

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



**Ethiopia Field Epidemiology and Laboratory Training
Program (EFELTP)**

Compiled Body of Works in Field Epidemiology

By

Fisseha Walle Tsegaw

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

**May 2017
Addis Ababa, Ethiopia**

Addis Ababa University

College of Health Sciences

School of Public Health

Ethiopia Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

By

Fisseha Walle Tsegaw

Submitted to the School of Graduate Studies of Addis Ababa University in

Partial Fulfillment for the Degree of Master of Public Health in Field

Epidemiology

Advisors

- 1. Professor Alemayehu Worku**
- 2. Mrs. Mastewal Worku**

May 2017

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY

School of Graduate Studies

Compiled Body of Works in Field Epidemiology

By

Fisseha Walle Tsegaw

Ethiopia Field Epidemiology Training Programme (EFETP)

School of Public Health, College of Health Sciences

Addis Ababa University

Approved by Examining Board

Chairman, School Graduate Committee

Advisor

Examiner

Examiner

Acknowledgements

First and foremost my deep thank goes to my respected mentors Professor Alemayehu Worku and Mrs. Mastewal Worku for their devotion of time on critically reviewing the output, genuine and helpful recommendations throughout all activities to complete this body of work.

I would like to thank my field supervisor Mr. Teklehaymanot Gebrehiwot for administrative arrangements and supervision during my residency time.

I want to express my heart full appreciation to Dr. Adamu Addissie and Abigiya Wondimagegnehu Addis Ababa university Ethiopia Field Epidemiology Training Program academic coordinators, Mr. Abdulnasir Abagero resident advisor and Dr. Tatek Bogale Anbessie country program director for their unreserved technical and administrative support, advice and motivation in achieving this body of work.

My gratitude also goes to Addis Ababa University School of Public Health, CDC, EPHA Ministry of Health and Amhara Regional Health Bureau for their financial, technical and logistic support to conduct all over the activities.

I am also extremely grateful appreciation to zonal health departments, district health offices and health facilities that were participated during investigations and assessments for their kind assistance and guidance.

The last but not the least, I would like to express my gratitude to co-investigators Mr. Sisay Awoke and Mr. Misganaw Ayalew and also other regional health bureau PHEM department staffs that made very useful contributions by advice and assist during the residency time.

Table of Contents

| | |
|---|------|
| Acknowledgements | i |
| List of Tables | iv |
| List of Figures | v |
| List of Annexes | viii |
| List of Acronyms/Abbreviations..... | ix |
| Executive Summary | xiii |
| CHAPTER I: OUTBREAK/EPIDEMIC INVESTIGATIONS | 1 |
| 1.1. Influenza like Illness Outbreak Investigation in Jawi district, Awi zone, North West Ethiopia, 2016 | 1 |
| 1.2. Acute Watery Diarrhea Outbreak Investigation in Minjar Shenkora district North Shoa zone, Amhara region, Ethiopia, 2016..... | 21 |
| CHAPTER II: SURVEILLANCE DATA ANALYSIS | 45 |
| 2.1. Malaria magnitude and trend analysis from 2011/2012 to 2014/2015 in South Gondar zone, North West Ethiopia, 2016 | 45 |
| CHAPTER III: EVALUATION OF SURVEILLANCE SYSTEM | 60 |
| 3.1. Evaluation of Public Health Surveillance System in West Gojjam Zone North West Ethiopia, 2016 | 60 |
| CHAPTER IV: DESCRIPTION OF HEALTH PROFILE..... | 85 |
| 4.1. Description of Health Profile Report in Ebinat District South Gondar Zone North West Ethiopia, 2016 | 85 |
| CHAPTER V: SCIENTIFIC MANUSCRIPTS FOR PEER REVIEWED JOURNALS | 105 |
| 5.1. Influenza like Illness Outbreak Investigation in Jawi District, Awi Zone, North West Ethiopia, 2016 | 105 |
| CHAPTER VI: ABSTRACTS FOR SCIENTIFIC PRESENTATION..... | 118 |
| 6.1. Acute Watery Diarrhea Outbreak Investigation in Minjar Shenkora District North Shoa Zone, Amhara Regional State, Ethiopia, 2016..... | 118 |

| | |
|--|-----|
| 6.2. Malaria Magnitude and Trend Analysis from 2011/2012 to 2014/2015 in South Gondar Zone, North West Ethiopia, 2016..... | 120 |
| CHAPTER VII: NARRATIVE SUMMARY OF DISASTER SITUATION VISITED | 121 |
| 7.1. Narrative Summary of Disaster Situation in Wagihemra and North Wollo Zones, Amhara Region, Ethiopia, 2016..... | 121 |
| CHAPTER VIII: PROTOCOL/PROPOSAL FOR EPIDEMIOLOGIC RESEARCH PROJECT | 148 |
| 8.1. Prevalence of Acute Malnutrition (Wasting) and Associated Factors Among Children Age 6-59 Months in Ziquala District, Wagihemra Zone, Amhara Region, Ethiopia, 2017 | 148 |
| CHAPTER IX: OTHER ADDITIONAL OUTPUT REPORTS | 166 |
| 9.1. Situational update of Acute Watery Diarrhea (AWD)..... | 166 |
| 9.2. Supportive supervision on acute watery diarrhea | 167 |
| 9.3. Tachi Armachiho 's team supervision briefing report | 173 |
| 9.4. Coordinating & supporting scabies mass drug administration campaigns in Ebinat district, South Gondar zone, North-West Ethiopia, 2016..... | 175 |
| 9.5. Weekly Epidemiological Bulletin provided to the zones and EPHI | 178 |

List of Tables

| | |
|---|-----|
| Table 1: Influenza like illness cases distribution by age group in Jawi district, 2016 | 11 |
| Table 2: Influenza like illness clinical signs and symptoms frequency in Jawi district, 2016 | 13 |
| Table 3: Logistic regression analysis to identify factors associated with ILI in Jawi district, 2016 | 14 |
| Table 4:- Distribution of AWD cases by age group in Minjar Shenkora district, 2016 | 33 |
| Table 5: Binary logistic regression analysis to identify factors associated with AWD in Minjar Shenkora district, North Shoa zone North East Ethiopia, 2016 | 36 |
| Table 6: The relationship of IRS coverage and average estimated malaria prevalence rate in South Gondar Zone from 2011/2012 – 2014/2015. | 55 |
| Table 7: List of PHEM weekly and immediately reportable diseases and conditions | 72 |
| Table 8: Estimated population by sex and kebele in Ebinat district 2014/2015 | 89 |
| Table 9: Human resource in Ebinat district health office and health facilities 2014/2015 | 93 |
| Table 10: Top ten leading cause of morbidity at OPD visited in Ebinat district, 2014/2015 | 94 |
| Table 11: Maternal health service delivery in Ebinat district from 2012/2013 to 2014/2015 | 96 |
| Table 12: Influenza like illness cases distribution by age group in Jawi district, 2016 | 111 |
| Table 13: Logistic regression analysis to identify factors associated with ILI in Jawi district, 2016 | 112 |
| Table 14: Top five causes of morbidity by district, North Wollo zone, 2015/2016. | 128 |
| Table 15: Drugs and medical supplies required for six months North Wollo zone, 2017. | 130 |
| Table 16: Risk types and at risk population of upcoming six months in North Wollo zone North East Ethiopia 2017. | 134 |
| Table 17: Estimated beneficiaries and required finance of upcoming six months in North Wollo zone, 2017. | 135 |
| Table 18: Top 5 morbidities in the visited districts of Wagihemra zone, 2015/2016 | 139 |
| Table 19: Drugs and medical Supplies required for six months Wagihemra zone, 2017. | 140 |
| Table 20: Summary needs assessment for the Coming Six Months in Wagihemra zone, 2017. | 145 |
| Table 21: Meher assessment team members in Wagihemra and North Wollo zones, 2016 | 147 |
| Table 22: List of institutions visited in Wagihemra and North Wollo zones, 2016. | 147 |
| Table 23: Budget break down for the study on prevalence and associated factors of acute malnutrition among 6- 59 months children in Ziquala district, 2017 | 162 |

List of Figures

| | |
|---|----|
| Figure 1: Map of Amhara region and Awi zone to indicate Jawi district, 2016 G.C | 7 |
| Figure 2: Influenza like illness outbreak epi-curve by date of onset in Jawi district, 2016..... | 12 |
| Figure 3: Map of Cherecha and Eranbuti kebeles found in Minjar Shenkora district, North Shoa zone, North-East Ethiopia, 2016 | 27 |
| Figure 4: The principal investigator interviewed a man who was control in the selected kebele M/Shenkora district, North-East Ethiopia, 2016..... | 29 |
| Figure 5:- AWD outbreak epi-curve by date of onset in Minjar Shenkora district, 2016. | 33 |
| Figure 6:- Distribution of cases by drinking water source in Minjar Shenkora District, 2016. | 34 |
| Figure 7: Environmental investigation of drinking water source in M/Shenkora district, 2016 .. | 35 |
| Figure 8: Health education was given to street food vendors by principal investigator in AWD affected village in M/Shenkora district, 2016. | 35 |
| Figure 9: Water treatment demonstration was given to the community at household level in Eranbuti kebele, M/Shenkora district, North-East Ethiopia, 2016 G.C..... | 40 |
| Figure 10: Location of South Gondar zone found in Amhara region, Ethiopia, 2016. | 49 |
| Figure 11: Trend of malaria cases proportion from total OPD in South Gondar zone from 2011/2012 – 2014/2015 GC..... | 51 |
| Figure 12: Trend of annual malaria prevalence rate in South Gondar zone from 2011/2012 – 2014/2015 GC..... | 52 |
| Figure 13: Trend of annual test positivity rate and plasmodium species in South Gondar zone from 2011/2012 – 2014/2015..... | 52 |
| Figure 14: Trend of death and inpatient malaria cases rate in South Gondar zone from 2011/2012 – 2014/2015..... | 53 |
| Figure 15: Trend of clinical cases in South Gondar zone from 2011/2012 – 2014/2015..... | 53 |
| Figure 16: Age specific malaria attack rate in South Gondar zone from 2011/2012 – 2014/2015. | 54 |
| Figure 17: Malaria stratification by district based on average annual parasite incidence rate in South Gondar Zone from 2011/2012 – 2014/2015. | 54 |
| Figure 18: Relationship of LLINs coverage and annual malaria prevalence rate by years in South Gondar zone 2011/2012 – 2014/2015..... | 55 |

| | |
|--|-----|
| Figure 19: The relationship between report completeness and trend of malaria prevalence rate in South Gondar zone from 2011/2012 – 2014/2015GC. | 56 |
| Figure 20: Map of the study areas in West Gojjam zone, North-West Ethiopia, 2016. | 65 |
| Figure 21: Distribution of malaria cases by time, in West Gojjam zone, 2015/2016. | 70 |
| Figure 22: Distribution of pandemic influenza cases by week in West Gojjam zone, North-West Ethiopia, 2016. | 71 |
| Figure 23: Diagram illustrating the formal and informal flow of surveillance data and information throughout a health system. | 74 |
| Figure 24: Trend of weekly report timeliness rate by WHO week in West Gojjam zone, 2015/2016. | 79 |
| Figure 25: Weekly timeliness report rate in visited districts, West Gojjam zone, 2015/2016. | 79 |
| Figure 26: Location of Ebinat district in South Gondar zone, Amhara region, 2016. | 87 |
| Figure 27: National Health Care Delivery Tier System in Ethiopia, 2016. | 92 |
| Figure 28: Ebinat health office structure, South Gondar zone North West Ethiopia, 2014/2015. | 92 |
| Figure 29: Vaccination coverage in Ebinat district, 2014/2015. | 95 |
| Figure 30: Trend of malaria cases in the last four years in Ebinat District, 2011/2012-2014/2015. | 97 |
| Figure 31: Influenza like illness outbreak epi-curve by date of onset in Jawi District, 2016. | 111 |
| Figure 32: Map of Amhara region to indicate the assessed districts, North East Ethiopia, 2016. | 125 |
| Figure 33: Comparing trends of 2015 and 2016 G.C. malaria cases with the same months of visited districts, North Wollo zone, 2016. | 129 |
| Figure 34: Comparing trends 2015 and 2016 TFP admission and performance of under-five years SAM management in North Wollo zone, 2016. | 132 |
| Figure 35: Screening performance of the last six months for 6-59 month children in North Wollo zone, 2016. | 133 |
| Figure 36: Screening performance of PLW in North Wollo zone May to October 2016. | 134 |
| Figure 37: Comparing trends of 2015 and 2016 GC malaria cases with the same month of visited districts, Wagihemra zone North-east Ethiopia. | 138 |
| Figure 38: Comparing trends 2015 and 2016 TFP admission and performance of under-five years SAM management in Wagihemra zone. | 142 |

| | |
|---|-----|
| Figure 39: Trend of MAM admission in TSFP in the last four months (July to October), in Wagihemra zone, North-East Ethiopia, 2016. | 143 |
| Figure 40: Screening performance of the last six months for 6-59 month children in Wagihemra zone, North-East Ethiopia, 2016. | 144 |
| Figure 41: Screening performance of PLW in Wagihemra zone May to October 2016. | 144 |
| Figure 42: Conceptual framework on prevalence and associated factors of acute malnutrition among children aged 6-59 months in Ziquala district, North East Ethiopia summarized from literature review, 2017. | 153 |
| Figure 43: Map of Wagihemra zone to indicate Ziquala district, Northwest Ethiopia, 2017. | 155 |
| Figure 44 Gantt chart showing the work plans on the prevalence of acute malnutrition and associated factors among children age 6-59 months in Ziquala district, Northwest Ethiopia, 2017 | 162 |
| Figure 45: AWD cases epi-curve by date of onset in South Gondar zone from 8 /12/2008 to 14/01/2009 EFY. | 168 |
| Figure 46: AWD cases distribution by age and sex in South Gondar zone from 8 /12/2008 to 14/01/2009 EFY. | 168 |
| Figure 47: Spot map of AWD cases distribution by district from 8/12/2008 to 14/01/2009 EFF. | 169 |
| Figure 48: Water source of AWD cases in South Gondar zone, 2016. | 169 |
| Figure 49: Source of AWD infection in Aember village Fogera district 2016. | 172 |
| Figure 50: Cholera treatment center in Aember health center, Fogera district 2016. | 172 |
| Figure 51: Assessment of community awareness and hygiene sanitation condition in Fogera district, 2016. | 173 |

List of Annexes

| | |
|--|-----|
| Annex 1: Influenza like illness outbreak investigation questionnaire | 179 |
| Annex 2: AWD outbreak investigation questionnaire and informed consent form..... | 182 |
| Annex 3 : Data Collection Tools for Health Profile of Ebinat Woreda/District 2014/2015 (2007EFY) | 228 |
| Annex 4: Rapid Meher assessment 2016 - Health and Nutrition Sector: Region/Zone level Questionnaire | 238 |
| Annex 5: EPIDEMIOLOGIC RESEARCH PROJECT Consent form..... | 269 |
| Annex 6: Epidemiologic Research Project Questionnaire | 269 |
| Annex 7: Declaration | 274 |

List of Acronyms/Abbreviations

| | |
|----------------|--|
| AAU | Addis Ababa University |
| AFENET | African Field Epidemiology Network |
| AFI | Acute Febrile Illness |
| AFRO | WHO Regional Office for Africa |
| AIDS | Acquired Immunodeficiency Syndrome |
| ANC | Antenatal Care |
| AOR | Adjusted Odds Ratio |
| API | Annual Parasite Incidence |
| ART | Anti-Retroviral Treatment |
| AWD | Acute Watery Diarrhea |
| BF | Blood Film |
| BCG | Bacille Calmette-Guerin (vaccine) |
| BMI | Body Mass Index |
| CDC | Centers for Disease Control and Prevention |
| CFR | Case Fatality Rate |
| CI | Confidence Interval |
| COR | Crude Odds Ratio |
| CTC | Cholera Treatment Center |
| CTC kit | Cholera Treatment Center Kit |
| DPPBs | Disaster Prevention and Preparedness Bureaus |
| DRMFSS | Disaster Risk Management and Food Security Sector |
| EC | Ethiopian Calendar |
| EDHS | Ethiopia Demographic and Health Survey |
| EFY | Ethiopian Fiscal Year |
| eHMIS | Electronics Health Management Information System |
| EMDHS | Ethiopia Mini Demographic Health Survey |
| EMIS | Ethiopia Malaria Indicator Survey |
| EPHA | Ethiopian Public Health Association |

| | |
|------------------|---|
| EPHI | Ethiopian Public Health Institute |
| EPRP | Epidemic Preparedness and Response Plan |
| ETB | Ethiopian Birr |
| FMOH | Federal Ministry of Health |
| FP | Family Planning |
| GAM | Global Acute Malnutrition |
| GC | Gregorian Calendar |
| GTP | Growth and Transformation Plan |
| H1N1/H3N2 | Hemagglutinin Neuraminidase |
| HCS | Health Centers |
| HCT | HIV Counseling and Testing |
| HDF | Home Delivery Free |
| HEWs | Health Extension Workers |
| HIV | Human Immunodeficiency Virus |
| HPs | Health Posts |
| HWs | Health Workers |
| ICT | Information Communication Technology |
| IDSR | Integrated Disease Surveillance and Response |
| IgM | Immunoglobulin M |
| ILI | Influenza Like Illness |
| IPD | Inpatient Department |
| IRS | Indoor Residual Spray |
| IRT | Integrated Refresher Training |
| LLINs | Long Lasting Insecticide Nets |
| MAM | Moderate Acute Malnutrition |
| MDG | Millennium Development Goals |
| MOH | Ministry of Health |
| MSF | Medicines Sans Frontiers |
| MUAC | Mid Upper Arm Circumference |

| | |
|---------------|--|
| NCHS | National Centre for Health Statistics of USA (Anthropometric Standards) |
| NGOs | Non-Governmental Organizations |
| ODF | Open Defecation Free |
| OPD | Outpatient Department |
| OR | Odds Ratio |
| OTP | Outpatient Therapeutic Program |
| PF | Plasmodium Falciparum |
| PHEM | Public Health Emergency Management |
| PLHIV | People Living with HIV |
| PLW | Pregnant and Lactating Women |
| PMTCT | Prevention Mother to Child Transmission |
| PNC | Postnatal Care |
| TPR | Test Positivity Rate |
| PV | Plasmodium Vivax |
| PVP | Predictive Value Positive |
| RDT | Rapid Diagnostic Test |
| RHB | Regional Health Bureau |
| RR | Relative Risk |
| RRT | Rapid Response Team |
| RT-PCR | Reverse Transcription-Polymerase Chain Reaction |
| RUSF | Ready to Use Supplementary Food |
| RUTF | Ready to Use Therapeutic Food |
| SAM | Sever Acute Malnutrition |
| SC | Stabilization Center |
| SD | Standard Deviation |
| SFP | Supplementary Feeding Program |
| SIA | Supplementary Immunization Activity |
| SPH | School of Public Health |
| SPR | Slide Positivity Rate |

| | |
|-----------------|--|
| SPSS | Statistical Package for Social Sciences |
| STI | Sexually Transmitted Infection |
| TB | Tuberculosis |
| TEPHINET | Training Programs in Epidemiology and Public Health Interventions Network |
| TFP | Therapeutic Feeding Program |
| TFU | Therapeutic Feeding Unit |
| TSFP | Target Supplementary Feeding Program |
| TT | Tetanus Toxoid |
| UN | United Nation |
| VCT | Voluntary Counseling and Testing |
| Vit A | Vitamin A |
| WASH | Water Sanitation and Hygiene |
| WHO | World Health Organization |
| WHZ | Weight-for-Height Z-Score |
| ZHDs | Zonal Health Departments |

Executive Summary

This compiled body of work (BoW) accomplished through the two years' time in field epidemiology training program in Addis Ababa university- School of public health. It has nine chapters which were completed during the residency time of the program. These are the following: outbreak investigations, surveillance data analysis, surveillance system evaluation, description of health profile report, writing of scientific manuscript for peer review journal, abstracts submitted in scientific conferences for presentation, writing protocol/proposal of epidemiologic research project, a summary of disaster situation, and other additional outputs.

Chapter One: We have produced two outbreak investigations: influenza like illness in Jawi district Awi zone North West Ethiopia, 2016, and acute watery diarrhea in Minjar Shenkora district North Shoa zone, Amhara region, Ethiopia, 2016. These investigations used to take appropriate measures to control and prevent the outbreaks in the respective districts.

Chapter Two: Malaria magnitude and trend analysis carried out in South Gondar zone from 2011/2012 through 2014/2015 G.C. On the basis of the finding, we provided recommendation and identified gaps for further improvement of malaria surveillance activities.

Chapter Three: We conducted surveillance system evaluation on malaria, measles and pandemic influenza diseases which have the major public health important in West Gojjam zone North West Ethiopia. The aim of the study was to evaluate effectiveness and efficiency of the system.

Chapter Four: We conducted description of health profile in Ebinat district 2014/2015 to summarize and produced base line information to support decision making in the district.

Chapter Five: We developed scientific manuscript for peer reviewed journals on influenza like illness outbreak investigation for publication.

Chapter Six: We prepared abstracts for scientific presentations on the malaria data analysis and acute watery diarrhea outbreak investigation for different annual conference; we presented influenza like illness outbreak investigation abstract at Ethiopian Medical Association (EMA) annual conference on 29 April 2017 at Millennium Hall.

Chapter Seven: We assessed disaster situations coordinated with disaster prevention and preparedness bureaus in Wagihemra and North Wollo zones, Amhara region, Ethiopia, 2016.

The aim of the study was to assess public health emergency situations, preparedness, need assistance and provide evidence based recommendation to ensure appropriate and effective humanitarian planning and responses that will alleviate morbidity and mortality of vulnerable groups.

Chapter Eight: I proposed epidemiologic research project to identify prevalence and factors associated with acute malnutrition among children age 6-59 months in Ziquala district, Wagihemra zone, Amhara region, Ethiopia, 2016. The main reason of this proposal was substantial increased prevalence of acute malnutrition in the study area and government concern.

Chapter nine comprise other outputs and training conducted on acute watery diarrhea, malaria annual micro planning, and scabies disease for capacity building to prepare and response public health practices.

Generally, since the program's philosophy is learning by doing; numerous activities were carried out at the field base which greatly contributes to strengthen the public health emergency management capacity through training, conducting diseases surveillance and emergency planning, preparedness and response activities.

CHAPTER I: OUTBREAK/EPIDEMIC INVESTIGATIONS

1.1. Influenza like Illness Outbreak Investigation in Jawi district, Awi zone, North West Ethiopia, 2016

Fisseha Walle, Alemayehu Worku, Mastewal Worku, Misganaw Ayalew

Abstract

Background: Influenza and influenza-like-illness (ILI) is the most contagious respiratory diseases having substantial public health problem. It is associated with higher morbidity and mortality during outbreak, especially among the elderly and children. The aim of the study was to identify existence of outbreak, etiologic agent, magnitude, associated factors with ILI to contain the outbreak.

