3.Neighbor 4. Radio/ TV 5. During MF/CC session 99. Other specify ____
2003	Who do you think can use latrine?	1.All the family member 2. Male 3. Female 4.Adult 99. others specify
2004	If not all for Q2003 why?	
2005	Do you think latrine utilization can reduce diarrheal disease?	1.Yes 2. No 3. I don't know
Infrastructure		
3001	Is there health facility in this area?	1.Yes 2. No
3002	If yes, how far from the house?	Specify in KM_____
3003	Is the HEWs visits you?	1.Yes 2. No
3004	If yes, how frequently in the month?	1.Once 2. Twice 3. Three times 4.Four and more 99.Other specify
3005	Is there primary/ secondary school in the area?	1.Yes 2. No
3006	If yes, how far from the house?	Specify in KM_____