Methods and materials: We conducted unmatched case-control study in Jawi district from 29 February through 10 March 2016 G.C. We enrolled 28 cases and 112 controls. We conducted face to face interview using structured questionnaire. Data were entered and analyzed using Epi-Info and SPSS. We performed binary logistic regression analysis to explore predictors of ILI.

Results: From 29 February through 10 March 2016, we identified 28 cases (attack rate, 20.55/100,000) and no death. From total cases, 4(14.29%) confirmed and 8 (28.6%) admitted cases were reported. Female cases were 67.9%. Majority affected age groups were <5 and ≥ 65 years with attack rates of 37.95 and 25.23 per 100,000 risk populations respectively. In multi variable analysis [AOR (95% CI)]: being female [3.76(1.23, 11.52)], family size ≥5 [4.56(1.24, 16.79)], having contact history with suspected ILI [5.57(1.64, 18.89)], living in ventilated house [0.14(0.04, 0.42)], and having knowledge to ILI [0.1(0.01, 0.91)] were associated factors.

Conclusion and recommendation: Most of the cases were females and under five children. Being female, living in large family size and having contact history with ILI were statistically significant risk factors; whereas living in ventilated house and having knowledge to ILI were protective factors. Health education should be continued to successfully contain the outbreak. The community should improve the ventilation status and room space of the house.

Key words: Influenza like illness, associated factors, Jawi district, Ethiopia.

Introduction

Background

Influenza is a contagious respiratory illness caused by the influenza virus. There are three types of influenza viruses: A, B, and C. Influenza type A viruses can infect people, birds, pigs, horses, seals, whales, and other animals; wild birds are the natural hosts for these viruses. Influenza A viruses are divided into subtypes based on two proteins on the surface of the virus. Only some influenza A subtypes (i.e. H1N1 and H3N2) are currently in general circulation among people, but other subtypes are found most commonly in other animal species. Influenza B viruses are normally found only in humans. Although influenza B viruses can cause human epidemics, they have not caused pandemics. Influenza type C viruses cause mild illness in humans and are not thought to cause epidemics (1).

Common clinical symptoms of influenza include fever, cough, sore throat, headache, muscle aches, nasal congestion, and weakness. These symptoms can be nonspecific and do not easily distinguish influenza from other respiratory viral syndromes, but any person with acute respiratory infection with fever $\geq 38^{\circ}\text{C}$, and cough or sore throat and onset within the last 10 days is the standard case definition of influenza like illness (2). Most of the current surveillance systems for influenza are targeted on influenza like illness (ILI) in clinical settings with the aim of detecting influenza epidemics and to issue timely alerts (3). While the outbreak control measures for many respiratory diseases are similar; it can be helpful to know the etiology of the outbreak in order to apply disease specific control measures (4).

Influenza viruses are spread from person to person by respiratory droplets generated when an infected person coughs, sneezes, or talks in close proximity to an uninfected person and by contact. Most healthy adults who are ill with influenza may be able to infect other people beginning 1 day before symptoms develop and up to 5 to 7 days after becoming sick. Influenza usually comes on suddenly, 1 to 4 days after the virus enters the body (1).

Influenza viruses are a major source of morbidity and mortality worldwide. The World Health Organization (WHO) estimates that influenza results in 3-5 million episodes severe illness with estimated annual influenza associated mortality between 500,000 and 1,000,000 cases (median case fatality of 190 deaths per 100,000 person infected with influenza (2, 5).

Influenza disease is responsible for an estimated 28,000–111,500 deaths annually among children aged <5 years, with 99% of these deaths occurring in developing countries. In Africa, respiratory infections rank among the leading causes of morbidity and mortality, however, information on the disease burden of influenza is lacking (6). Since 2006, substantial progress has been made to improve surveillance of influenza in Africa. The number of countries conducting surveillance, the number of sentinel sites, and the number of specimens tested have increased sharply, which has allowed for better understanding of seasonal influenza and the recent pandemic (5).

In April 2009, the novel influenza A (H1N1) pdm09 virus emerged in Mexico and then spread rapidly throughout the world. Influenza is generally a self-limiting infection with systemic and respiratory symptoms that usually resolve after 3–6 days. Most persons infected with the 2009 influenza A(H1N1)pdm09 virus experienced uncomplicated illness with full recovery within 1 week, even without medical treatment; severe progressive disease developed in only a small subset of patients. Primary viral pneumonia was the most common finding in severe cases, but secondary bacterial infections played a role in ≈30% of fatal cases (7).

In late 2008, Ethiopia launched a sentinel surveillance program for influenza as part of pandemic preparedness efforts. The first 2 cases of pandemic influenza A virus subtype H1N1 were detected in Ethiopia in June 2009 and involved individuals who recently returned from travel to the United States, creating a sudden increase in demand for testing; however, the most frequently identified virus during this period was seasonal influenza A virus subtype H3N2 (6).

Influenza like illness is one of the priority diseases that are immediately reportable in the Public Health Emergency Managements system in Ethiopia.

On 29 February 2016, Amhara regional health bureau Public Health Emergency Management (PHEM) unit received ILI report from Awi zonal health department through the routine immediately surveillance report. From 29 February through 10 March 2016, investigation team conducted a case-control study in Jawi district, Awi zone. The aim of the study was to identify the existence of outbreak, etiologic agent, the magnitude of outbreak, risk factors associated with ILI, to guide disease prevention and control strategies and resource targeting for the outbreak response.

Literature review

Each year, influenza causes a substantial burden of illness. Even in a non-pandemic year, influenza is estimated to cause 250,000 to 500,000 deaths worldwide. In some years, the burden can be much higher. Serological studies estimated that in the second wave of the 2009 pandemic, in the United Kingdom (UK) per risk groups, 49% of under-five year olds, 59% of 5-14 year olds, 35% of 15-24 year olds, and 25% of ≥ 25 year olds were infected (8).

Influenza surveillance in 15 countries in Africa from 2006 through 2010 showed that, influenza is a major cause of respiratory illness in Africa, especially in children. Ethiopia is one of the 15 countries that conducted at least 1 complete year of surveillance for ILI from 2006 through 2010 G.C. In Africa, of the 69,860 ILI cases tested, 15,165 (21.7%) were positive for influenza (ranging from 6.7% in Angola to 40.4% in Madagascar). The proportion was highest in the aged 10–14 years (34%) and lowest in aged >65 years (17%) (5).

Mortality and transmissibility patterns of the 1957 influenza pandemic in Maricopa county study showed excess mortality rates varied between waves, age groups, and causes of death, but overall remained low. From October 1959 through June 1960, the most severe wave of the pandemic, the absolute excess mortality rate based on respiratory deaths was 16.59 per 10,000 populations in the elderly (≥ 65 years). All other age groups exhibit very low mortality and the typical U-shaped age pattern was absent (9).

In South Africa, 2014 communicable diseases surveillance bulletin revealed that during 2014, 1585 patients with ILI were enrolled at the two clinics and 1558 (98%) upper respiratory samples were tested. The overall detection rate for influenza was 13% (n=202). Excluding non-subtyped samples, 80% (156/195) were influenza A (H3N2), 15% (30/195) were influenza B and 5% (9/195) were influenza A (H1N1) pdm09. Regarding age group distribution, 0-4=33%, 5-14=14%, 15-24= 11%, 25-44= 27%, 45-64= 11% and $\geq 65=2%$ (10).

Washington state influenza update 2017, during week 3, of the 1,771 specimens tested, 440 (28.8%) were positive for influenza; 2 influenza A (2009 H1N1), 145 influenza A (H3N2), 273 influenza A (not subtyped) and 20 influenza B (11).

In 2014, online community cohort surveys using Flu survey conducted in United Kingdom to identify incidence and risk factors for ILI; multi variable logistic regression showed that; being female, unvaccinated, having underlying health issues, having contact with children, being aged 35- 64, and being a smoker were associated with the highest risk of reporting an ILI (8).

A case-control study conducted for various factors associated with manifestation of influenza like illness among school children in Kasugai City, Western Japan showed that, increased risks were observed for easily-inflamed tonsils (OR = 3.0, 95% CI: 1.7-5.4), and larger family size (1.9, 1.1-3.4), whereas decreased risks: higher school grades (0.4, 0.2-0.9), and larger room space per capita (0.4, 0.2-0.9). For severe ILI, there were increased risks: easily-inflamed tonsils (3.8, 1.8-8.1), and history of asthma (2.9, 1.2-6.7), whereas decreased risks, higher grades (0.2, 0.1-0.6), frequent intake of milk (0.3, 0.1-0.6), and having vaccination history (0.3, 0.1-0.8) (12).

A prospective cohort study was done in Nicaragua, 2005-2007 to determine prevalence and Seasonality of ILI in children revealed; family size ≥ 5 persons per room was risk factor with RR of (1.18, 1.04–1.34) compared with households with < 3 persons per room, whereas having a literate mother was protective against ILI with RR (0.79, 0.64-0.98) (13). Exposure to persons with ILI is a known risk factor for infection as human to human transmission occurs readily with influenza viruses (14)

A prospective cohort study in Victoria, Australia showed that households provide for the close interaction among members of varying age groups within a confined space provided excellent opportunity for transmission of influenza and other respiratory viruses (15).

Cross-sectional study in Djibouti city residents revealed that the final multi variable model, working environment, occupation and wealth index (SES) were significant risk predictors of A (H1N1) pdm09 infection. With the exception of occupation students (AOR 2.2, $p = 0.0075$), the two others, working in open air space and belonging to low SES class were protective against the risk of infection (16).

Ethiopia conducted routine influenza sentinel surveillance from 2008–2010; 59 patients evaluated at 5 sentinel health facilities in Addis Ababa met case definitions for influenza-like illness. Of 59 tested, 7(11.9%) were positive for influenza. Proportion of age distribution were

<5 years (0%), 5-14 (42.8%), and 15-64 (57.2%). Compared with children aged <5 years, older children and adults (age range, 5–64 years) were more likely to have influenza (6).

Rationale of the study

Influenza is very contagious disease easily passed from person-to-person. All four pandemics were caused by different types of influenza viruses that had been introduced to humans from animals. Due to this reason any new flu viruses that might be able to infect humans and cause high levels of illness or death. Even if the virus is not particularly lethal, high number of people off sick from work or school can have serious effects on the economy. Once an outbreak of ILI/Influenza disease is notified to public health; a risk assessment should be undertaken to verify the extent and seriousness of the outbreak. To minimize their impact, it is essential that outbreaks are investigated properly so that appropriate and adequate control measures can be initiated in a timely manner.

Objectives

General Objective

- To investigate influenza like illness outbreak in Jawi district, Awi zone, North-West Ethiopia, February, 2016.

Specific objectives

- To verify the existence of outbreak, in Jawi district, 2016
- To identify the etiologic agent of the disease in Jawi district, 2016
- To describe the outbreak pattern by place person and time in Jawi district, 2016
- To identify the associated factors of the outbreak in Jawi district, 2016
- To implement control and prevention measures to contain outbreak in Jawi district, 2016

Methods and Materials

Study Setting/area: The study was conducted in Jawi district. The district is located 250 KM from Bahir Dar and 670 KM from the capital city of Addis Ababa in the North-West Ethiopia direction. The district is found in Awi zone. Administratively the district is divided in to 27 kebeles with an estimated population size 136,228; 72,201 (53%) were males based on 2007 census projection. The actual population might be much bigger than the projection due to new inhabitants in Jawi Sugar Corporation and daily laborers. The district health care coverage is 91.7% health centers and 95.4% health posts.

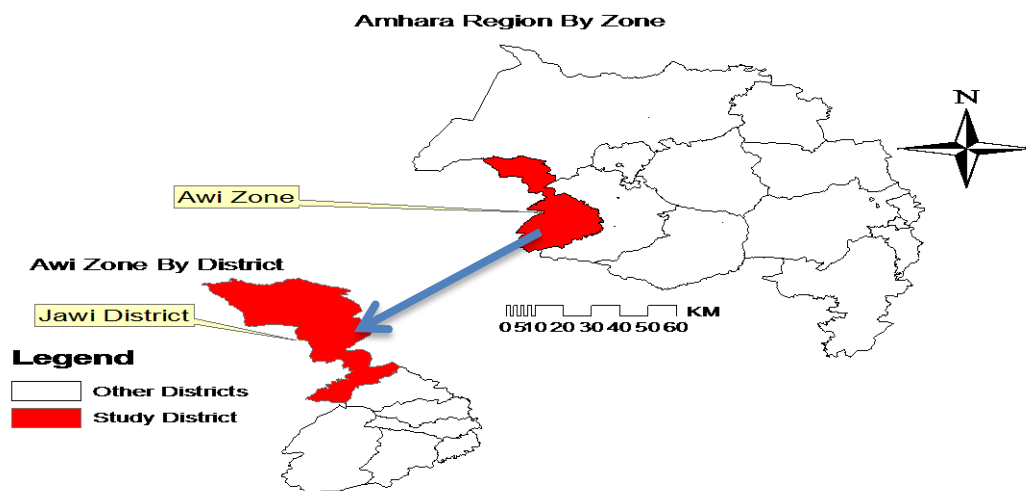


Figure 1: Map of Amhara region and Awi zone to indicate Jawi district, 2016 G.C

Study design and period: We conducted a 1:4 unmatched case-control study from 29 February through 10 March 2016.

Target population: All population who are lived in Jawi district, in 2016

Study population: Cases: Any resident of Jawi district who met the WHO case definition of influenza like illness during the study period.

Controls: Any resident of Jawi district who lived in the affected kebeles, and did not develop signs and symptoms of influenza like illness during the study period.

Inclusion criteria

Cases: Any resident of Jawi district who met the WHO case definition of influenza like illness during the study period and accepted to participate.

Controls: Any resident of Jawi district who lived in the affected kebeles; and did not develop signs and symptoms of influenza like illness during the study period and accepted to participate.

Exclusion criteria

Cases: Those cases that are unconscious and refused to participate in the study.

Controls: Those controls that refused to participate were excluded as well as more than one eligible family member from the same house hold.

Sample size determination: All case-patients enrolled in the study due to small number of cases. We used significant increase in terms of precision or statistical power assumption. Selecting more than 1 control per case improve the statistical power of the study and precision, though including more than 4 controls per case is generally considered to be no more efficient. Thus, we used 1:4 case control ratios, and computed a total sample size was 28 cases and 112 controls (140 study subjects).

Sampling procedure: We selected all cases in the affected district using line list. Controls were selected using simple random sampling method at each affected kebele based on case control proportion on the sampling frame of community health information system family folder at

health post level. If more than one eligible lived in the selected household, one control was selected by the lottery method.

Data collection method: A structured questionnaire was adapted from previous outputs and used to collect data. The questionnaire was initially prepared in English and translated into the local language (Amharic) by fluent speakers of both languages to maintain its consistency. The questionnaire had different parts including demographic, clinical, exposure and knowledge information. We used face to face interview to collect data. We conducted the same procedures to collect data for exposure of cases and controls.

Variable of the study

Dependent variable

Influenza like illness

Independent variables

Socio demographic characteristics: age, sex, marital status, educational status, occupation, and family size

Potential risk factors: contact history to ILI, travel history to ILI outbreak areas, house ventilation status, hand washing, and knowledge about influenza like illness

Operational definition

Case definition: Influenza like illnesses (ILI): Any individual with fever, cough, sore throat, shortness of breath, difficulty of breathing, and chest pain and/or has history of contact during the 7 days prior to the onset of symptoms with sick or dead birds, including chickens (17).

Case classification (18): Possible case: Any person meeting the clinical criteria (ILI)

Probable case: Any person meeting the clinical criteria (ILI) and an epidemiological link

Confirmed case: Any person meeting the clinical (ILI) and positive results in a national influenza laboratory

Well ventilated house: Window openness 5 per week and room space

Hand washing: Hand washing after physical contact between an infected and susceptible person, or by indirect contact with contaminated with virus-containing fomites on environmental surfaces.

Knowledge is persons who know mode of transmission and prevention methods.

Marital status: Single means any widow, divorce and unmarried person

Data processing and management: We produced data entry format template using EPI-INFO version 7. Data were coded and entered in to EPI-INFO version 7 and cleaned, then exported to SPSS version 20 and analyzed.

Data quality control: Data were collected only by principal investigator and co-investigator after discussion of the objectives, methods, tool and ethics of the study conducted. Regular meetings were held between the principal investigator and co-investigator together to identify faced problem during data collection and discussed to make correction. Questionnaires were checked for completeness and consistency daily.

Statistical analysis: We performed binary logistic regression analysis to identify associated factors; we used chi-square or a Fisher's exact test, and 95% confidence interval for statistical tests. Odds ratios at 95% confidence interval were used to see the significance of the study and the strength of association between study variables. Bivariate analysis was done to explore the crude association between different predictor variables and ILI. To control possible confounding factors, and to identify independent factors associated with ILI, multi variable analysis was performed for those variables with p value ≤ 0.25 in the bivariate analysis. Model goodness of fit was assessed by the Hosmer-Lemeshow test. In multi variable analysis, we used a p value ≤ 0.05 and 95% of CI not including 1 to declare the presence of statistically significant association.

Ethical considerations/ Protecting human subjects: Permission letter was obtained from Amhara regional health bureau and from Awi zone health department to Jawi district health office. We introduced ourselves and explained the purpose of the study using specific statements in a standard procedure. Verbal consent was obtained from participants or from their parents to participate in the study. Confidentiality was assured and no personal details was recorded or produced on this documentation.

Dissemination of the results: The results of the study were submitted to school of Public Health Addis Ababa University and the respective district, zonal and regional health bureau and other stakeholders those who need to know and working with together.

Results of the study

Descriptive epidemiology

From 29 February through 10 March 2016, we identified a total of 28 cases (4 confirmed and 24 epidemiologically linked). Overall attack rate was 20.55 per 100,000 risk populations.

Laboratory investigation: From ten ILI patients throat swab specimens were collected. Specimens were stored and shipped to national influenza laboratory in viral transport media (VTM) at 2-8C⁰, and tested by RT-PCR for influenza viruses. Four out of ten (40%) were positive for influenza A type. Regarding subtypes, 3 (75%) were pandemic influenza A (H1N1)2009, and 1 (25%) was not subtyped.

Case distribution by place: Among 27 kebeles, only 4 were affected. Attack rates per 100,000 risk populations were 7.19 in Addis Woyin, 0.46 in Argabo, 0.72 in Filfil, and 0.58 in Dek.

Case distribution by person: Cases and controls median age was 22 years (range 8 month-68 years) and 32 years (range 1-74 years) respectively. Female cases were 19 (67.9%) with attack rate of 29.67 per 100,000 risk populations. Less than five years were slightly more affected than the others (attack rate was 37.95 per 100,000 risk populations) and followed by aged ≥ 65 years was 25.23 per 100,000 risk populations (see table 1). Of 28 cases, 8 (28.6%) were admitted and no death reported.

Table 1: Influenza like illness cases distribution by age group in Jawi district, 2016

| Age Group | Population At risk | Case frequency | Cumulative frequency | Relative frequency (%) | Cumulative relative frequency (%) | Age specific attack rate/100,000 |
|-----------|--------------------|----------------|----------------------|------------------------|-----------------------------------|----------------------------------|
| <5 | 18,445 | 7 | 7 | 25.00 | 25.00 | 37.95 |
| 5-14 | 41,100 | 4 | 11 | 14.29 | 39.29 | 9.73 |
| 15-64 | 72,719 | 16 | 27 | 57.14 | 96.43 | 22.00 |
| ≥ 65 | 3,964 | 1 | 28 | 3.57 | 100.00 | 25.23 |
| Total | 136,228 | 28 | - | 100.00 | - | 20.55 |

Case distribution by time: We observed a triple peak in different times during the outbreak showed that propagated source of transmission. The duration of outbreak starting from 29 February to ended March-08 with in short period of time.

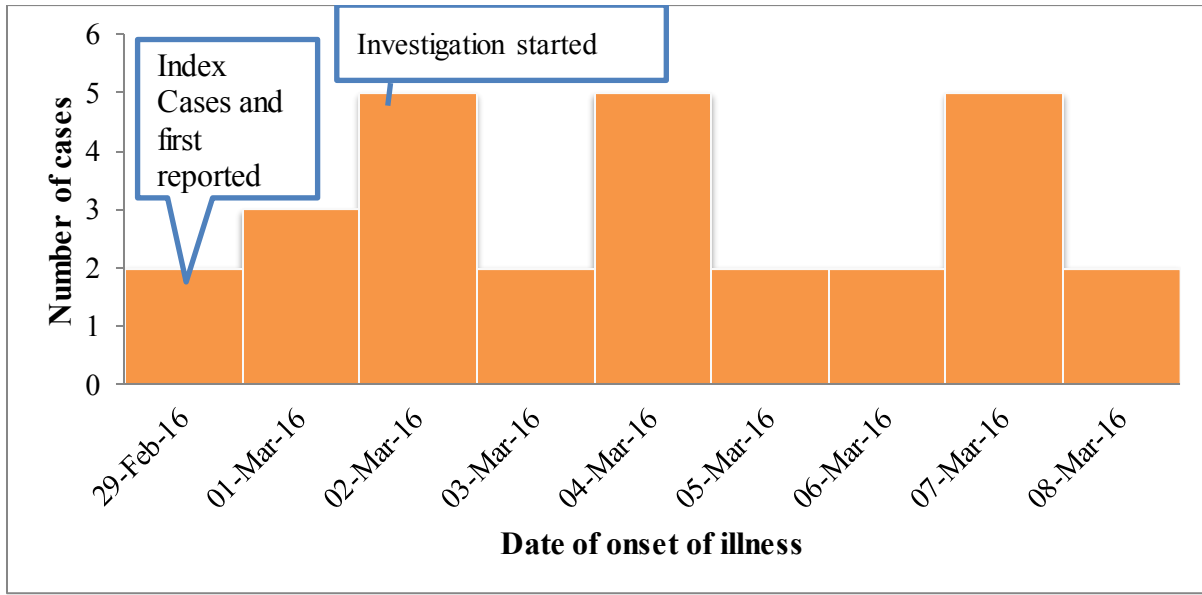


Figure 2: Influenza like illness outbreak epi-curve by date of onset in Jawi district, 2016

Clinical characteristics of influenza like illness: The major manifestation of the signs and symptoms during the outbreak was characterized by; high grade fever (100%), Cough (96.43%), headache (67.86%), sore throat (46.43%) (See table 2).

Table 2: Influenza like illness clinical signs and symptoms frequency in Jawi district, 2016

| Clinical signs and symptoms | Frequency | Relative frequency (%) |
|-----------------------------|-----------|------------------------|
| Fever | 28 | 100 |
| Cough | 27 | 96.43 |
| Sore throat | 13 | 46.43 |
| Headache | 19 | 67.86 |
| Sneezing | 15 | 53.57 |
| Joint pain | 7 | 25 |
| Chest pain | 8 | 28.57 |
| Shortness of breath | 8 | 28.57 |
| Vomiting | 7 | 25 |
| Diarrhea | 6 | 21.43 |
| Chills | 0 | 0 |

Analytic epidemiology

On this study, bivariate analysis showed that there was statistically significant association between ILI and sex, age group, family size, well ventilated house (Window openness >5 days per week and room space), having knowledge of influenza like illness, and having contact history with ILI cases. Present of sick person in the house not included in the analysis due to fear of collinearity between contact history and presence of sick person in the house.

In bivariate analysis sex, family size, age group, marital status, contact history, travel history, living in well ventilated house and having knowledge of influenza like illness showed P value \leq 0.25 entered to multi variable logistic regression model.

In multi variable analysis [AOR (95% CI)]: being female [3.76(1.23, 11.52)], family size \geq 5 [4.56(1.24, 16.79)], having contact history with ILI [5.57(1.64, 18.89)], living in ventilated house [0.14(0.04, 0.42)], and having knowledge of ILI [0.1(0.01, 0.91)] were statistically significant

factors. After adjusting for all variables the association of age group with influenza like illness failed to resist (see table 3).

Table 3: Logistic regression analysis to identify factors associated with ILI in Jawi district, 2016

| Variable | | Case status | | Bivariate analysis | | Multi variable analysis | |
|----------------|---------|-------------------------|-----------------------------|----------------------|---------|-------------------------|---------|
| | | Case n=28 (Col %) | Control n=112 (Col %) | COR (95% CI) | P-Value | AOR (95% CI) | P-Value |
| Sex | Female | 19 (67.86) | 44 (39.29) | 3.26 (1.36,7.86) | 0.008* | 3.76 (1.23,11.52) | 0.02** |
| | Male | 9 (32.14) | 68 (60.71) | Ref. | Ref. | Ref. | Ref. |
| Age group | <5 | 7 (25) | 8 (7.14) | 14 (1.46,134.25) | 0.02* | 0.95 (0.05,19.08) | 0.98 |
| | 5-14 | 4 (14.29) | 12 (10.71) | 5.33 (0.53,54.03) | 0.16 | 0.76 (0.03,17.4) | 0.86 |
| | 15-64 | 16 (57.1) | 76 (67.9) | 3.34 (0.42,27.26) | 0.26 | 0.99 (0.08,12.87) | 0.99 |
| | ≥65 | 1 (3.57) | 16 (14.29) | Ref. | Ref. | Ref. | Ref. |
| Family size | <3 | 6 (21.4) | 47 (42) | Ref. | Ref. | Ref. | Ref. |
| | 3-4 | 5 (17.9) | 35 (31.2) | 1.12 (0.32,3.97) | 0.86 | 0.89 (0.2,3.99) | 0.88 |
| | ≥5 | 17 (60.7) | 30 (26.8) | 4.44 (1.57,12.53) | 0.005* | 4.56 (1.24,16.79) | 0.02** |
| Marital status | Married | 16 (57.1) | 78 (69.6) | 0.58 (0.25,1.36) | 0.21 | 0.58 (0.18,1.91) | 0.37 |
| | Single | 12 (42.9) | 34 (30.4) | Ref. | Ref. | Ref. | Ref. |

| | | | | | | | |
|--------------------------------------|-----|-----------|-----------|---------------------|--------|----------------------|---------|
| Contact history | Yes | 13 (46.4) | 20 (17.9) | 3.99 (1.64,9.67) | 0.002* | 5.57 (1.64,18.89) | 0.006** |
| | No | 15 (53.6) | 92 (82.1) | Ref. | Ref. | Ref. | Ref. |
| Travel history to ILI outbreak areas | Yes | 8 (28.6) | 20 (17.9) | 1.84 (0.71,4.77) | 0.21 | 1.98 (0.5,7.78) | 0.33 |
| | No | 20 (71.4) | 92 (82.1) | Ref. | Ref. | Ref. | Ref. |
| Living in well ventilated house | Yes | 10 (35.7) | 89 (79.5) | 0.14 (0.06,0.35) | 0.01* | 0.14 (0.04,0.42) | 0.001** |
| | No | 18 (64.3) | 23 (20.5) | Ref. | Ref. | Ref. | Ref. |
| Hand washing after shaking | Yes | 0 (0) | 9 (8) | 0.0001 (0.00,-) | 0.99 | NA | NA |
| | No | 28 (100) | 103 (92) | Ref. | Ref. | NA | NA |
| Having knowledge to ILI | Yes | 1 (3.6) | 37 (33) | 0.08 (0.01,0.57) | 0.01* | 0.1 (0.01,0.91) | 0.04** |
| | No | 27 (96.4) | 75 (67) | Ref. | Ref. | Ref. | Ref. |

N.B ** = statistically significant association in multi variable analysis

*= Statistically significant association during bivariate analysis

Ref= Reference

NA= Not met criteria to enter final multi variable model or p value > 0.25 in bivariate analysis.

Action taken

After briefing with key stakeholders, the public health field team engaged in activating the district epidemic response task force to participate in active case detection and educating the community to control the epidemic.

- Throat swabs were taken from patients for confirmation of the outbreak
- Isolation of admitted cases in health facilities to prevent cross transmission
- Mobilizing Clinical management, investigation and social mobilization teams
- Managing of cases with supportive treatment and administering antibiotics if complication developed.
- Leaflets prepared for community awareness creation activities
- Technical guidance to strengthen the coordination mechanism to stakeholders (to involve sectors like education and communication)
- Epidemiologic investigation conducted including a case control study
- Distribution of infection prevention materials to patient and care providers (masks) and implementation of strike hand washing procedures
- Media briefing in different areas to create awareness about prevention mechanisms, strength surveillance and supportive care at home

Discussion

We identified a total of 28 ILI cases with attack rate of 20.55 per 100,000 risk population. Most of the cases were females; and under-five children with age specific attack rate of 37.95 per 100,000 risk population which was slightly higher than the overall attack rate. Similarly, the study conducted in Djibouti city residents (16). Estimating age specific attack rate provide information about special risk groups to be infected. This information may provide base line to guide mitigation efforts for the future planning.

The major manifestation of the sign and symptoms during the outbreak were also characterized by high grade fever, Cough, headache and sore throat; in line with different literatures (2, 17).

Of 10 throat swabs were tested at national laboratory for etiologic cause confirmation for influenza; 4 (40%) suspected influenza like illness were positive for influenza A; which were higher positivity rates compared with the study conducted in routine influenza sentinel surveillance in Ethiopia, 2008–2010 (6), South Africa 2014 communicable diseases surveillance bulletin (10), influenza Surveillance in 15 countries in Africa, 2006–2010 (5), and Washington State influenza update, 2017 week 3 (11). Our study found that attack rate was slightly higher in study subjects under 5 years old, however, in the multi variable model analysis, the difference with other age groups was not statistically significant ($P = 0.9$).

Being female was significantly associated with influenza like illness; the odd of developing influenza like illness was 3.76 times among females compared to males. The possible reason might be females were adjusted for living with children, or for daily contact with groups of children or care givers to patients at home. The study is also in line with online community cohort surveys study conducted in United Kingdom (8).

Having family size equal or greater than five in house hold was significantly associated with influenza like illness; the odds of developing disease was 4.56 times higher compared with having family size less than three. The possible reason might be over condensed family size or confined space increased person density in the household and suitable to transmission of infection during sneezing, cough, or talk; consistent with the study done in Nicaragua, Kasuga City Western Japan, in Victoria Australia (12, 13, 15).

People who had close contact history with suspected influenza like illness were 5.57 times more likely to develop influenza like illness than people had not contact history. The possible reason could in fact, cross contamination plays a great role in infectious diseases or direct contact may have increased impact on transmission via aerosols or by indirect contact with contaminated with virus-containing fomites on environmental surfaces consistent with other studies (14).

Having knowledge of the mode of influenza like illness transmission and prevention significantly reduces the risk of acquiring ILI by almost 90% $|1-AOR|*100$ compared with others.

Those people living in well ventilated house (good room space and window openness >5 per week) were significantly reduced contracting of ILI by near to 86% $|1-OR|*100$ compared with living in closed or confined room space, similarly, the study conducted in, Kasugai city in Western Japan, and Djibouti city residents (12, 16).

Limitation of the study

The study design was prone to selection and recall bias, specifically in the control group. Sample size of the case group was small; due to this reason the representativeness of the findings may not be representative for the entire population.

Conclusion

Our study revealed that females and under-five children were reported higher attack rate of influenza like illness. Most of the causative agent of the outbreak confirmed by PCR test was influenza A subtype (H1N1) pdm09. Being female, large number of family size and contact history were statistically significant risk factors for influenza like illness; whereas livings in well ventilated house and having knowledge about influenza like illness were protective factors.

Recommendation

Health workers should continue health education how to prevent and minimize the spread of the disease using different media to the people regularly.

The community should improve the ventilation status and room space of the house.

Reference

1. Texas Department of State Health Services. FAQs Data Reporting Investigation Immunization Resources Monitoring, Infectious Disease Control Influenza Unit. 2016;(December, 14):1–5.
2. Kasper MR, Wierzba TF, Sovann L, Putnam SD. Evaluation of an influenza - like illness case definition in the diagnosis of influenza among patients with acute febrile illness in cambodia. 2010;2–7.
3. Ministry of Health. Operational Guideline for Influenza-Like Illness and Severe Acute Respiratory Infection Second Edi. 2014;
4. Arizona Department of Health Service. Guidelines for Investigating Outbreaks of Influenza-Like Illness or Respiratory Disease. 2013;(April 2011).
5. Radin JM, Katz MA, Tempia S, Nzussouo NT, Davis R, Duque J, et al. In fl uenza Surveillance in 15 Countries in Africa , 2006 – 2010. 2012;206(Suppl 1):2006–10.
6. Ayele W, Demissie G, Kassa W, Zemelak E, Afework A, Amare B, et al. Challenges of Establishing Routine In fl uenza Sentinel Surveillance in Ethiopia , 2008 – 2010. 2012;206(Suppl 1):2008–10.
7. Season P, Lehnert N, Geis S, Eisenbach C, Neben K, Schnitzler P. Changes in Severity of Influenza from Pandemic to First. 2013;19(5).
8. Adler AJ, Eames KTD, Funk S, Edmunds WJ. Incidence and risk factors for influenza-like-illness in the UK : online surveillance using Flusurvey. 2014;
9. Cobos AJ, Nelson CG. Mortality and transmissibility patterns of the 1957 influenza pandemic in Maricopa County , Arizona. 2017;(August 2016):1–18.
10. Cohen C, Dreyer A, Frean J, Treurnicht F, Iyaloo S, Ismail N, et al. Respiratory pathogens from influenza - like illness and pneumonia surveillance programmes , South Africa 2014. 2014;13(1).
11. Epidemiology CD. Washington state influenza update. 2017;1–8.

12. Hirota Y, Takeshita S, Idek S, Ohkubo A, Fukuyoshi S, Takahashi K, and Kajij M. Various factors associated with the manifestation of influenza-like illness. 1992;2(3):574–82.
13. Gordon A, Ortega O, Kuan G, Reingold A, Saborio S, Balmaseda A, et al. Prevalence and seasonality of influenza-like illness in children. 2009;15(3):2005–7.
14. Belser JA, Maines TR, Tumpey TM, Katz JM, Belser JA, Maines TR, et al. Influenza A virus transmission: Contributing factors and clinical implications. 2012;(December 2010).
15. Brown CR, Mccaw JM, Fairmaid EJ, Brown LE, Leder K. Factors associated with transmission of influenza-like illness in a cohort of households containing multiple children. 2015;247–54.
16. Andayi F, Crepey P, Kieffer A, Salez N, Abdo AA, Carrat F, et al. Determinants of individuals' risks to 2009 pandemic influenza virus infection at household level amongst Djibouti city residents - A CoPanFlu cross-sectional study. 2014;1–11.
17. Ethiopian Health and Nutrition Research Institute. Public health emergency management. 2012;
18. Health P, Communicable M, Group D. Public health guidelines 1 on the prevention and management of influenza outbreaks in residential care facilities in Ireland 2016 / 2017. 2017;(August 2016):1–58.
19. Atlanta, GA: U.S. Centers for Disease Control and Prevention. Advanced management and analysis of data using epi info for windows. 2010;

1.2. Acute Watery Diarrhea Outbreak Investigation in Minjar Shenkora district North Shoa zone, Amhara region, Ethiopia, 2016

Fisseha Walle, Alemayehu Worku, Mastewal Worku, Sisay Awoke

Abstract

Background: Acute watery diarrhea (AWD) is becoming a serious problem in Ethiopia. AWD outbreak is public health emergency which results in increased morbidity and mortality and put acute demands on the health system. Knowing the determinants of a disease enables us to design an effective intervention. The aim of the study was to identify existence of outbreak, etiologic agent, magnitude source of infection, and associated factors of the disease and to initiate appropriate control and prevention measures.

Methods and materials: We conducted unmatched case control study in Minjar Shenkora district from 22 July through 24 August 2016 G.C. We selected 51 cases and 51 controls. We conducted face to face interview using structured questionnaire. The collected data were entered and analyzed using Epi-info version 7 and SPSS version 20. We used logistic regression analysis to explore significant predictors of AWD.

Results: From on 22 July through 24 August 2016, 218 cases (attack rate 0.12), and no death were reported. *Vibrio cholerae* serogroup O1 was identified in stool and water cultures. Of 218 notified cases, 60.1% were men, and 62.84% were 15 - 44 years age group. In multi variable analysis; drinking river water and eating raw food were significantly associated risk factors, whereas drinking treated water and eating reheated food were significantly associated preventive factors.

Conclusion and recommendation: According to the findings of this study, river water consumption was the main source of infection in the district and drinking treated water and eating reheated food were protective factors against infection. Water chlorination, case treatment and health education were main interventions undertaken. The district should provide water treatment chemicals and potable water supply to the community; raising community awareness about feeding practices to control diarrheal disease is necessary.

Key words: AWD outbreak, associated factors, Minjar Shenkora district, Ethiopia

Introduction

Background

Cholera is an acute diarrhoeal disease caused by *Vibrio cholerae* O1 or O139. The disease primarily affects gastrointestinal tract (acute gastroenteritis); the exotoxin produced by *Vibrios* may lead to excessive (sometimes rapid) fluid and electrolyte loss resulting in dehydration, circulatory failure, shock, and electrolyte imbalance. The chain of events may lead to acidosis, myocarditis, heart failure, tubular necrosis and eventual death unless timely intervention is carried out (1). In most cases, infection is asymptomatic or causes mild diarrhea, especially with organisms of the El Tor biotype; carriers can transmit the infection. In severely dehydrated cases, death may occur within a few hours, and the case-fatality rate may exceed 50% when left untreated. With proper and timely rehydration, the death rate can be less than 1% (2).

Of those with cholera-associated diarrheal disease, some patients presented with mild, moderate or severe (20%) symptoms (3). Once an outbreak is confirmed; a clinical diagnosis using WHO standard case definition is sufficient accompanied by sporadic testing at regular intervals (4). The primary treatment of any patient who presents with acute watery diarrhea, regardless of the etiology is to ensure that fluid and electrolyte status are maintained through rehydration. Often this can be achieved through the administration of oral rehydration solution a simple, inexpensive, but effective method for replacing fluids and electrolytes. More severely dehydrated patients, and those who are vomiting too frequently, may require intravenous rehydration with fluids containing the proper concentration of electrolytes (Lactated Ringer's Solution is commonly used; solutions that do not contain any potassium should be avoided). For cholera, antimicrobial treatment is recommended only for patients with severe illness, for whom the reduction in fluid losses and in the duration of illness and carriage may be important. The choice of antimicrobial should be guided by susceptibility testing of circulating strains (3).

Humans are the main reservoir of *Vibrio cholerae*. Other potential reservoirs are water, fish and aquatic plants. *Vibrio* grows easily in saline water and alkaline media. They survive at low temperatures but do not survive in acid media; they are destroyed by gastric acid in the stomach, by chlorine disinfectant solutions or by boiling during at least one minute (5).

Cholera is usually transmitted through faecally contaminated water, hands or food, and remains

an ever present risk in many countries. A dose of more than one million organisms is usually needed to cause illness. It is transmitted almost exclusively by contaminated water or food; however, transmission by contact (touching patients) is rare (6).

Cholera remains a major public health problem in many parts of the world and is often a relatively neglected disease. In 2014, a total of 190,549 cases with 2,231 deaths were reported to WHO by 42 countries resulting in an overall case fatality rate (CFR) of 1.17%. Compared with 2013, this represents 47% increased. Cases were reported from all regions. However, 5 countries: Afghanistan, Democratic Republic of the Congo (DRC), Ghana, Haiti and Nigeria together reported 84% of all cases; 55% of all reported cases originated from Africa, 30% from Asia and 15% from Hispaniola (7).

In 2014, 24 countries reported cholera death; 1,882 deaths occurred in Africa, 42 in Asia, and 307 in Hispaniola. CFRs ranged from 0.01% to 25.71%; 8 countries reported CFRs <1%, and 12 countries reported CFRs between 1% and 5%. Four African countries reported CFRs >5% were Cameroon, Guinea Bissau, Sierra Leone and Kenya (7).

In Ethiopia, there was acute watery diarrhea (AWD) epidemic in 1990 which persisted with recrudescence of cases till 1998. Moreover, from July 2008 to June 2009, there were a total of 9,485 cases and 193 deaths (CFR was 2%) of acute watery diarrhea in six regions including Addis Ababa. Afar Region took the country's highest share of cases 2,988(31.5%) and deaths 99(51.25%) of AWD with a case fatality rate of 3.3% (8).

Cholera is one of the priority diseases & events that are reportable in Public Health Emergency Managements system in Ethiopia. On 23 July 2016, there was AWD cases report in Minjar Shenkora district, North Shoa zone. From 25 July through 24 August 2016, the outbreak investigation team conducted a case control study in Minjar Shenkora district, North Shoa zone. The purpose of the study was to identify etiologic agent, factors associated with symptomatic AWD infection, and environmental conditions related to hygienic practices in order to contain the outbreak.

Literature review

Cholera remains a public health threat affecting vulnerable populations living with unreliable water supply and sub-standard sanitary conditions (9). The water borne diseases are transmitted by contaminated water and food. *V. cholerae* produces a toxin that stimulates the secretion of water and electrolytes in the intestinal tract. Patients with cholera may suffer from acute watery diarrhea, vomiting, and dehydration. Cholera outbreak need prompt diagnosis, treatment, public health intervention and notification (1).

Magnitude of the disease

Every year, there are an estimated 1.3 - 4 million cholera cases with 21, 000–143,000 deaths occur worldwide. The Americas a total of 28, 456 cholera cases with 307 deaths (CFR, 1.08%) were reported from 7 countries. Imported cases were reported in Canada, Chile and the USA (7).

In 2014, 19 countries in African continent reported 105, 287 cases of cholera with 1882 deaths (CFR, 1.79%). Compared with 2013, the number of cases reported from Africa increased by 87%. Three countries DRC (22 203 cases, 372 deaths); Ghana (28 944 cases, 243 deaths); and Nigeria (35 996 cases, 755 deaths) accounted from 87,143 cases. In African Region 2014, Cholera outbreaks were the most reported public health event in the WHO. In 2014, West Africa reported were increased compared with (from 9765 to 68,384), due to mainly outbreaks in Nigeria and Ghana. In central African region, there was a decrease in number of reported cases compared to the previous year (36 809 in 2013 and 26 353 in 2014). The situation in South-Eastern African remained stable (9755 cases in 2013 and 9550 in 2014); 97% of the cases were reported from Somalia and South Sudan (7).

A cross sectional study conducted in Oromia region, Ethiopia, 2006 showed that the overall attack rate was 0.5% with 1.11% CFR (10). A study conducted in Afar region, Ethiopia, 2009 G.C showed that a total of 1,076 cases and 48 deaths were reviewed with 0.9% attack rate and 4.4% CFR. The majority 945 (87.8%) of cases were males and 561(52.1%) were in the age category of 15-44 years old (8).

Factors associated with cholera disease

A community based cross sectional study conducted in India 2015 revealed that the main source

of outbreak of diarrhea in the village Haryana, district Rewari was due to contamination of water storage tank used for drinking purpose at local Mela and *Vibrio Cholerae* 01 El Tor, Ogawa serotype were identified to be the main causative agent in stool and water culture (11).

A total sample of 37 case-patients and 37 controls matched case control study conducted in Central Africa Republic 2011 revealed that identified a significant association between eating cold cassava leaves and cholera (12).

A total sample of 49 case-patients and 98 controls, a matched case control study conducted in Sierra Leone, 2012 revealed that 71% case-patients and 43% controls reported drinking any untreated/unsafe water in the 5 days before the case-patient's illness onset. Drinking untreated/unsafe water remained statistically significant in the multivariable analysis (AOR 3.43, 95% CI, 1.07-11.04). A total of 18 (38%) case-patients and 47 (49%) controls reported treating their drinking water at home in the 5 days before illness onset. This difference was not statistically significant. A larger proportion of case-patients than controls reported contact with a person with cholera in the 5 days before illness onset (17% vs. 9%), but this difference was not statistically significant (AOR 2.26, 95% CI 0.67-8.08) (13).

Descriptive and un-matched community-based 1:2 case control study conducted in the Greater Accra Region 2014 with a total sample of 138; showed that the most likely vehicles of the cholera transmission in the region was contaminated street vended sachet water and food from poor environmental sanitation. The Odds of acquiring cholera was reduced by 70% by hand washing after defecating comparing with others (AOR = 0.3; 95% CI: 0.1- 0.8). Knowledge of the mode of cholera transmission significantly reduces the risk of acquiring cholera by almost 60% (AOR= 0.4; 95% CI: 0.2-0.8; p-value: 0.01) (14).

A total of 54 sample size case control study conducted in Afar region, Ethiopia, 2009 G.C. showed that on bivariate analysis, drinking untreated water, close contact with a case, unhygienic latrine, and not practicing hand washing were the possible risk factors for the outbreak (8).

Rationale of the study

Cholera outbreak is characteristically abrupt and often creates an acute public health problem. Cholera cases when left untreated, death can occur rapidly, sometimes within hours (2). Cholera

outbreak is a quick spread disease; it has potentially high attack rates, and high mortality rates. Therefore, need prompt diagnosis, treatment, and public health intervention (1). To minimize their impact, cholera outbreak should be investigated properly and timely in order to take appropriate and adequate control measures.

Objectives

General objective

- To investigate the etiologic agent, magnitude, determinant factors of AWD outbreak, and to implement control measures for containment of the outbreak in Minjar Shenkora district, North-East Ethiopia, 2016.

Specific Objectives

- ❖ To verify the existence of outbreak in Minjar Shenkora district, 2016
- ❖ To identify etiologic agent of the disease in Minjar Shenkora district, 2016
- ❖ To describe the magnitude of the outbreak by place, person and time in Minjar Shenkora district, 2016
- ❖ To identify the risk factors for the outbreak in Minjar Shenkora district, 2016
- ❖ To implement control and prevention measures for containment of the outbreak

Methods and Materials

Study area and period: The study was conducted in Minjar Shenkora district, North Shoa zone, North East Ethiopia from 25 July through 24 August 2016. The district has 158412 total populations. Of 158412, 137019 (86.5%) were rural, and 21393 (13.5%), urban residences. Males were 51.6%, and under five, 13.54% based on 2007 census projection. The actual population may be much bigger than the census projection, due to new inhabitants in holy water and migrant daily laborers. The district has 27 rural and 02 urban kebeles (smallest administrative units in Ethiopia) with 01 district hospital, 06 (94.7%) health centers, and 29 (91.5%) health posts. On the basis of administrative report, safe water coverage was 54% in rural and 70% in town, and all over latrine coverage was 90%.

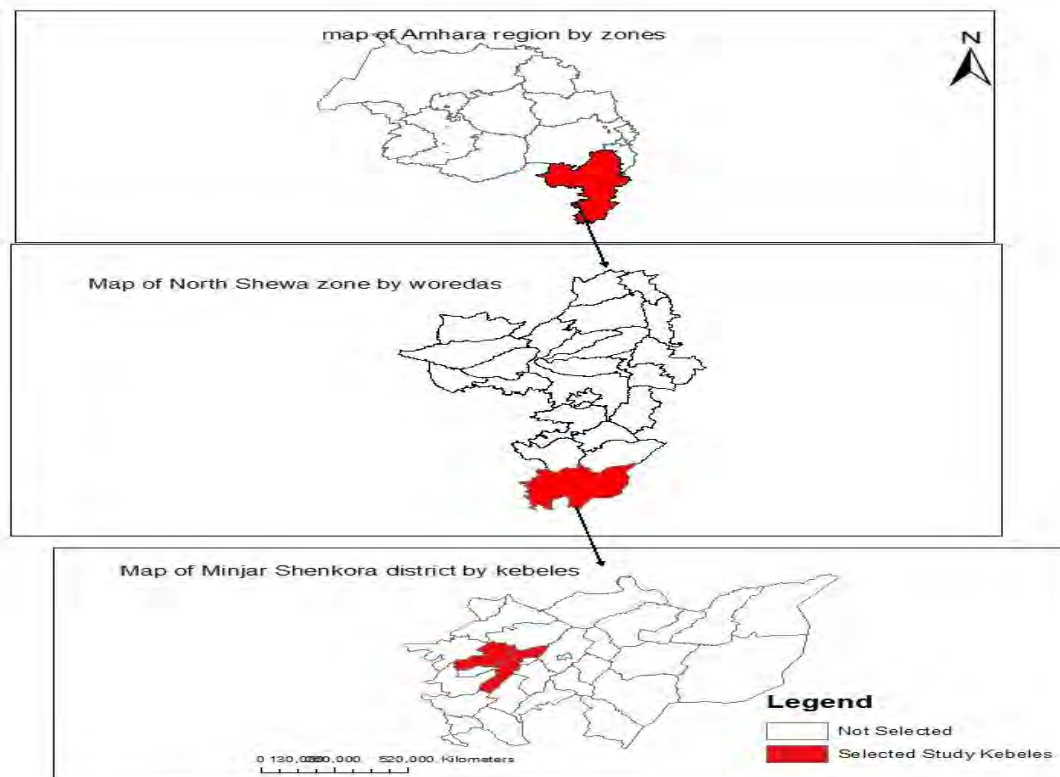


Figure 3: Map of Cherecha and Eranbuti kebeles found in Minjar Shenkora district, North Shoa zone, North-East Ethiopia, 2016

Study design: We conducted 1:1 unmatched case control study

Source population: All individuals who lived in M/Shenkora district, 2016

Study population: For cases: All individuals aged ≥ 5 years with acute watery diarrhea, with or without vomiting (5, 15, 16), who lived in Cherecha and Eranbuti kebeles, Minjar Shenkora district, 2016. In children under 5 years of age, a number of pathogens can produce symptoms similar to those of cholera, such as rice watery diarrhoea. To maintain specificity or to reduce false positive), children under 5 are not included in the case definitions of cholera (5, 16).

For controls: All individuals aged ≥ 5 years without acute watery diarrhea and vomiting who lived in Cherecha and Eranbuti kebeles, Minjar Shenkora district, 2016.

Inclusion and exclusion criteria

Inclusion criteria

For cases: A case was defined as any person aged ≥ 5 years who lived in Cherecha and Eranbuti kebeles presented with acute watery diarrhea, with or without vomiting from 22 July through 24 August 2016.

For controls: A control was defined as any person aged ≥ 5 years who lived Cherecha and Eranbuti Kebeles and did not present any of the above mentioned symptoms in the one month prior to the beginning of the outbreak.

Exclusion criteria

For cases: Unconscious patients were excluded from the study.

For controls: Family members from the same household of the cases were excluded from control groups.

Sample size determination: We calculated a total of 102 (51 cases and 51 controls) sample size using Epi-Info 7 statcalc unmatched case control study Fleiss w/cc method. The sample was calculated based on two tailed significance level 5% (alpha 0.05), confidence level of 95%, power of 80%, and exposure prevalence of unsafe drinking water 43% among controls and odds ratio of 3.43 (13).

Sampling procedure: Purposive sampling method was used to choose Cherecha and Eranbuti kebeles based on increased number of case distribution. Sample size was distributed to each kebele based on case distribution. We selected all active cases during data collection period who met WHO case definition, and those accepted to participate in the study were interviewed. For control selection, we selected households using simple random sampling from the sampling frame of community health information system family folder proportional to case distribution, and then controls were selected from the randomly selected households in each study kebele. If more than one control lived in the selected household, one control was selected by the lottery method.

Data collection methods: A structured and pretested questionnaire and line list was used to collect data on demographic, clinical and exposure history, disease knowledge and treatment,

hygienic and sanitation condition. The questionnaire was initially prepared in English and translated into the local language (Amharic) by fluent speakers of both languages to maintain its consistency. Cases were identified using WHO case definitions in the cholera treatment center (CTC) by experienced clinicians. If the study subjects were children, face to face questionnaire was administered to their parents/guardians or care givers. We followed-up cases into their residences and conducted environmental assessment to identify source of infection.



Figure 4: The principal investigator interviewed a man who was control in the selected kebele M/Shenkora district, North-East Ethiopia, 2016.

Variables of the study

Dependent variable

Acute Watery Diarrhea (AWD)

Independent variables

Age

Sex

Educational level

Occupational status

Marital status

Religion

Family size

Drinking water source and purification

Feeding practice

Hand washing practice

Knowledge of the disease prevention and control methods

Latrine utilization

Contact history to AWD suspected cases

Travel history to AWD outbreak suspected areas

Operational definition

Case definitions of cholera (5, 15, 16)

Suspected case: A case of cholera should be suspected when:

In an area where the disease is not known to be present, a patient aged 5 years or more develops severe dehydration or dies from acute watery diarrhea.

In an area where there is a cholera epidemic, a patient aged 5 years or more develops acute watery diarrhea, with or without vomiting.

At the health post and at community levels, a suspected cholera case can be defined as follows:

Any person 5 years of age or more having profuse acute watery diarrhea and vomiting.

Confirmed case: A suspected case in which *Vibrio cholerae* O1 or O139 has been isolated from their stool.

Knowledge: Any person knows the signs and symptoms, mode of transmission and prevention methods.

Data processing and management: We produced data entry format template using EPI-INFO version 7. Data were coded and entered in to EPI-INFO version 7 and cleaned, then exported to SPSS version 20 and analyzed.

Data quality control: Data quality was controlled through conducting pre-test on 15% of the samples in an area where the study was not undertaken, with similar set up in order to assess the quality of the data collection tool, and time consuming. Important modifications were made based on the findings. Data were collected only by principal investigator and co-investigator after discussion of the objectives, methods, tool and ethics of the study conducted. Regular meetings were held between the principal investigator and co-investigator with problematic issues faced during data collection period, and discussed to make correction. Questionnaire was checked for completeness and consistency daily.

Statistical analysis: We performed binary logistic regression analysis to identify associated factors; we used chi-square or a Fisher's exact test, and 95% confidence interval for statistical tests. Odds ratios at 95% confidence interval were used to see the significance of the study and the strength of association between study variables. Bivariate analysis was done to explore the crude association between different predictor variables and AWD. To control possible confounding factors, and to identify independent factors associated with AWD, multi variable analysis was performed for those variables with p value ≤ 0.25 in the bivariate analysis. Model goodness of fit was assessed by the Hosmer-Lemeshow test. In multi variable analysis, we used a p value ≤ 0.05 and 95% of CI not included 1 to declare the presence of statistically significant association.

Ethical Consideration and permission: Ethical approval was not obtained, because of outbreak is an emergency response, and its investigation was carried out by rapid response team. However, Permission letter to collect data was obtained from Amhara regional health bureau, public health emergency management unit. Verbal informed consent was obtained from case-patients and controls if case-patients or controls were minor, consent were obtained from their parents. We explained the objective of the study and ensured their privacy and confidentiality of

the information. We gave health education to study participants how to prevent and control the disease after interviewed.

Dissemination of the results: The results of the study were submitted to school of Public Health Addis Ababa University and the respective district, zonal and regional health bureau and other stakeholders those who need to know and working with together.

Results of the study

Descriptive epidemiology

Seven acute watery diarrheal index cases were notified to the Amhara region health bureau on 23 July 2016. When the outbreak was reported to the region a team composed of different disciplines including regulatory, environmental health specialist, clinician and two field epidemiology residents went to the district, and verified the existence of AWD outbreak.

Between on 22 July through 24 August 2016, a total of 218 cases (215 suspected and 3 confirmed by culture test) were reported. An overall attack rate was 0.14% with no death reported. Of the 218 cases 116 (53.2%) and 102 (46.8%) were developed severe and some dehydration respectively.

Laboratory investigation: On 28 July 2016, three stool samples were collected and sent to national public health laboratory for culture testing from admitted patients in the CTC. All stool samples were confirmed positive for *vibrio cholerae serogroup O1*. From the total 43 RDT tested cases, 41 (95.3%) were positive for *vibrio cholerae serogroup O1*. We tested five stool specimens using cholera RDT among the index cases on the date of reporting, 100% were positive for *Vibrio cholerae O1*.

Distribution of Cases by Place: Of the total cases, 188 (87%) were residences within the district. Of the seven index cases, two had traveled history from Addis Ababa AWD suspected area. Of 29 kebeles, 21 (72.4%) were affected by the outbreak. From 188 district residence cases, 88 (47%) were reported from Cherecha, 34 (18%) from Eranbuti, and 35% from the remaining kebeles.

Distribution of Cases by person: Of 218 notified cases, 131(60.1%) were men. Total cases mean and median ages were 37.28 and 30 years old respectively (range, 4-90 years); however, mean and median ages among the selected cases were 34.9 and 30 years respectively (range, 6-82 years), and controls were 37.74 years mean and 32 years median (range, 19-80 years). Age group 15 - 44 years were the highest affected (62.84%) and under-five were the least (0.46%).

Table 4:- Distribution of AWD cases by age group in Minjar Shenkora district, 2016

| Age group | Risk population | Number of cases | % of Relative frequency | Age specific attack rate (%) |
|-----------|-----------------|-----------------|-------------------------|------------------------------|
| 2- <5 | 21386 | 1 | 0.46 | 0.00 |
| 5_14 | 51959 | 9 | 4.13 | 0.02 |
| 15_44 | 53860 | 137 | 62.84 | 0.25 |
| >=45 | 31207 | 71 | 32.57 | 0.23 |
| Total | 158412 | 218 | 100 | 0.14 |

Distribution of cases by time: AWD cases were notified from on July 22, 2016 in the district and on July 23, 2016 notified to regional health bureau. The cases increased exponentially from date 23 to reach a peak in date around on 28 July 2016 within short period of time indicates common source of exposure at starting points.

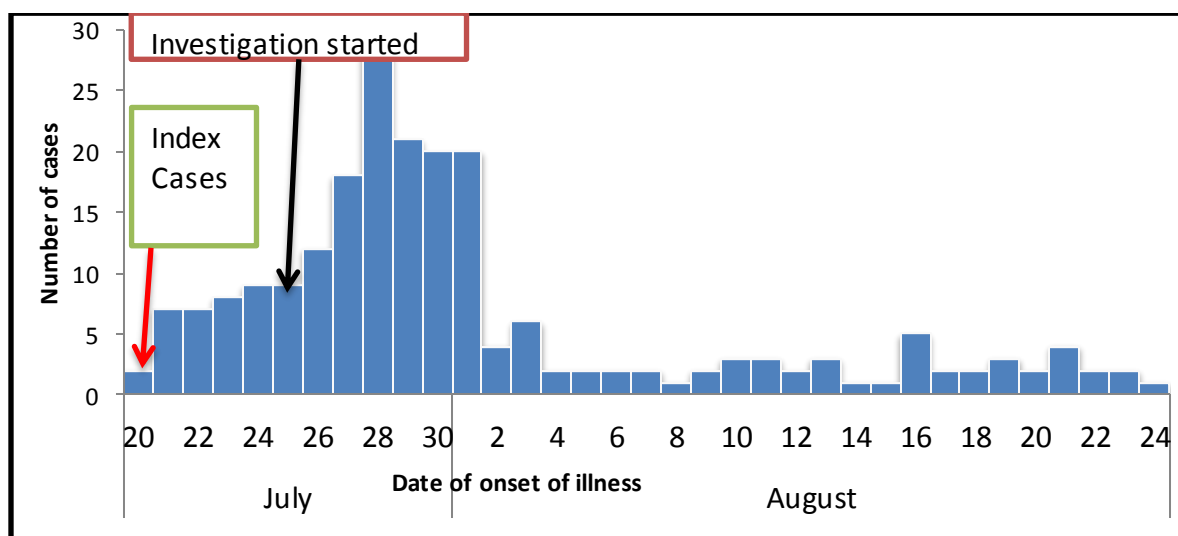


Figure 5:- AWD outbreak epi-curve by date of onset in Minjar Shenkora district, 2016.

Potential source of infection: On the basis of line list, of 218 cases reported, 26 (12%) had travel history to AWD outbreak area of Addis Ababa, 19 (9%) had contact history to AWD cases, 178 (82%) had exposed to drinking river water; only 13 (6%) and 5 (2%) AWD cases had gotten tap / pipe and hand dug well protected water source respectively.

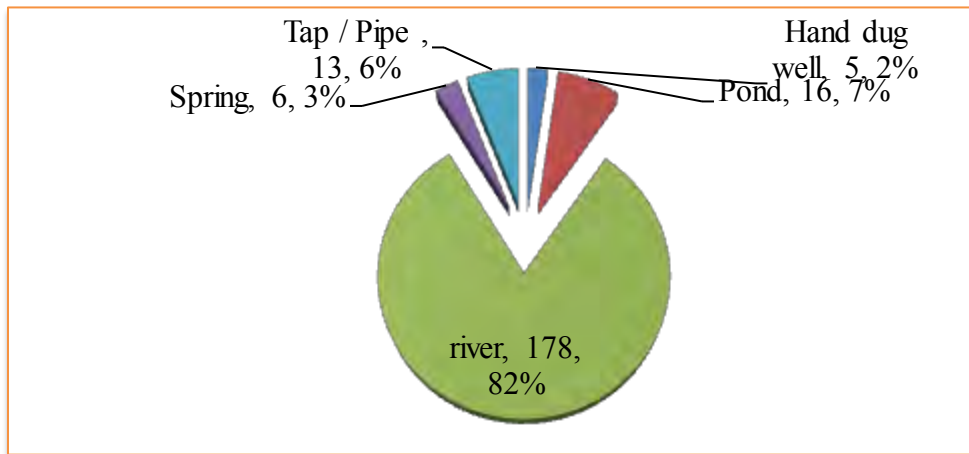


Figure 6:- Distribution of cases by drinking water source in Minjar Shenkora District, 2016.

Environmental Assessment: We conducted environmental investigation to identify source of infection. Different experts were deployed for field investigation. We observed lack of safe drinking water source, poor sanitation, and hygiene. We observed many hand dug wells broken and closed due to flooding. In addition, we observed many street food vendors. From four water source, (river, holly water, spring and hand dug well), samples were taken for culture test, only Shenkora Yohanis River was confirmed positive for vibrio cholerae serogroup O1.



Figure 7: Environmental investigation of drinking water source in M/Shenkora district, 2016



Figure 8: Health education was given to street food vendors by principal investigator in AWD affected village in M/Shenkora district, 2016.

Hypothesis developed for why the outbreak occurred: On the basis of descriptive epidemiology analysis, a high proportion of the cases drank river water, had travel history to AWD outbreak suspected area, had contact history to AWD suspected patients, and on the environmental assessment eating food from street food vendors which was most likely

contaminated and inadequate water and sanitation facilities, therefore these variables could be associated with outbreak occurred in Minjar Shenkora district and tested by conducted case control study.

Analytic Epidemiology

In multi variable logistic regression analysis; drinking river water [AOR= 6.39, 95% CI (1.93, 21.18, p value= 0.002)] and eating raw / uncooked food [AOR= 6.47, 95% CI (1.24, 33.83, p value= 0.03)] were significantly associated risk factors, whereas drinking purified/ treated water [AOR= 0.18, 95% CI (0.05, 0.75, p value= 0.02)] and eating reheated food [AOR= 0.14, 95% CI (0.03, 0.7, p value= 0.02)] were significantly associated preventive factors.

Table 5: Binary logistic regression analysis to identify factors associated with AWD in Minjar Shenkora district, North Shoa zone North East Ethiopia, 2016

| Variable | | Case status | | Bivariate analysis | | Multi variable analysis | |
|------------------------|--------|----------------------|----------------------------|----------------------|-----------|-------------------------|-----------|
| | | Case n=51 (Col %) | Control n=51 (Col %) | COR (95% CI) | P-Value | AOR (95% CI) | P-Value |
| Sex | Male | 34 (66.67%) | 20 (39.22%) | 3.1 (1.38, 6.96) | 0.005* | 1.52 (0.48, 4.88) | 0.48 |
| | Female | 17 (33.33%) | 31 (60.78%) | reference | reference | reference | reference |
| Knowledge of AWD | Yes | 16 (31.37%) | 32 (62.75%) | 0.27 (0.12, 0.62) | 0.002* | 0.61 (0.19, 1.96) | 0.41 |
| | No | 35 (68.63%) | 19 (37.25%) | reference | reference | reference | reference |
| Contact history | Yes | 36 (70.59%) | 11 (21.57%) | 8.73 (3.55,21.44) | <0.0001* | 3.41 (0.91, 6.51) | 0.12 |
| | No | 15 (29.41%) | 40 (78.43%) | reference | reference | reference | reference |

| | | | | | | | |
|-----------------------------------|-----|----------------|----------------|-----------------------|-----------|-----------------------|-----------|
| Travel history | Yes | 8 (15.69%) | 3 (5.88%) | 2.98 (0.74, 11.94) | 0.11 | 4.91 (0.76, 31.6) | 0.09 |
| | No | 43 (84.31%) | 48 (94.12%) | reference | reference | reference | reference |
| Sick person in the house | Yes | 10 (19.61%) | 2 (3.92%) | 5.98 (1.24, 28.83) | 0.014* | 3.89 (0.47, 32.2) | 0.21 |
| | No | 41 (80.39%) | 49 (96.08%) | reference | reference | reference | reference |
| Drinking river water | Yes | 42 (82.35%) | 22 (43.14%) | 6.15 (2.48, 15.26) | <0.0001* | 6.39 (1.93, 21.2) | 0.002** |
| | No | 9 (17.65%) | 29 (56.86%) | reference | reference | reference | reference |
| Drinking spring water | Yes | 9 (17.65%) | 17 (33.33%) | 0.43 (0.17, 1.08) | 0.07 | 0.9 (0.16, 4.97) | 0.9 |
| | No | 42 (82.35%) | 34 (66.67%) | reference | reference | reference | reference |
| Drinking treated water | Yes | 5 (9.8%) | 20 (39.22%) | 0.17 (0.06, 0.49) | 0.0006* | 0.18 (0.05, 0.75) | 0.02** |
| | No | 46 (90.2%) | 31 (60.78%) | reference | reference | reference | reference |
| Drinking pipe water | Yes | 5 (9.8%) | 14 (27.45%) | 0.29 (0.09, 0.87) | 0.03* | 0.994 (0.16, 6.18) | 0.995 |
| | No | 46 (90.2%) | 37 (72.55%) | reference | reference | reference | reference |
| Washing water container regularly | Yes | 45 (88.24%) | 48 (94.12%) | 0.47 (0.11, 1.99) | 0.29 | NA | NA |
| | No | 6 (11.76%) | 3 (5.88%) | reference | reference | reference | reference |
| Use latrine | | 37 | 50 | 0.05 | | 0.2 | 0.45 |

| | | | | | | | |
|--|-----|----------------|----------------|-----------------------|-----------|----------------------|-----------|
| | Yes | (72.55%) | (98.04%) | (0.01, 0.42) | 0.0002* | (0.14, 3.2) | |
| | No | 14 (27.45) | 1 (1.96%) | reference | reference | reference | reference |
| Hand washing after defecate | Yes | 22 (43.14%) | 31 (60.78%) | 0.49 (0.22, 1.08) | 0.075 | 0.41 (0.11, 1.54) | 0.19 |
| | No | 29 (56.86%) | 20 (39.22%) | reference | reference | reference | reference |
| Feeding outside home in the past 05 days | Yes | 14 (27.45%) | 5 (9.8%) | 3.48 (1.15, 10.55) | 0.28 | NA | NA |
| | No | 37 (72.55%) | 46 (90.2%) | reference | reference | reference | reference |
| Eating uncooked food | Yes | 21 (41.18%) | 5 (9.8%) | 6.44 (2.19, 18.93) | 0.0003* | 6.47 (1.24, 33.8) | 0.03** |
| | No | 30 (58.82%) | 46 (90.2%) | reference | reference | reference | reference |
| Use reheated food | Yes | 28 (54.9%) | 48 (94.12%) | 0.08 (0.02, 0.28) | <0.0001* | 0.14 (0.03, 0.7) | 0.02** |
| | No | 23 (45.1%) | 3 (5.88%) | reference | reference | reference | reference |
| Attend to public ceremony | Yes | 4 (7.84%) | 3 (5.88%) | 1.36 (0.29, 6.42) | 0.69 | NA | NA |
| | No | 47 (92.16%) | 48 (94.12%) | reference | reference | reference | reference |

N.B ** = statistically significant association in multi variable analysis

*= Statistically significant association during bivariate analysis

NA= Not met criteria to enter final multi variable model or p value > 0.25 in bivariate analysis

P-values < 0.0001 mean values indicates 0.0000

Actions taken to contain the outbreak

After conducted briefing to the stakeholders about the outbreak situation, the team engaged in activating the district epidemic response task force to participate in active case detection, early responses and educating the community to contain the outbreak.

- The investigation team identified and characterized the AWD outbreak.
- Technical assistance was given for health workers and community members those who were affected by the outbreak.
- Epidemiological investigation conducted including a case control study
- Established cholera treatment centers and Oral rehydration points in the health centers/hospitals and the affected villages respectively.
- Cases were treated to prevent further spread; and reduce morbidity and mortality attributed to AWD.
- Health education was provided to the community on general hygiene, improvement of sanitation, food preparation, handling, water treatment, mode of transmission, prevention and control methods, funerals and burial practices.
- We gave training to health personnel on AWD overall activities to contain the outbreak.
- We advise affected people to use oral rehydration solution immediately at local preparation and seek health care at the onset of watery diarrhea and/or vomiting.
- Water treatment chlorine and demonstration was given to the community to treat water at house hold level
- The district administrative body maintained broken hand dug wells.
- Implement prevention and control measures which include: reactivation of epidemic management committees, enhancement of surveillance, risk assessment, public health awareness, WASH activities and resource mobilization.



Figure 9: Water treatment demonstration was given to the community at household level in Eranbuti kebele, M/Shenkora district, North-East Ethiopia, 2016 G.C.

Discussion

The outbreak was confirmed by culture test in patient stool and water samples; vibrio cholerae serogroup O1 was isolated from both stool and water specimens. We identified a total of 218 cases with attack rate of 0.14%, which is low compared to the study done in Afar and Oromia region (8, 10), in Africa, and the globe (7).

This study found that most of the AWD cases were men. The most affected age group was 15 - 44 years, 137 (62.84%), and the least affected was under-five age group which accounted 0.46% consistently with the study conducted in Afar region, Ethiopia (8). In this study the most affected age groups were 15 - 44 years, the possible reason might be drinking unpurified river water at the farm areas outside the home.

All the reported cases met the case definition of acute watery diarrhea and most of cases developed severe dehydration which covered 116 (53.2%) of the total reported cases inconsistent compared with MSF cholera guideline which is 20% (3). The possible reasons of this study severe dehydration greater than 20% might be delayed arrival at cholera treatment center or misclassification of level of dehydration.

On the basis of descriptive analysis results the potential causes of the AWD cases were hypothesized drinking water from river, eating food from street food vendors outside home, contact history to AWD patients, travel history to AWD outbreak area and poor personal hygiene practices like hand washing after defecating consistent with Oxfams cholera guideline (6).

According to this study finding consumption of river water was a statistically significant risk factor for AWD infection in the multi variable logistic regression analysis which was similar to the study done in Afar region (8), and Sierra Leone 2012 (13). Therefore, the odds of developing AWD illness were 6.39 times higher among those consumed river water than among those not consumed. Eating raw / un cooked food also was a statistically significant risk factor for AWD illness in the multi variable logistic regression analysis which was similar to the study done in Greater Accra region, June-August 2014 (14), whereas drinking purified or treated water and eating reheated food were significantly reduces the risk of acquiring AWD by almost 82% and 86% respectively, consistent with the study done in Greater Accra region, June-August 2014 (9).

Another finding in this study is lack of significant associations between AWD and hand washing after defecation contradict with the study employed in Afar region, Ethiopia, 2009 (8), and in Greater Accra region, June-August 2014 (14).

Limitations of the study

Controls might have been misclassified despite the fact that they did not have diarrhea or vomiting during the epidemic, because some cases may remain asymptomatic for the infection. The study design was prone to selection and recall bias specifically in the control group.

Conclusion

The study revealed that, AWD outbreak affected all age groups in the district and more especially among adult males age group from 15-44 years. *Vibrio Cholerae* O1 was identified to be the main causative agent in stool and water culture.

Epidemiological evidence in this study showed that river water consumption was the main source of infection and drinking treated water and eating reheated food were protective factors against acquiring AWD.

Recommendations

- The district continues with health education and social mobilization on eating habits, personal and community hygiene, sanitation.
- The district should maintain the broken hand dug wells to improve supply of water for drinking and washing of utensils to the communities.
- The district distributes water treatment products to communities in order to treat water at household level for drinking and washing utensils purpose.
- Improve food handling practice and feeding practice at the community.

References

1. Monthly Newsletter of National Institute of Communicable Diseases, Directorate General of Health Services, Government of India. A continuing challenge to Public Health. 2008;12(2):1–8.
2. Centers for Disease Control and Prevention (CDC). Watery Diarrhea Differential Diagnosis : Outbreaks of Acute Watery Diarrhea. 2011;2011(Cdc).
3. Médecins Sans Frontières. Cholera Guidelines. Second Edi. 2004.
4. World Health Organization. Prevention and Control of Cholera Outbreaks : WHO Policy and Recommendations. 2008;(November):1–4.
5. Ethiopian Public Health Institute. Guideline on CHOLERA OUTBREAK MANAGEMENT Ethiopia, 2011.
6. Lamond E, Kinyanjui J. Cholera Outbreak Guidelines Preparedness , Prevention And Control. 2012;(June).
7. World Health Organization. Weekly Epidemiological Record Relevé Épidémiologique Hebdomadaire. 2015;(40):517–44.
8. Beyene BB, Tumato M, Abera B, Maskai O, Luce R. Epidemiology of Acute Watery Diarrhea Outbreak and Challenges of Control — Afar , Ethiopia . 2014;1(10):162–9.
9. Kong H. Scientific Committee on Enteric Infections and Foodborne Diseases. 2011;(4).
10. Susan A. Bartels, P. Gregg Greenough, M. Tamar, Michael J. VanRooyen. Investigation of a Cholera Outbreak in Ethiopia's Oromiya Region. 2010;(December).
11. Verma R, Singh B, Bhalla K, Kamal M, Officer DI. Epidemiological Lesson Learnt : Diarrhea Outbreak Investigation In A Remote Village Of District Rewari (Haryana), India. 2015;5(1):103–7.
12. FELTP Residents : Penguele A, Djeintote M., Balekouzou A., Tembeti J FP, FELTP Resident Advisors : Kazambu D DD. Cholera Outbreak Investigation in the Central

- African Republic October – November 2011. 2011;(November).
13. Jambai A, Leone S, Dafaé F, Surveillance ND, Leone S, Alemu W, et al. Sierra Leone Cholera Outbreak Investigation , 2012. 2013;1–66.
 14. Emmanuel I, Alexander D, Noor C. Report of Cholera Outbreak Investigation , Greater Accra Region , June-August 2014. 2014;(August).
 15. Ethiopian Health and Nutrition Research Institute. Public Health Emergency Management. 2012;
 16. World Health Organization. Assessing the cholera outbreak response and improving preparedness, Geneva 2004.
 17. Atlanta, GA: U.S. Centers for Disease Control and Prevention. Advanced Management and Analysis of Data Using Epi Info for Windows. 2010;

CHAPTER II: SURVEILLANCE DATA ANALYSIS

2.1. Malaria magnitude and trend analysis from 2011/2012 to 2014/2015 in South Gondar zone, North West Ethiopia, 2016

Abstract

Background: Malaria is a serious public health problem in many parts of the world. Even though malaria surveillance has been implemented in Ethiopia, there is limited regular dissemination of surveillance data analysis and feed back to health care providers. The aim of the study was to analyze malaria surveillance data making essential contributions to determine burden and trend over time and the impact of control measures.

Methods: We conducted cross sectional study from 29 January through 13 February 2016 at South Gondar zone. We used semi-structured questionnaire and checklist. Data were reviewed and checked for completeness and consistency. Data were entered and analyzed using Microsoft Excel 2010.

Results: Between 2011/2012 through 2014/2015 GC, 40.29% of total patients visited at outpatient department (OPD), laboratory were done for malaria confirmation. There were 471,890 confirmed malaria cases with 45.1% test positivity rate. *Plasmodium falciparum* accounted 65.81%, and *vivax*, 34.19%. A total of 523,159 (9.86% clinical cases) malaria cases were reported. Average annual prevalence rate was 67.7 per 1000 risk population per year. The proportion of death in 2014/2015 was 0, and clinical cases, 0.02%. Regarding age groups were 8.88% under five, 15.08% 5-14, and 76.04% ≥ 15 years. Regarding to reporting time were 25.76% in 2011/2012, 38.52% in 2012/2013, 16.50% in 2013/2014, and 18.99% in 2014/2015.

Conclusion and recommendation: Malaria is still a major source of morbidity in South Gondar zone among outpatient visits. Generally, there was intermittent trend of confirmed out-patient malaria cases in the last four years period. However, the clinical malaria cases, inpatient and death reached near to zero time to time in the study area. To evaluate control and prevention measures of malaria needs further assessment or operational research.

Keywords: Annual estimated malaria prevalence rate, malaria data analysis, south Gondar zone.

Introduction

Background

Malaria is a serious public health problem in many parts of the world. It is a protozoan disease caused by five species of the genus *plasmodium* –*falciparum*, *p. vivax*, *p. ovale*, *p. malariae* and *P. Knowlesi*. Microscopic diagnosis and malaria Rapid Diagnostic Tests (RDTs) are the methods employed for confirmation of malaria etiology (1).

Globally widespread in 106 malaria endemic countries which have 3.2 billion people are at risk of malaria, and 1.2 billion are at high risk (>1 in 1000 chance of getting malaria in a year) (2). According to 2014 WHO report, 198 million cases of malaria occurred globally (uncertainty range 124–283 million), and the disease led to 584 000 deaths (uncertainty range 367,000–755,000). The global burden of mortality is dominated by countries in sub-Saharan Africa, where an estimated 90% of all malaria deaths occur, and in children aged under-five years, who accounted for 78% of all deaths (3).

Approximately 60% of Ethiopia's population lives in malarious areas (2, 4), and 75% of the country's landmass is favorable for malaria transmission; malaria primarily associated with altitude and rainfall (1, 2, 4); malaria incidence peak follows the main rainfall season (1, 2, 4). Due to the unstable and seasonal transmission of malaria, protective immunity is generally low, and all age groups of the population are at risk of the disease. The central highlands, which are >2,500 meters above sea level are generally free of malaria (1, 2, 4).

The Federal Ministry of Health (FMoH) of Ethiopia plans a strategy to achieve malaria elimination within specific geographical areas with historically low malaria transmission and zero deaths due to malaria in areas with malaria transmission by 2020 (2).

In areas where control measures are intensified, the proportion of cases due to *P. falciparum* may decrease; *P. vivax* appears to be responding less quickly to control measures because it can tolerate a wider range of environmental conditions and because the dormant liver stage (hypnozoite) enables infections to persist in the absence of mosquito transmission (5).

According to EMIS 2015, overall malaria prevalence in Ethiopia among all age groups living in malarious areas was 0.5% and 1.2% by microscopy and RDT respectively. By region, Gambella (6%) and Benshangul Gumuz (3%) reported the highest prevalence by microscopy (4).

In 2014/2015, Amhara region malaria statistics report indicated 615,945 (7.3% from total patient) malaria cases with 29 % test positivity rate, and annual prevalence rate was 30.1 /1000 risk population decreased by 10% of cases compared with 2013/2014 report. Confirmed and clinical malaria cases were 614,542 (99.8%), and 1,403(0.2%) respectively (6).

Malaria is a major public health problem in south Gondar zone which is 82% of the total populations being at risk of developing the disease annually. Distribution of 2014/2015 malaria cases decreased by 10% at regional level but at South Gondar zone, the distribution is increased by 15.2% compared with 2014/2015 report (6). The aim of the study was to analyze malaria burden over time periods in South Gondar zone from 2011/2012 through 2014/2015 G.C.

Literature review

Globally, *P. falciparum* and *vivax* is responsible for 95 % cases of malaria. In Ethiopia, *P. falciparum* and *vivax* accounts 60-70 % and 30-40% respectively. *P. Falciparum* is the dominant parasite species in malaria epidemic situations, and this species causes severe and complicated manifestations and almost all malaria deaths (1, 5).

The study conducted in Bata district, Equatorial Guinea showed overall RDT-based prevalence (test positivity rate) of malaria was 46.2 % (7).

According to malaria surveillance data in Ethiopia, prevalence of total malaria out-patients (clinical and confirmed) in the overall population averaged 23.4 per 1000 persons per year over 2005 to 2008 and reported malaria in-patient admissions and deaths averaging 6.4 per 10,000 and 2.3 per 100,000 per year respectively. *P. falciparum* and *p. vivax* accounted 67% and 33% respectively (8).

According to health related indicators in 2014/2015, the total numbers of laboratory-confirmed plus clinical malaria cases were 2,174,707. Of those cases, 1,867,059 (85.9%) were confirmed by

either microscopy or rapid diagnostic tests (RDTs) out of which 1,188,627 (63.7%) were *P. falciparum* and 678,432 (36.3%) were *P. vivax* (9)

A cross sectional study conducted in Wolaita Zone, Southern Ethiopia showed that mean annual malaria occurrence of 21,151 cases with 33.27% of test positivity rate. Predominantly reported species was *P. falciparum* with 71.80%. Majority of reported cases were in the age group of ≥ 15 years consistently across years with 58.80% of the overall prevalence (10).

Cross sectional study conducted in low transmission area Hadiya Zone, Ethiopia revealed test positivity rate was 25.8% by microscopy. Of these, *P. vivax* and *P. falciparum* (including mixed) infection accounted 71.7% and 28.3% respectively (3).

Cross sectional study conducted in Butajira district, Southern Ethiopia showed the prevalence of malaria cases were 9.3 per 1000 population. Regarding to plasmodium species 86.5% were *Plasmodium vivax* and 13.5% *Plasmodium falciparum* including mixed infections (11).

Rationale of malaria data analysis

Carefully assessed and analyzed routine malaria surveillance data making essential contributions to understanding the malaria burden, how it varies over space and time, and the impact of control measures and climate on malaria. Even though malaria surveillance has been implementing in Ethiopia, there is limited regular dissemination of surveillance data analysis and feed back to health care providers. Regular data analysis and timely providing feedback will inform and motivate health care providers, guide public health intervention, allow monitoring of malaria season, identify population at risk, clearly make out trends of malaria and stratification of malaria endemic area. Therefore, this surveillance data analysis aimed to analysis or describes malaria burden in South Gondar zone.

Objectives

General Objective:

- ❖ To determine malaria surveillance data in the last four years period from 2011/2012 through 2014/2015 G.C. in South Gondar zone, North-West Ethiopia, 2016.

Specific Objectives

- To identify magnitude of malaria morbidity & mortality in South Gondar zone.
- To describe malaria surveillance data with respect to person, place and time.
- To stratify malaria risk areas of the district depend on annual parasite incidence rate.

Methods and Materials

Study area and period: The study was conducted in South Gondar zone, North-West Ethiopia from 29 January to 13 February 2016. The zone administratively divided into 10 districts (locally termed *woredas*) and 02 town administration with total populations of 2,442,603 (2,296, 047 rural and 146,556 urban) including 330,729 under-five years children residences based on 2007 G.C. census projection. Malaria at risk populations were 1,931,987. The zone has four hospitals, 93 health centers, 11 medium clinics and 377 health posts.

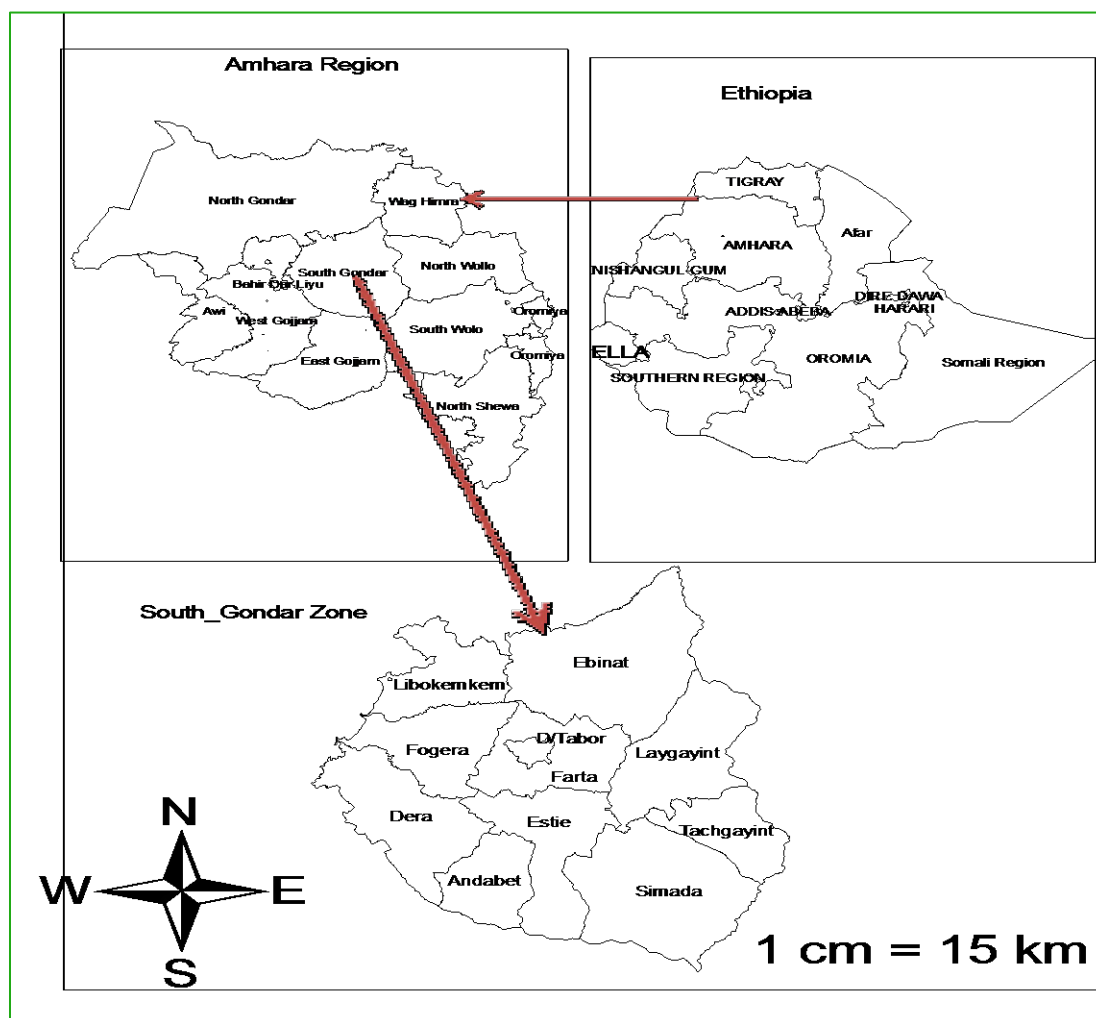


Figure 10: Location of South Gondar zone found in Amhara region, Ethiopia, 2016.

Study design: Descriptive cross sectional study design was conducted.

Source population: Total catchment population at risk for malaria in South Gondar zone.

Study Population: Malaria cases in south Gondar zone in the last four years from 2011/2012 – 2014/2015.

Sample size and sampling technique: Purposive sampling method was used to select one administrative zone from the region based on relative high burden of malaria cases compared to all zones.

Data collection instrument and procedure: Semi- Structured questionnaire and checklist were developed based on malaria indicators used to collect secondary data. I interviewed relevant officers and observed on the wall posted charts and tables.

Operational definition

Malaria case definition (1, 5)

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

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

Annual parasite incidence: $(\text{Confirmed malaria cases} \times 1000) / \text{malaria risk populations}$

Data quality control, processing and analysis: The collected data were reviewed and checked manually for completeness and consistency before data entry, then data were entered, cleaned and analyzed using Microsoft Excel 2010. The annual parasite incidence rates by district setting were mapped using the Geographical Information System Arc-GIS version 10.1. Descriptive statistics including Proportion, percentage, ratios, frequency tables and figures, mean, median and dispersion were used for presenting the findings.

Ethical Consideration: Official letter was obtained from Amhara regional PHEM unit. I explained the objectives of the study, confidentiality to the zone, and obtained permission.

Dissemination of the results: The results of the study was submitted and presented to the SPH-AAU and the respective zone health department and regional health bureau with a hard copy and soft copy, and other stakeholders those who needed to know and working with together.

Results

Malaria morbidity and mortality

Overall malaria burden in the last four years before the study, Of 2,594,927 patients visited at OPD during a period; 1,045,589 (40.29%) of a total patients were suspected malaria and laboratory done for malaria confirmation. Of 2,594,927 OPD patients, 523,159 (20.2%) were malaria cases (range 11.7% - 27.3%) (See fig below).

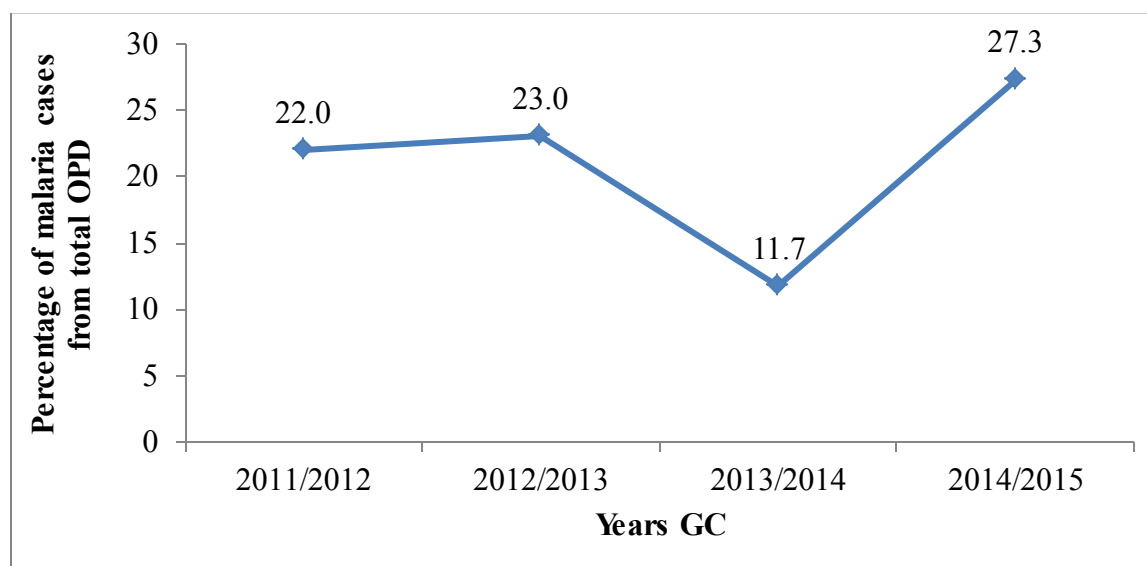


Figure 11: Trend of malaria cases proportion from total OPD in South Gondar zone from 2011/2012 – 2014/2015 GC.

Source: PHEM weekly report, South Gondar zone from 2011/2012 – 2014/2015 GC.

Average annual malaria prevalence rate in the last four years was 130,796/1,931,987 (67.7 cases per 1000 risk population per year) (range 44.3 to 106.1 cases per 1000 risk population) (see below fig).

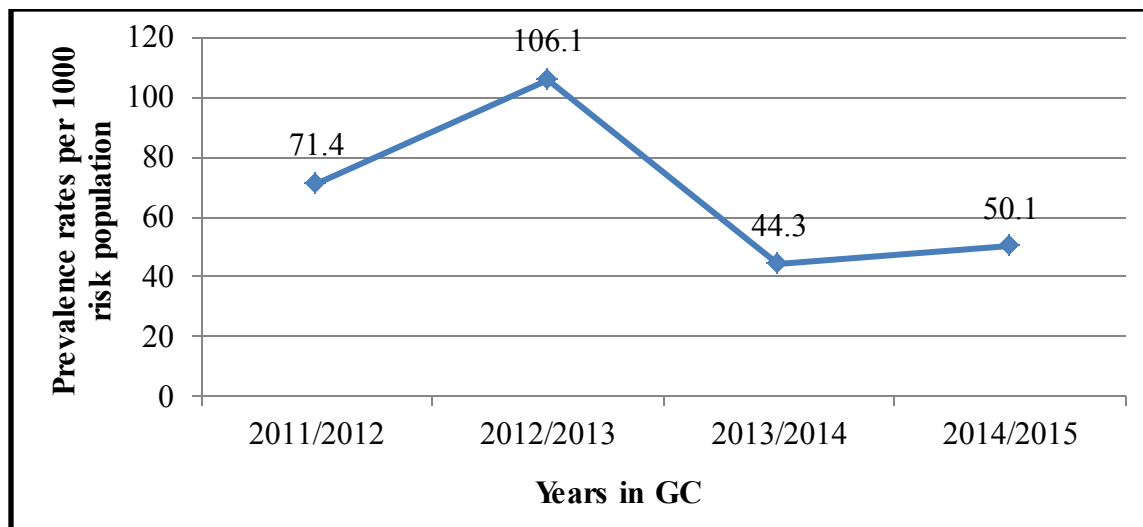


Figure 12: Trend of annual malaria prevalence rate in South Gondar zone from 2011/2012 – 2014/2015 GC.

Malaria test positivity rate: Among the total laboratory done in the last four years were 608,492(58.2%) blood film (BF), and 437,097 (41.8%) rapid diagnostic test (RDT). Average test positivity rate both RDT and BF over the last four years were 45% (range 30% to 78%). Percentage of cases due to plasmodium species among confirmed malaria cases, average p. falciparum and p. vivax covered 65.81% (range 61.5% to 68.8%) and 34.19% (range 31.3% to 38.5%) respectively (see below figure).

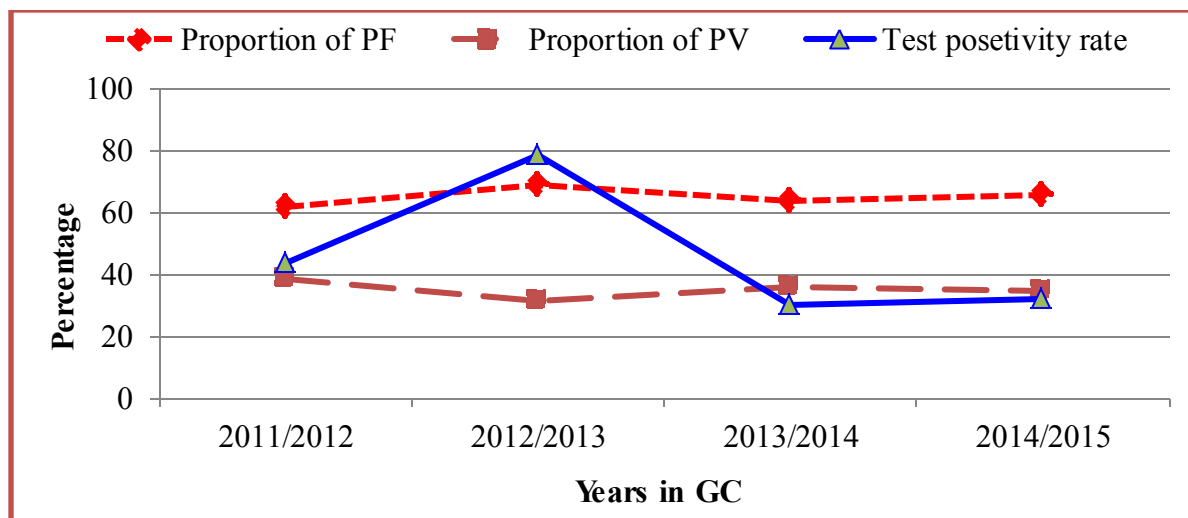


Figure 13: Trend of annual test positivity rate and plasmodium species in South Gondar zone from 2011/2012 – 2014/2015.

Average annual malaria cases burden in the last four years from the outpatient morbidity was plasmodium falciparum 11.91% and plasmodium vivax 6.2%. Percentage of malaria inpatient cases were 6.82% from a total of 17,278 inpatient cases. Percentage of death cases 1.9% from a total of 455 death and pregnant malaria cases were 0.44% from a total of malaria cases.

Average annual estimated inpatient malaria case rate was 1.5 (range 0.4 to 2.7) per 10,000 risk population per year, whereas inpatient malaria death rate was 0.1 (range 0 to 0.4) per 100,000 risk population per year. Average annual estimated percentage of malaria clinical cases was 9.86% (range 0.02 to 35.95%).

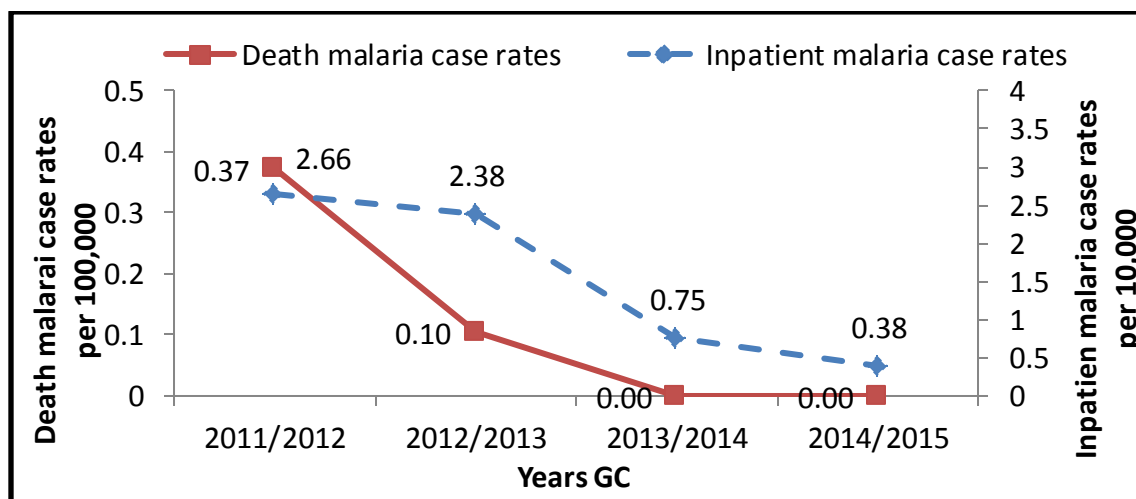


Figure 14: Trend of death and inpatient malaria cases rate in South Gondar zone from 2011/2012 – 2014/2015.

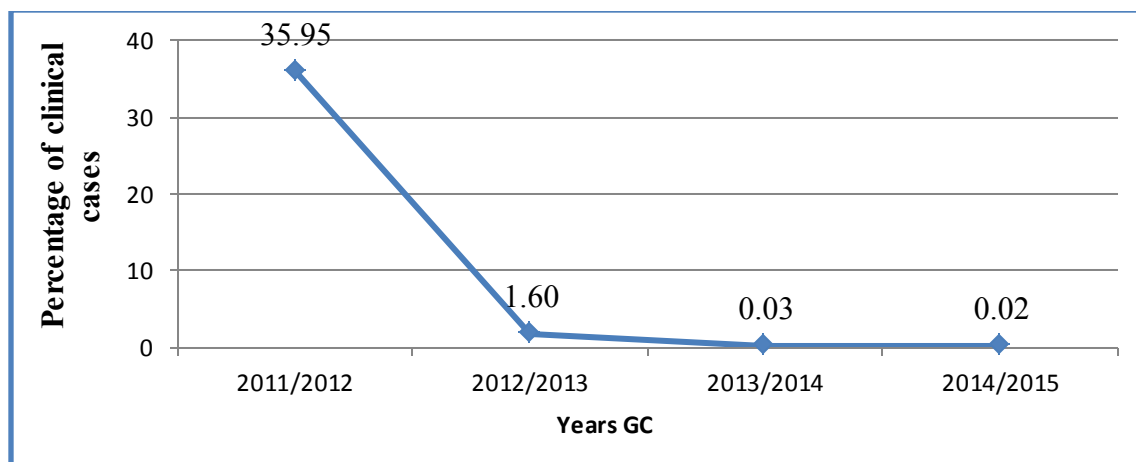


Figure 15: Trend of clinical cases in South Gondar zone from 2011/2012 – 2014/2015.

Malaria cases distribution by age group: Age specific malaria attack rate per risk groups were 4.44 % <5, 3.51% 5-14, and 8.97% ≥15 years.

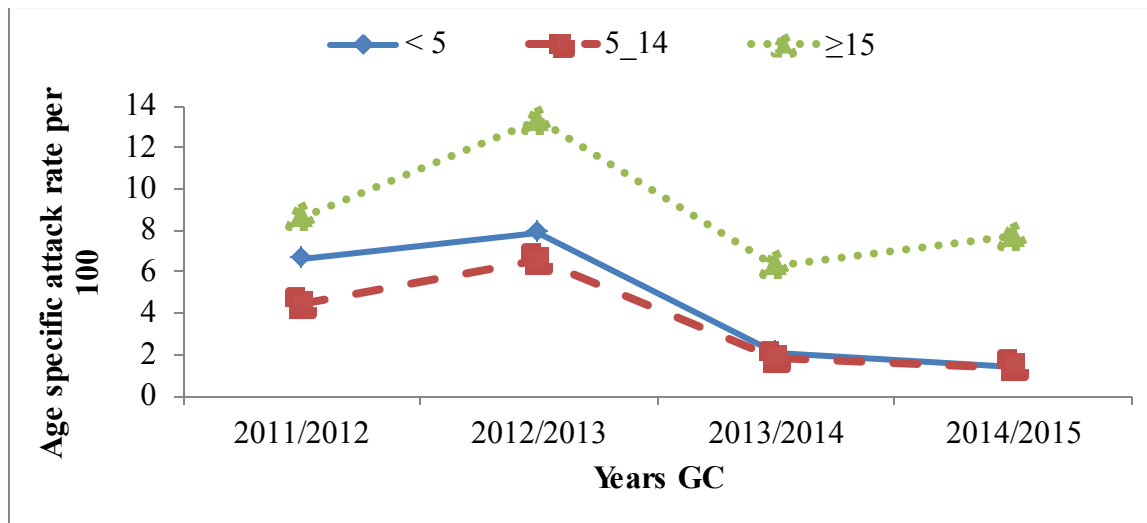


Figure 16: Age specific malaria attack rate in South Gondar zone from 2011/2012 – 2014/2015.

Malaria stratification: On the basis of average annual malaria parasite incidence rate; Dera and Fogera districts were the highest, whereas the lowest was Debretabor town.

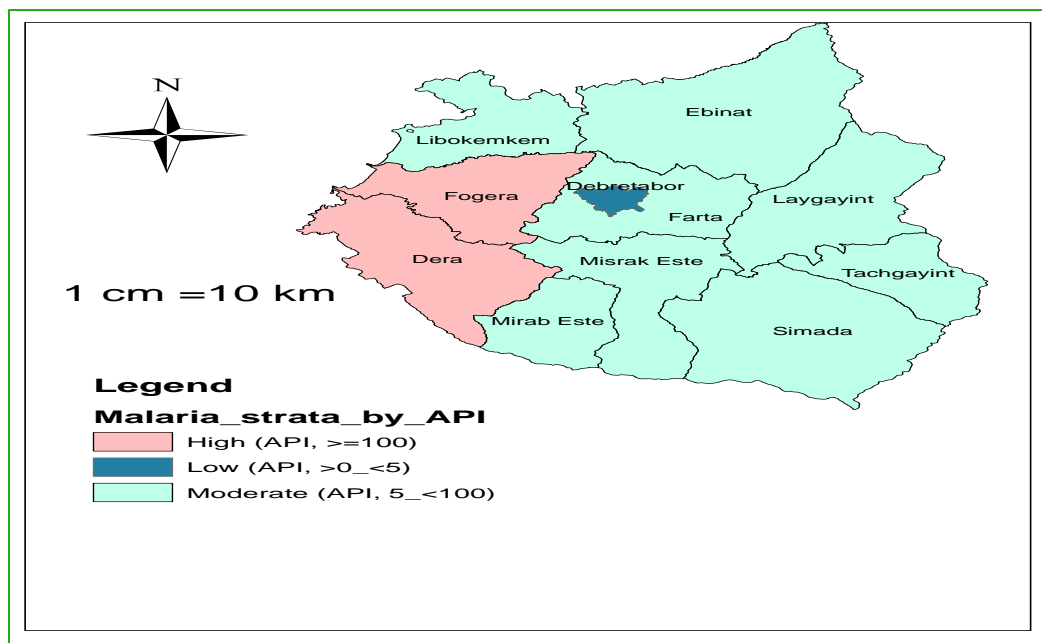


Figure 17: Malaria stratification by district based on average annual parasite incidence rate in South Gondar Zone from 2011/2012 – 2014/2015.

Vector control measures

According to Public health emergency management report, Long Lasting Insecticide Nets (LLINs) coverage by households was 85% in 2011/2012, 86% in 2012/2013, 69% in 2013/2014, and 91% in 2014/2015. However, there was no any information available about LLIN utilization.

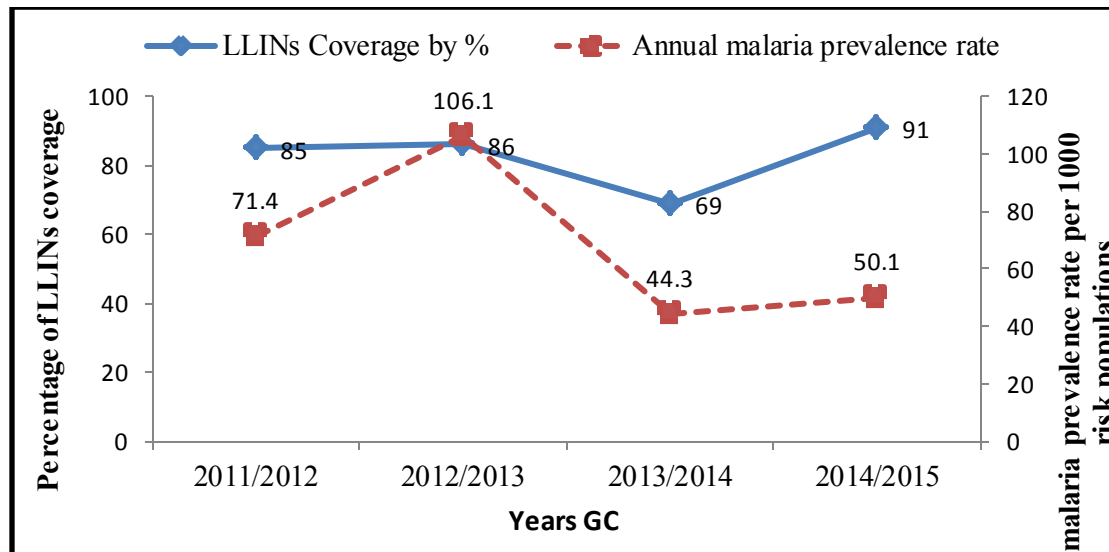


Figure 18: Relationship of LLINs coverage and annual malaria prevalence rate by years in South Gondar zone 2011/2012 – 2014/2015.

Regarding to Indoor Residual Spray (IRS) targeted households in malarious areas sprayed coverage in the last four years were ranged from 62.5% to 89.6% (see table 6).

Table 6: The relationship of IRS coverage and average estimated malaria prevalence rate in South Gondar Zone from 2011/2012 – 2014/2015.

| Year in GC | Coverage of sprayed unit structures (%) | Coverage of population protected (%) | Prevalence rate per 1000 risk population per year |
|------------|---|--------------------------------------|---|
| 2011/2012 | 64 | 62.5 | 71.39 |
| 2012/2013 | 96 | 89.6 | 106.06 |
| 2013/2014 | 85 | 88 | 44.29 |
| 2014/2015 | 83 | 84 | 50.12 |

Weekly Public health emergency management report completeness

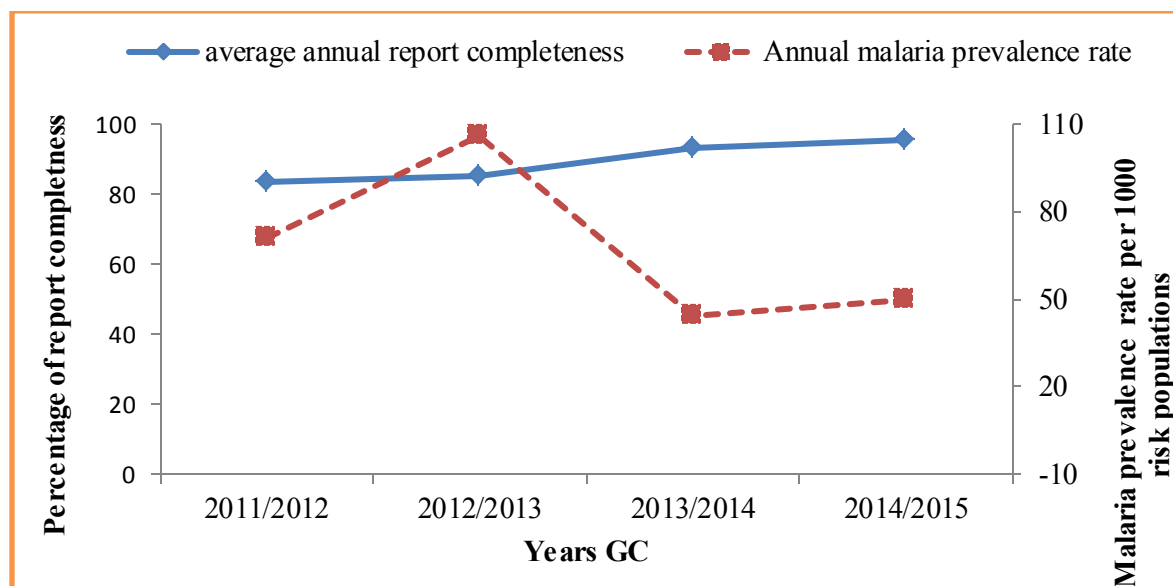


Figure 19: The relationship between report completeness and trend of malaria prevalence rate in South Gondar zone from 2011/2012 – 2014/2015GC.

Discussion

In this study, a total of clinical and confirmed average annual estimated malaria prevalence rate was 67.7 per 1000 risk population per year in the last four years before the study; it was highest prevalence rate to compare with Amhara region annually reported (6), EMIS 2015 (4), malaria surveillance data analysis in Ethiopia (8), and Butajira district (11). The higher rate in South Gondar zone might be due to geographical and climatic condition differences. Across the districts, during the last four years average annual malaria prevalence rates were high in Dera and Fogera districts and low in Debretabor town the remaining were moderate based on national malaria strategic plan 2014-2020 (2).

Average annual malaria cases inpatient and death rates were lower than the result of malaria surveillance data analysis in Ethiopia (8). This might be improvement of early diagnosis and treatment malaria control and prevention strategy.

Regarding to distribution of malaria annual estimated prevalence rate by age group in the last four years, majority of reported cases were in the age group of ≥ 15 years consistently across

years and places, in line with the study done in Wolaita zone, Southern Ethiopia (10), and with national malaria guide line (1). The highest morbidity rate in the adult population might be significantly reducing productivity in the zone as well as the region. The proportion of under-five children age group malaria cases was decreased from 2011/12 through 2014/15 exponentially dropped by 69.73%.

Average annual test positivity rate (Microscopic and RDT) in South Gondar zone was the highest (45.1%) compared with Amhara regional state annual reported (6), the study done in Wolaita zone, Southern Ethiopia (10), in Hadiya zone (3) and Bata district Equatorial Guinea (7). Of the total confirmed malaria cases, the predominantly reported species was *P. falciparum* consistent with Amhara region annually reported (6), national malaria guideline (1), health related indicator 2014/2015 (9), malaria surveillance data analysis (8), and study done in Wolaita zone (10). However, contrast with the study done in Hadiya zone and Butajira district Central Ethiopia (11).

The annual prevalence rate of malaria cases varies from year to year. The highest malaria prevalence rate was registered in 2012/2013 increased by two folds compared to 2011/2012 years and the lowest was registered in 2013/2014 years reduced nearly by 3 folds compared to 2012/2013 years. There was slightly increment confirmed malaria cases in 2014/2015 compared to 2013/2014 year. Generally, there was intermittent trend of confirmed out-patient malaria over time period. There was no clear declining trend in the number of malaria out-patients confirmed cases. However, the clinical malaria cases, inpatient and death of malaria cases reached near to zero time to time in South Gondar zone.

In this study, the relationship of LLINs and IRS coverage trends and malaria prevalence rates were controversial. This might be due to either poor documentation technique or poor LLINs utilization (there is no any information available in LLINs utilization overall the time periods) or any chemical resistance of the mosquitos.

The overall report completeness during the last four years before the study was slightly increased year to year. However, the malaria cases distribution was intermittent or up and down slop overall time period.

Limitations of the study

In this study, the level of malaria occurrence might be underestimated as secondary surveillance data might be incomplete and cases counted are only those cases detected and reported passively at health institutions. This may not have been a true reflection of all the malaria cases in the community.

The secondary data information may be imprecise, limited to some variables or incomplete. There were difficult to confirm any malaria disease control and prevention strategies in the community like LLINs utilization rate and IRS sprayed status. Due to this reason could not conclude the relationship of malaria intervention and prevalence rates without operational research.

Conclusion

This study found that malaria is still a major source of morbidity in South Gondar zone among outpatient visits. In this study, the highest affected age group was ≥ 15 year populations. Generally, there was intermittent trend of confirmed out-patient malaria cases in the last four years before the study period. However, the clinical malaria cases, inpatient and death of malaria cases reached near to zero time to time in the study area. Thus, the study suggests that the scale up of interventions (early diagnosis and prompt treatment) had considerable impact on malaria in-patient cases and mortality reduction, as reported from health centers and hospitals. However, there is the problem of scale up of malaria related intervention special LLINs utilization and IRS support because of there is very high flow of outpatient morbidity of malaria cases and *P. falciparum* was persistently predominant parasite species throughout the time period.

Recommendation

- To evaluate the impact of LLINs and IRS control and prevention measures on malaria, further assessment or operational research should be done.
- Zonal health department should do LLINs utilization surveillance and documentation.
- Zonal health department should scale up malaria related interventions, strengthen health systems, and make a major effort to reduce the impact of malaria.

Reference

1. Federal Ministry of Health. National Malaria Guidelines. Addis Ababa; 2012.
2. Federal Ministry of Health. National malaria program monitoring and evaluation plan 2014–2020. Federal Democratic Republic of Ethiopia Ministry of Health. Addis Ababa; 2014.
3. Delil RK, Dileba TK, Habtu YA. Magnitude of Malaria and Factors among Febrile Cases in Low Transmission Areas of Hadiya Zone , Ethiopia : A Facility Based Cross Sectional Study. 2016;76:1–17.
4. Ethiopian Public Health Institute. Ethiopia National Malaria Indicator Survey 2015. Addis Ababa, Ethiopia. 2015;
5. World Health Organization. Disease surveillance for Malaria control an operational manual. 2012;
6. Amhara Regional Health Bureau. Amhara Regional Health Bureau Public Health Emergency Bureau annual malaria report. 2014.
7. Ncogo P, Herrador Z, Barja MR, Carrasco EG, Nseng G, Berzosa P, et al. Malaria prevalence in Bata district , Equatorial Guinea : a cross - sectional study. Malar J. BioMed Central; 2015;1–10.
8. Jima D, Wondabeku M, Alemu A, Teferra A, Awel N, Deressa W, et al. Analysis of malaria surveillance data in Ethiopia : what can be learned from the Integrated Disease Surveillance and Response System? Malar J [Internet]. Malaria Journal; 2012;11(1):1. Available from: Malaria Journal
9. Federal Ministry of Health. Health and Health Related Indicators 2007 E.C. (2014/2015 G.C.). Addis Ababa. 2015;1:1–66.
10. Legesse D, Haji Y, Abreha S. Trend Analysis of Malaria Occurrence in Wolaita Zone , Southern Ethiopia : Retrospective Cross-Sectional Study. 2015;2015.
11. Woyessa A, Deressa W, Ali A, and Lindtjorn B. Prevalence of malaria infection in Butajira area ,. 2012;1–8.

CHAPTER III: EVALUATION OF SURVEILLANCE SYSTEM

3.1. Evaluation of Public Health Surveillance System in West Gojjam Zone North West Ethiopia, 2016

Abstract

Background: Regular and relevant evaluations of surveillance systems are essential to improve their performance and cost-effectiveness. The aim of this study was to evaluate the efficiency and effectiveness of the surveillance system and the finding can be used as an input to strengthen the overall surveillance system activities of the zone.

Methods and Materials: We conducted descriptive cross-sectional study from June 20 to July 05, 2016, in West Gojjam zone. A total of 12 study subjects were enrolled in the study. Data were collected using semi-structured questionnaires on face to face interview and observation. Data were entered and analyzed using the Microsoft Excel 2010. Text, frequency tables and figures were used for presenting the results.

Results: Total population under the surveillance is 2,560,131. Malaria, measles and pandemic influenza were the major diseases of public health importance in the zone. In 2015/2016, malaria prevalence and admission rate per risk population was 34.33 per 1000 and 2.1 per 10,000 respectively with 0 deaths. Measles and pandemic influenza prevalence rate per risk population was 6.6 per 100,000 and 77.03 per 100,000 respectively. There was no regular supportive supervision. Timeliness reporting rate was 99.87% and 85.57% governmental and other health facilities respectively. None of the assessed health offices and health facilities investigated outbreak using standard investigation checklist. Data analysis was not routinely practiced in all visited districts and health facilities. Majority of public health surveillance systems were passive, due to this reason, the collected data might be incomplete. The surveillance system was more-or-less simple, flexible, acceptable, useful but not representative.

Conclusion and recommendation: Some of surveillance activities of the zone were not satisfactory and efforts should be exerted to improve the system mainly on supportive supervision, emergency preparedness, proper and timely feedback, outbreak investigation, data management and analysis of prioritized diseases.

Keywords: Surveillance evaluation, West Gojjam zone, 2014/2015.

Introduction

Background

Public health surveillance is an ongoing, systematic collection, analysis, and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice, with timely dissemination of these data to those who are responsible for action; it also defined as “Information for Action” (1). Surveillance is carried out through a system which has legal support and extending from the central health authorities down to the peripheral health facilities and community level through sets of communication channels. These sets include upward and down ward reporting and feedback mechanism respectively (1, 2).

Diseases control and prevention programs have been successful when resources were dedicated to detecting targeted diseases, obtaining laboratory confirmation of the disease, and using thresholds to initiate action at the district level. Accordingly, the World Health Organization (WHO) Regional Office for Africa (AFRO) proposed an Integrated Disease Surveillance and Response (IDSR) approach for improving public health surveillance and response in the African Region linking community, health facility, district and national levels. IDSR promotes rational use of resources by integrating and streamlining common surveillance activities. Surveillance activities for different diseases involve similar functions (detection, reporting, analysis, interpretation, feedback, action) and often use the same structures, processes and personnel (1).

The Ethiopian Ministry of Health has designed a new system to ensure rapid detection of any public health threats, preparedness related to logistic and fund administration and prompt response to and recovery from various public health emergencies. The system is fully integrated, adaptable, all-hazards and all health approach national preparedness and response system. The system comprised of four major components, which included Public Health Emergency Preparedness, Early Warning, Response, and Recovery. The major component of the early warning is surveillance of diseases. As Surveillance is a cyclic process; it interacts, and is linked with other major components and activities. It is clear that surveillance could not be carried out for all diseases and conditions. Therefore, priority should be given to those diseases having interest at national and international levels. Ethiopian Ministry of Health (MOH) currently identified 21 top priority diseases and conditions (13 immediately reportable and 8 weekly

reportable) for surveillance activities that are epidemic prone, internationally required under IHR 2005, public health importance and diseases targeted for eradication and elimination. These diseases are set to be reported as mandatory notification by designated bodies through available means of communication (telephone, email and paper based reporting so on) to the next level according to the reporting period (immediately or weekly) (2). In addition to these, there is one region specific disease in Amhara that is called *Visceral Leishmaniasis or Kala-aza*.

After a decision has been made to undertake surveillance for a particular health problem adopting or, if necessary, developing an operational definition of the health problem for surveillance is necessary for the health problem to be accurately, reliably recognized, and counted. The operational definition consists of one or more criteria are known as the **case definition** for surveillance (3).

Overall purpose of surveillance of all diseases is to monitor the trend against the stated tolerance limits, as early warning and response system, and pick any deviation from the limit at the earliest point in time for prompt response to assess diseases performance activities and attributes of surveillance system. Public health surveillance systems should be evaluated periodically to assure the effectiveness and efficiency of the systems to achieve the surveillance objectives. The purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively (4).

Malaria, pandemic influenza and measles are highly burdens to the public or public health importance, epidemic potential and targeted for elimination diseases respectively among 21 priorities identified in Ethiopia. Malaria is a major public health problem in Ethiopia and has been consistently reported as one of the three leading causes of morbidity and mortality. Malaria is mainly seasonal in the highland fringe areas and of relatively longer transmission duration in lowland areas, river basins and valleys (5). Due to the unstable and seasonal pattern of malaria transmission, the protective immunity of the population is generally low, and all age groups are at risk of infection and disease. Most malaria cases are observed in persons over five years of age, although children under five and pregnant women are most vulnerable to the severe effects of infection (6).

An influenza pandemic occurs when a new influenza A virus emerges with efficient and sustained human-to human transmission in populations with limited immunity. Influenza pandemics occurred in 1918, 1957, and 1968. The 1918 pandemic killed an estimated 40–50 million people. It is predicted that a pandemic of equivalent magnitude could kill 62 million people, 96% of them in developing countries. Successful containment or control of pandemic influenza is dependent on early recognition of sustained human-to-human transmission. Countries have been encouraged as part of pandemic preparedness planning to enhance surveillance. Influenza A (H1N1) 2009, on 11 June 2009, WHO declared a global pandemic due to influenza A (H1N1) 2009 virus and 8 October 2009, 195 countries, territories and areas had reported cases and/or outbreaks of pandemic (H1N1) virus. The spectrum of disease ranges from non-febrile, mild upper respiratory tract illness to severe or fatal pneumonia (1).

Measles is one of the communicable disease causing preventable mortality and morbidity in the country. Epidemiological surveillance of measles is a major public health strategy in prevention and control of disease. Ethiopia is working towards measles elimination by 2020. The National immunization program was established in the 1980s, and currently delivers service through static and outreach sites nationwide (7).

Critical to maintaining useful, cost-effective surveillance is periodic evaluation and implementation of recommended improvements. Stakeholders should be identified and included in evaluation processes; a clear description and diagram of surveillance activities and attributes should be developed for those most important for the surveillance objectives (monitoring diseases trends, detect the outbreaks, estimate the magnitude of the diseases, stimulate epidemiologic research and identify the risk factors) and the usefulness, resource requirements, and characteristics of optimal surveillance should be individually assessed (3).

Therefore, we have planned to evaluate the surveillance system of selected diseases of West Gojjam zone. The aim of this study was to assess the existing of malaria, measles and pandemic influenza surveillance system to achieve the intended objectives and the finding can be used as an input to strengthen the overall surveillance system activities of the zone.

Rational of the study

Malaria, pandemic influenza and measles diseases have public health importance in Ethiopia as well as West Gojjam zone. Surveillance system evaluation is an important tool to evaluate the capacity of the system to meet its purpose and objectives; to improve its operation and to optimize the available resources. However, as my knowledge in West Gojjam zone, surveillance system evaluation was not done recently. Therefore, we conducted a surveillance system evaluation in the zone to evaluate the existing of malaria, measles and pandemic influenza surveillance system; the finding of this evaluation can be used as an input to strengthen the overall surveillance system activities of zone to achieve its intended objectives and purpose.

Objectives of evaluation

General Objective:

- To evaluate the existing of malaria, measles and pandemic influenza surveillance systems in West Gojjam zone, North-West Ethiopia, 2016.

Specific Objectives:

- To assess the core activities such as case detection, registration, reporting, analysis and response of surveillance system of West Gojjam zone, 2016.
- To assess the supportive activities of surveillance (training, supportive supervision, resource) in West Gojjam zone 2016.
- To assess the available resources for surveillance system in West Gojjam zone 2016.
- To evaluate the attributes of surveillance system in West Gojjam zone 2016.

Methods and Materials

Study area/ setting: The study was conducted in West Gojjam zone, North-West Ethiopia 2016. West Gojjam zone is one of the 10 zones and 03 town administrations of Amhara region; which consists of 13 districts and 02 town administrations including 363 rural and 31 urban kebeles. The zone has a total population of 2,560,131 under the surveillance, females and under-five children account 1,318,468 (51.5%) and 346,642 (13.54%) respectively. Of the total

populations, 358,507 (14%) are urban inhabitants. Primary health care coverage is 58.6% general hospital, 23.4% primary hospitals, 100% health centers, and 72% health posts.

Jabitehnan, Dembecha & Burie town are the districts in where the evaluation has been conducted. The total population each district has 214,763, 153,787 & 54,268 respectively.

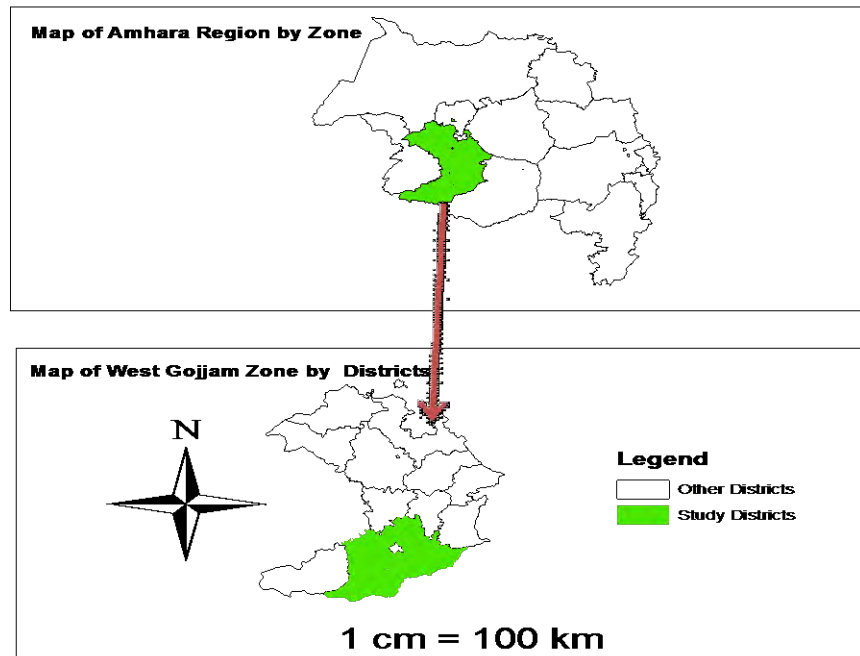


Figure 20: Map of the study areas in West Gojjam zone, North-West Ethiopia, 2016.

Study design and period: We conducted cross sectional study from Jun 20 to July 05, 2016.

Source population: All health facilities those are found in West Gojjam zone, North-West Ethiopia, 2016.

Study population: All functional health facilities have been available in the zone during the study period starting from the beginning of the year.

Sample size: A total of 12 (05 health posts, 03 health centers, 03 district health offices and zonal health department) were included in the study.

Sampling technique: Purposive sampling method was used to select one zone from the region based on relative high burden of selected diseases; and three district health offices were selected

by presenting good, medium and poor surveillance practices by consultation with zonal PHEM officers, and also health facilities were selected using simple random sampling techniques.

Study unit: The study units were zonal, district public health emergency management units and health facilities.

Data collection instrument and procedure: Semi- structured questionnaire was adapted through review of CDC surveillance system evaluation guideline and others outputs were done previously. We collected data using face to face interview at zonal, districts, and facility based key informants; and also observations and document review were conducted.

Operational definition

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.

Case definition: is a set of criteria used to decide if a person has a particular disease, or if the case can be considered for reporting and investigating.

Standard case definition: is a case definition that is agreed up on to be used by everyone within the country. Standard case definition can be classified as confirmed, probable and possible or suspected.

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

Sensitivity: It is defined as: first, the proportion of cases of a disease or health condition detected by the surveillance system ($a / (a+c)$); the second, the system ability to detect epidemics.

Positive predictive value: is the proportion of reported cases that actually have true diseases under surveillance system ($a / (a+b)$).

Acceptability: It reflects the willingness of persons and organizations to participate in the surveillance system. It was measured quantitatively through reviewing completeness of report forms and timeliness of data reporting in the past year.

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

Flexibility: A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds.

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

Timeliness: Interval between the Occurrences of an adverse health event: (i) the recognition of the event, (ii) report of the event (iii) the implementation of control measures.

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

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

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

Standard Case definition of selected diseases

Suspected

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

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

Pandemic Influenza A: A person with acute febrile respiratory illness; fever, cough, sore throat, shortness of breath, difficulty in breathing or chest pains with onset within 7 days of close contact with a person who is a confirmed case of the new influenza A (H1N1) virus infection.

Confirmed

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

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

Pandemic Influenza A: An individual with laboratory confirmed new influenza A (H1N1) virus infection by real-time RT-PCR.

Community case definitions

Malaria: Any person with fever or fever with headache, back pain, chills, rigor, sweating, muscle pain, nausea, and vomiting.

Rash: Any person with fever and vesicular, maculopapular or pustular rashes on any part of the body.

Influenza like Illnesses: Any individual with fever, cough, sore throat, shorten breathing, chest pain; and/or has history of contact during the 7 days prior to the onset of symptoms with sick or dead birds, including chickens.

Data quality control, processing and analysis: Interview with key informants was conducted and all questionnaires were administered by a single interviewer to keep the consistency of administering the questions. The collected data were reviewed and checked for completeness, consistency and validity by reviewed document and regional data base review. Data were entered, cleaned and analyzed using Microsoft office Excel 2010. Text, frequency tables and diagrams were used for presenting the results.

Ethical considerations and Permission: No need of institutional review board approval and informed consent; because surveillance is public health practice conducted by government body with legal authorization and duty to perform activity to protect public health. However, formal permission letter was obtained from Amhara regional health bureau public health emergency management unit and consultation with the respective health departments.

Dissemination of the Study: The result of the study was submitted to the SPH- AAU and the respective district, zonal and regional health bureau with a hard copy and soft copy, and other stakeholders those who needed to work.

Results

Engagement of Stakeholders: The stakeholders that are engaged in malaria, measles and pandemic influenza A surveillance include; health workers such as public health professionals, surveillance focal persons, clinicians & laboratory technicians, health extension workers, health facilities (public, & private), managers & officers who are working at different levels of district health offices, zonal health department, regional health bureau & Ethiopian public health institute (EPHI), Partners working on public health surveillance such as World Health Organization (WHO) and United Nations Children's Fund (UNICEF) but not engaged community members and leaders to participate actively in the surveillance system.

Description of surveillance systems

Public health importance of the diseases

(Malaria, Measles and Pandemic influenza)

In 2015/2016, a total of 2,560,131 (91.7% malaria risk) populations were under surveillance in West Gojjam zone. In 2015/2016, the zone reported nationally notifiable diseases data such as malaria, pandemic influenza and measles have been major health problems. In 2015/2016, of 1,491,914 OPD & IPD visited patients, 390,696 (26.18%) were tested for malaria confirmation. Of these, 80,486 were positive for malaria with 20.6% test positivity rate. Of confirmed malaria cases plasmodium falciparum and plasmodium vivax accounted 49,887(62%) and 30,599(38%) respectively and 72 were clinical malaria. Of the total malaria cases 10,305 (12.79%) were under five children, 16,574 (20.57%), aged from 5-14, the remaining 53,679 (66.63%), ≥15 years old.

Of the total malaria cases, 37.7% were reported from Jabitehnan, 11.3% from Quarit, 7.5% from Sekela districts, and the remaining 43.5 % were reported from other 12 districts. Annual estimated malaria prevalence rate was 34.33 cases per 1000 risk population, and admission rate was 2.1 cases per 10,000 risk populations.

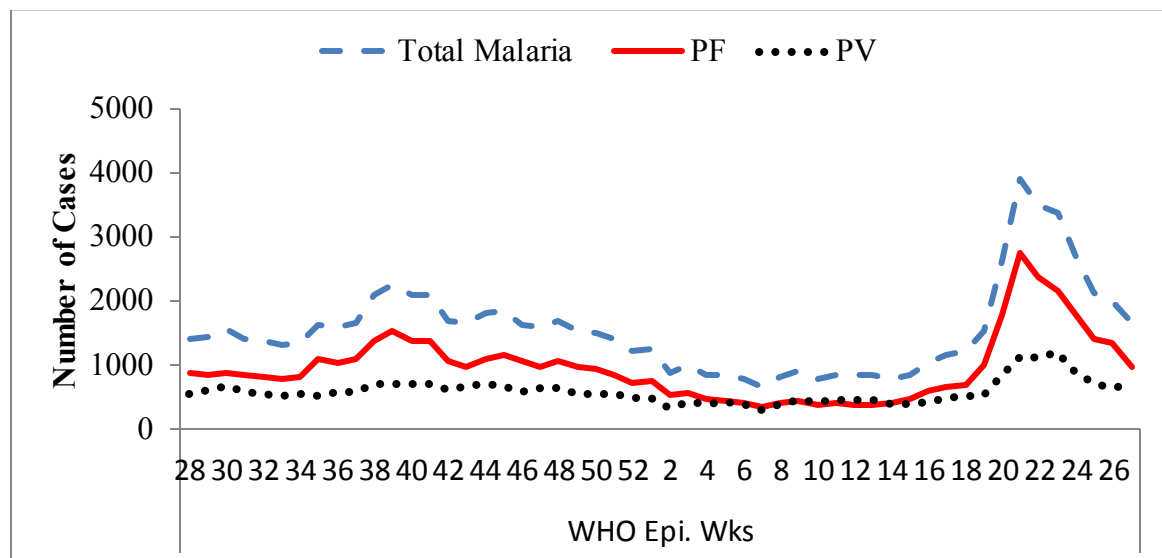


Figure 21: Distribution of malaria cases by time, in West Gojjam zone, 2015/2016.

A total of 169 measles cases were reported with annual estimated incidence rate of 6.6 per 100,000 risk population. There were seven positive cases for measles specific IgM with 63.6% positivity rate. However, the remaining were epidemiologically linked and suspected measles cases. The majority of cases were reported from North Achefer (47.9%) and Bahirdar Zuria (18.4%) in the zone.

In 2015/2016, there were 1972 pandemic influenza cases reported in the zone with incidence rate of 77.03 cases per 100,000 risk population. All cases were reported from Mecha district. Of the total of 06 specimens sent to confirmation, all were positive for pandemic influenza A(H1N1); the remaining was suspected cases based on WHO case definition. Both measles and pandemic influenza A cases were not complete line listed; only 343(17.4%) pandemic influenza cases were listed on line list. Of 343 notified line listed cases, 176(51.3%) were men as well as age group distribution were 64 (18.7%) under five years. There was no death case reported by pandemic influenza and measles outbreaks.

Pandemic influenza cases were notified and reach peak in WHO week 12, then the cases dropping sharply in four consecutive weeks.

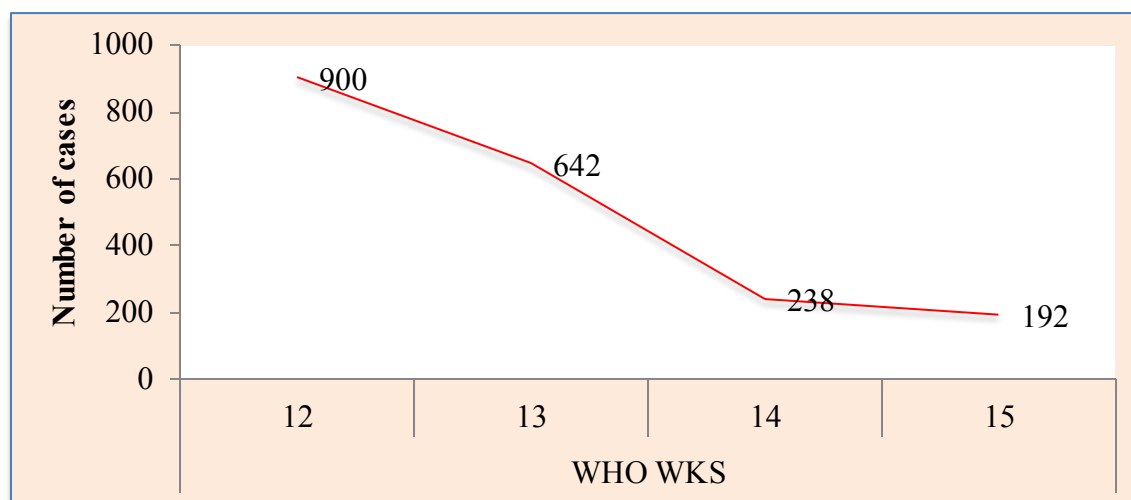


Figure 22: Distribution of pandemic influenza cases by week in West Gojjam zone, North-West Ethiopia, 2016.

Operation of the surveillance systems

Case detection, registration, confirmation, reporting and communication

At zone and district level there were assigned PHEM officers, at health center PHEM focal person and at health post health extension workers who have full responsibility on public health emergency management. Nowadays in the visited health facilities, district health offices and zone 22 (13 immediately and 9 weekly) diseases and conditions have existed and functional. In the zone, malaria, measles, and pandemic influenza were the major disease burdens of all the 22 priority diseases targeted under surveillance which were covered in this study.

Table 7: List of PHEM weekly and immediately reportable diseases and conditions

| Immediately Reportable | Weekly Reportable |
|---|---|
| <ol style="list-style-type: none"> 1. Acute Flaccid Paralysis(polio) 2. Anthrax 3. Avian Human Influenza 4. Cholera 5. Dracunculiasis / Guinea worm 6. Measles 7. Neonatal Tetanus 8. Pandemic Influenza A (H1N1) 9. Rabies 10. Smallpox 11. Severe Acute Respiratory Syndrome (SARS) 12. Viral Hemorrhagic Fever (VHF) 13. Yellow fever | <ol style="list-style-type: none"> 1. Dysentery 2. Malaria 3. Meningitis 4. Relapsing fever 5. Typhoid fever 6. Typhus 7. Malnutrition 8. Maternal Death 9. Visceral Lishmaniasis only in Amhara region |

The zone has a total of 2,560,131 populations with 14% urban residences under the surveillance based on 2007 census projection. In all assessed areas most of the time health care provider initiated (passive surveillance) was performed with in health facilities. Reporting forms, case definitions and reporting mechanisms were used to facilitate early warning system. A public health surveillance system is dependent on a clear case definition to detect for the health-related event under surveillance. Standard case definition for malaria, measles and pandemic influenza diseases were available in all visited district health office, health centers and zonal health departments. However, from 05 assessed health posts, only 1 (20%) had the community case definition for measles, but no had malaria and pandemic influenza in all visited areas. Health extension workers used IRT module they got during their training for detection or identification of suspected cases of the above selected diseases. The health professionals were detecting any suspected cases of malaria using the case definition and laboratory investigation using microscopes at the health center level. Rapid Diagnostic Tests (RDT) was done at health post

level for malaria confirmation. Measles and pandemic influenza identified using standard case definition at health center level. IRT module used as the community case definition were difficult, because of included all clinical signs and symptoms. This type of case definition is not loosely sensitive to detect all suspected cases. All assessed health centers were used clinical register and correctly recorded reportable diseases whereas none of the health posts had standardized clinical registration logbooks. Only malaria cases recorded on community health information system (CHIS) card and used talley sheet for PHEM weekly report.

The zonal health department and visited districts had PHEM guideline, reporting formats (weekly reporting format, line list, case based form and daily epidemic reporting format) except Burie town administration. However, health facilities didn't have the national PHEM guideline and updated (Amharic translated) guideline including case based formats and line lists at health posts. In all visited health centers different surveillance formats, specimen collection materials and cold chains were available specifically blood/serum, and stool materials. However, at all visited health posts there was no available of any formats except PHEM weekly report format. Specially in Burie town at woreda health office, health center and health posts, there was no available of PHEM weekly report form. Thought there was shortage of reporting form, they have reported to the next level by separated printed papers.

Communication and reporting system

A) Weekly reporting: Forty percent of the visited health posts sent report on Saturday to cluster health centers by travelers or delivered by health extension themselves due to inaccessibility of the network. All visited health centers provided report on Monday to districts by mobile communication and districts to zone provided report on Tuesday by mobile communication whereas the zone to the region sent on Wednesday by email communication.

B) Immediately reporting: Immediately reporting diseases should be reported within 30 minute to the next level. However, majority of the health facilities and district health offices didn't report as per PHEM guidelines. During outbreak period had daily communication to the next higher level by mobile starting from health center to zone, however the health post didn't report to cluster health centers.

The report flow is from health post/health center to district and from district to zone while the feedback is the inverse way (see figure below).

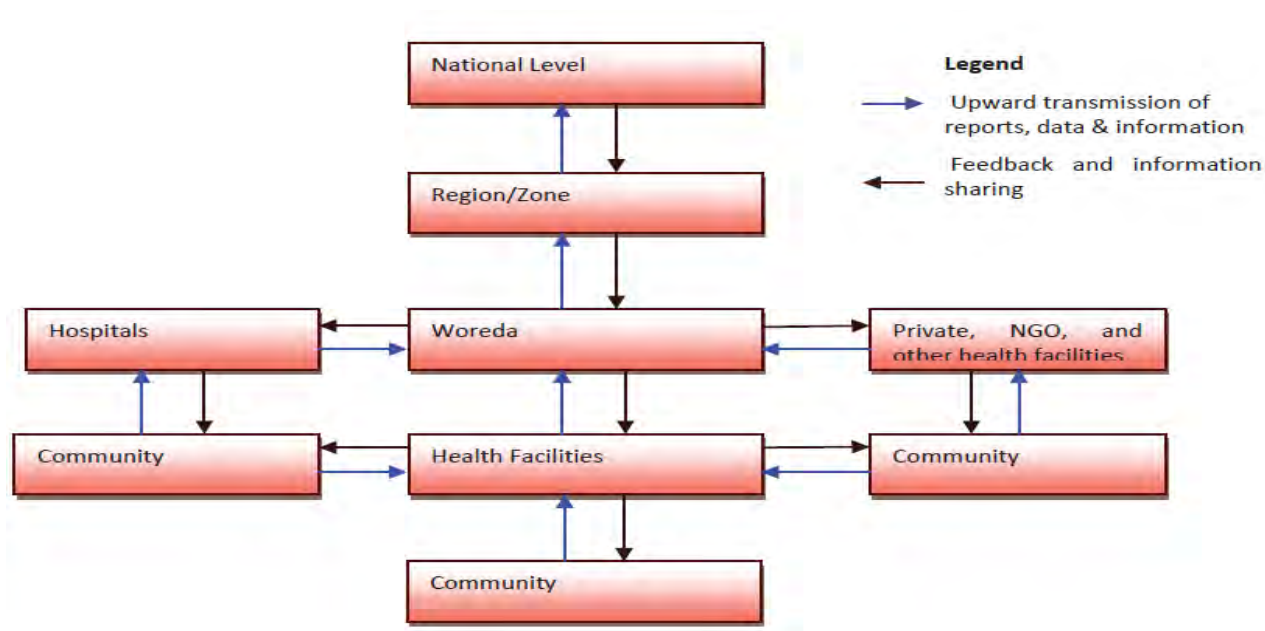


Figure 23: Diagram illustrating the formal and informal flow of surveillance data and information throughout a health system.

Source: Ministry of Health PHEM guideline, 2012.

Data analysis, Supportive supervision and Feed back

Of the three visited district health offices only one had computer and used for data entry and analysis. However, the other visited health centers and districts data analysis did manually using calculators and only malaria trend analysis available in visited districts except Burie town administration health office including health facilities. All the visited district health offices and health facilities had denominators of under surveillance population, male, female and under-5 year children which are very important to calculate epidemiological measures to determine burden of the diseases. The districts and health facilities analysis was not described by person and place, only by time in malaria monitoring chart. Even though weekly analysis was done at zonal level, there was no weekly regular feedback sent to the lower level. Moreover, all assessed health offices and health facilities data analysis and feedback was not done on regular basis.

The zone had a plan to supervise districts once quarterly surveillance program specific alone. But due to time shortage and transportation, there were not accomplished as per the plan. Zonal health department and district health offices did not conduct program specific supportive supervision, however, the zone and districts conducted as integrated supportive supervision in each quarter. All visited health centers and health posts had no plan for supervisions. From the assessed health facilities, never received documented feedback in 2015/2016 from higher levels. None of the health centers conducted supportive supervision for their respective health posts. Overall, there was no trend of written feedback provide from districts to health centers and health centers to health posts and health posts to the community.

Outbreak investigation and confirmation

In the assessed zone and districts, one or more types of outbreak were occurred in the 2015/2016. These were outbreaks of malaria, pandemic influenza and measles. However, none of these outbreaks were investigated by district or zonal level following the standard procedure of outbreak investigation. The only thing was laboratory confirmation done for a few measles and pandemic influenza cases, otherwise, no any information about risk factors and source of infection. Response was provided based on the clinical findings and confirmed laboratory samples. The zonal health department and all visited district health offices and health centers had no outbreak investigation checklists.

Epidemic preparedness and response

None of the assessed districts and health facilities had an epidemic preparedness plan. Rapid response team (RRT) and epidemic preparedness committee did not have scheduled prior to the outbreak occurrence. Neither the zonal health department nor the district health offices had budget and stoke of drugs for epidemic response. There was no car assigned for emergency response. The epidemic management committee and RRT activated only an event occurred.

Resources available to the surveillance systems

Resources for data management, communication, and stationery logistics were all available at zonal level. However, they all became very scarce down in the bottom. From all the 6 visited health offices and health centers the only once Jabitehnan had computer at the district office

level. All visited health offices and health centers had telephone service but not available at health post levels. There was no available other services at health facility level like fax machines, internet and so on. The logistic and budget constraints were complained by all visited health units from zone to health facilities.

Training: All assessed district health offices responded that all the district staffs working on surveillance units got short term training (3 days) by zonal health department, regional health bureau and partners. At the health facilities, only the focal person assigned for surveillance and health extensions were trained, other staffs didn't have detailed information about surveillance systems.

Surveillance system attributes and performance evaluation

Usefulness: The surveillance systems on the selected diseases were used to estimate the magnitude of the diseases, monitoring the trend, detecting the outbreaks, and give response. The systems were early warning tools and indicative of a potential risk areas and population to the respective diseases. The decision-makers and programme planners were used the surveillance data for priority setting and implement actions.

Simplicity: All the interviewed participants of health extension workers, health workers and officers replied that the selected surveillance system had simple case definitions, report record onto paper forms within 5-10 minutes, but they said that difficult of measles case based form to fill and manually data management of the surveillance system as well as reporting method (channel) at health post level. Active surveillance system performed at community level was difficult to access the remote areas and poor transportation system. The structure of the surveillance system was not yet included the health development armies to detect and notify the rumors. Laboratory confirmation of cases took only 15- 30 minutes in case of malaria but in case of measles and pandemic influenza it took 1 to 2 weeks. The data analysis was not simple in all selected diseases surveillance starting from the districts to the bottom.

Flexibility: In all visited districts and health facilities, respondents replied that the weekly form can be used to notify new diseases, the reporting format is open for newly emerged and re-emerging diseases and conditions that the existing surveillance system is flexible. Line list format has blank variables to use for recorded all diseases variables. Reporting period was

changed from weekly to daily when an outbreak occurred. Generally, it can accommodate newly occurring health events/diseases to fill on without any difficulty.

Data Quality: Review of the health posts and health centers record and report documents showed that incomplete fill of zero reports, reporting date, included starting and ending dates and discrepancy of total malaria cases by species and age categories. Zonal officers had no complete line list of measles and pandemic influenza cases occurred by outbreak manner. There was data inconsistency when they received on phone calls and followed by paper forms.

Sensitivity: In the selected diseases malaria, measles and pandemic influenza case definitions had not implemented gold standard tests for all suspected cases met WHO case definitions, and not met WHO case definitions to examine the sensitivity of the case definitions. This made it difficult to evaluate case definition of the selected diseases sensitivity because there was no external gold standard for true cases in a population.

Only the surveillance performed on the health facilities were health care provider initiated (passive surveillance) due to this reason the sensitivity of the surveillance system is not detect the actual health problem in the community. However, the surveillance systems detect the epidemics or outbreaks. Generally, there was difficult to evaluate sensitivity of the system quantitatively without knowing false negatives and true positives that identified by the system, which requires collection or access to data external to the system (gold standard) to determine the true frequency of reported health conditions and validation of data collected by the system.

Predictive value positive of the case definitions: In this study could be calculated positive predictive value in the case of malaria surveillance system RDT and microscopic diagnostic materials considered as diagnostic gold standard. Of 364,182 samples collected from malaria suspected cases met WHO case definitions, 32,566 of positive for RDT and 43,059 positive for microscope with 28.16% and 17.3% test positivity rate (PVP) respectively. However, in the case of pandemic influenza and measles surveillance system could not be calculated positive predictive value. Because all suspected cases met WHO case definitions were not tested due to lack of diagnostic gold standard materials in the local area and not applicability of all samples collected and sent to regional or national laboratory.

Representativeness: The primary health care coverage of the zone has been 100% and 72% for health center and health post respectively. The visited districts have been ranged from 74% to 100% health centers and 37% to 91% health posts. Health service utilization rate of the population were 0.58 out Patient attendances per capita in the zone and the visited districts ranged from 0.88 to 1.13 in 2015/2016. Most of the routine surveillance performed was health facility based health care provider initiated surveillance. Thus, the events occurred in the community reported to the health facilities were influenced by health care seeking behaviors and accessibility of facilities. In addition to this zero report was not performed consistently as we observed in the reported documents. Due to this reason under reporting might be presented. Therefore, the selected diseases surveillance system didn't describe accurately the occurrence of a health event over time and its distribution in the population by place and person; didn't reflect its actual occurrence.

Timeliness: According to this study, the reporting time between the date an event began and the date an event registered and the action taken were difficult to evaluate due to lack of register data. However, timely weekly reporting rate of the system was 99.87% governmental and 85.57% other health facilities in West Gojjam Zone, 2015/2016. Distant areas reported less frequently due to lack of mobile network. Zonal PHEM department provided timely report to the regional PHEM department. Timeliness of report is very important to find out abnormal increases in the number of cases and to take immediate actions. Non-governmental and private health facilities, there was unexpected reporting rate in "WHO" week 32. However, the reason of under reporting rate was not clearly known by zonal health department PHEM officers. All visited district health offices weekly report timeliness rate were range from 90 % to 100% in other health facilities and 100% in governmental health facilities.

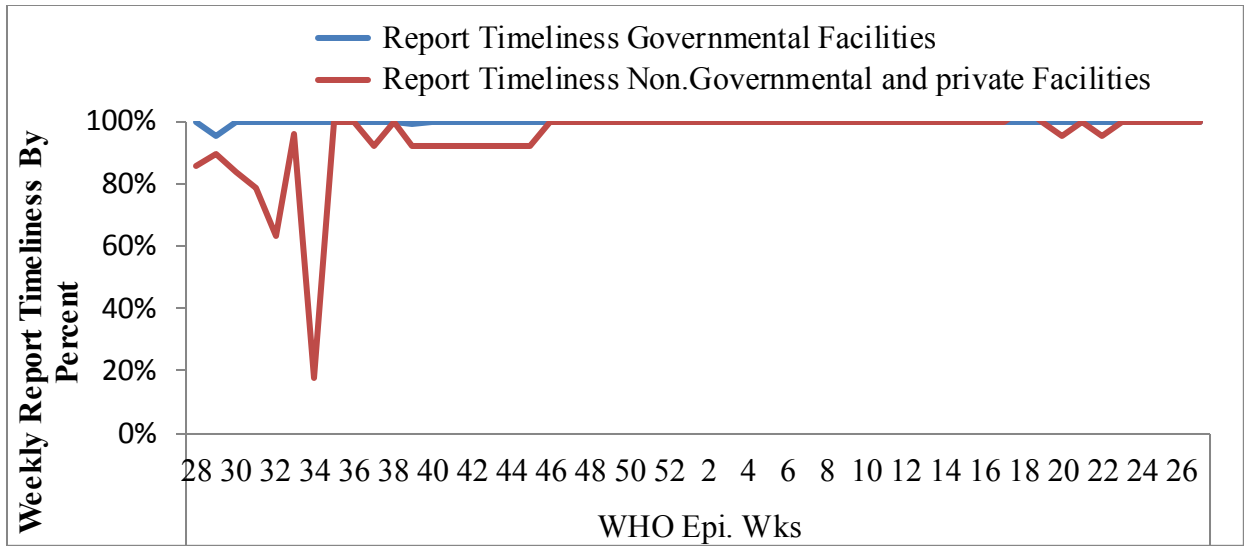


Figure 24: Trend of weekly report timeliness rate by WHO week in West Gojjam zone, 2015/2016.

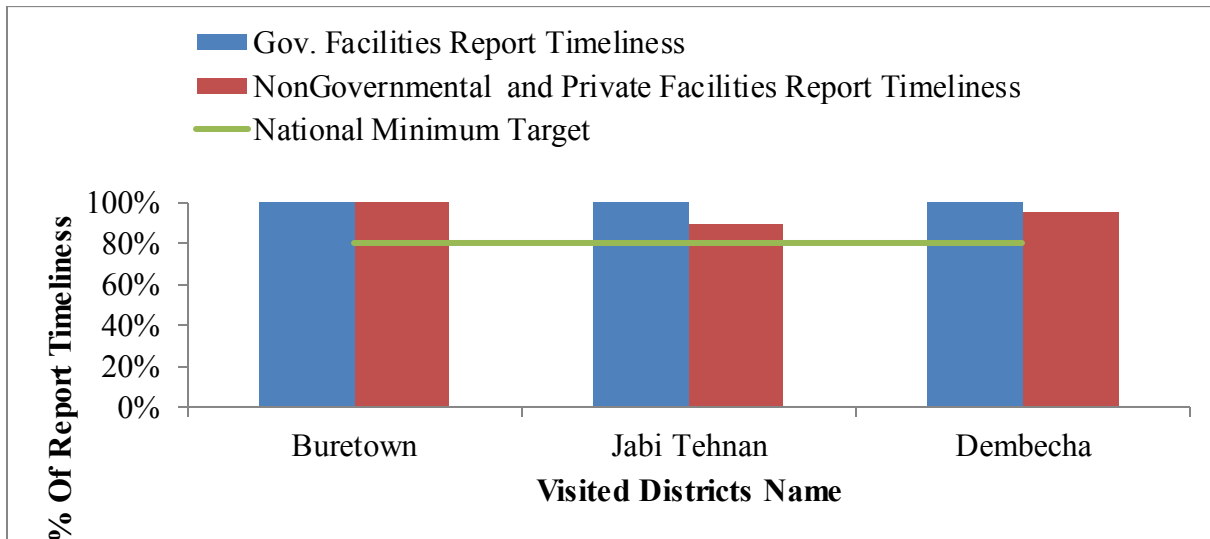


Figure 25: Weekly timeliness report rate in visited districts, West Gojjam zone, 2015/2016.

Stability: The surveillance system helps to collect, manage and provide data properly and it was operational at any time, but the continuity of the system was interrupted at health post level when health extension workers were not available and network limited. Generally, shortage of budget and logistics specific to the system was hindering supportive supervision and capacity building activities at all levels to achieve the intended purpose and objectives of the surveillance system.

Acceptability: In this study the participants of the surveillance system are health facilities, health offices and health workers and the community as well as stockholders; therefore, all the mentioned agents except the communities are well engaged to the surveillance activities. Even though they mentioned that they send the report from their mobile without the presence of assigned budget. The overall weekly reporting rate was good.

Discussion

In all visited health centers understanding of the health care providers to the case definitions were good and detection of cases were performed using standard case definitions of malaria, measles and pandemic influenza as explained by some of health workers working in examination rooms during the time of field visit. However, in all visited health posts there were no available case definitions of the selected diseases and no clearly detection of cases using case definitions. Due to this reason, early case detection might be poor at health post level.

All assessed health centers were used clinical registration logbooks and correctly recorded reportable diseases, whereas health posts didn't have clinical registration logbooks. This made difficult to evaluate the data quality of the reported and recorded data in the surveillance system at health post level.

All visited districts and health facilities reporting of the identified diseases was either immediately or on weekly bases using their own reporting formats. However, during epidemics the reporting procedures varies from the routine reporting period consistent with Ethiopia public health emergency management guideline (2). In most visited district health offices, health centers and health posts sent report to the respective body based on reporting formats on the reporting period. Even though some health institutions sent reports timely to the respective body, there was a gap of report format used and didn't kept (documented) a copy of the report in the facilities.

None of the occurred outbreaks investigated based on investigation procedure in West Gojjam zone. However, all assessed health facilities were capable to transport specimen to reference laboratory and have the necessary materials (cold box, packaging materials and cold chain) to handle and transport the specimens. This was important for early confirmation of cases and response of outbreaks; however, it was not enough to outbreak investigation in order to identify risk factors, mode of transmission and source of infection.

Surveillance is information for action (1), therefore the collected immediately and weekly reporting data was needed to be analyzed by time, place and person, interpreted and used for action and decision making by each level of the system. However, none of the visited district health offices and health facilities analyzed the surveillance data except weekly malaria data analysis to monitor its trends compared with the last year in the same epidemiological week.

Frequent supportive supervision and providing regular feedback are vital for the improvement of surveillance data quality, stability, report timeliness and completeness. According to the surveillance guideline in AFRO region supervision and feedback system should be conducted with a regular time interval (1). However, due to shortage of budget, vehicle and logistics supportive supervision on surveillance activities have not been conducted in 2015/2016 at health facilities. The districts have been supervised by zone health office integrated with other departments. Zonal health office has not provided written specific feedback on surveillance activities to the districts and health facilities, but irregular feedback provided by email. Similarly, none of the assessed district health offices and health facilities has provided written surveillance specific feedback to their respective reporting facilities.

Planning is the theme of the whole emergency preparedness exercise, should be updated regularly, especially following major incidents and make exercises to include lessons learned (2). The zonal PHEM department had done emergency preparedness and response plan for epidemic prone diseases, but didn't have all assessed district health offices and health centers. Due to this reason some of assessed districts and health facilities faced shortage of drugs and supplies necessary for emergency management.

Regarding existence and activities of epidemic management committee and rapid response team, there was established committee at zonal and visited districts, however, the established committee at each level was not conducting scheduled regular meeting and activities contrast with the PHEM guideline (2).

Regarding to sensitivity refers the capacity of case definition to detect the highest proportion of true cases (4), however, there was difficult to evaluate sensitivity of the system quantitatively without knowing false negatives and true positives that identified by the system, which requires gold standard test to determine the true frequency of reported health conditions and validation of

data collected by the system. However, the system was sensitive to detect the epidemic or outbreak. A surveillance system with a low PVP, (frequent false positive case reports), would lead to resources being wasted on cases that do not exist. However, in the case of pandemic influenza and measles surveillance system, predictive value positive was not calculated, due to lack of the golden standard test.

The Timeliness reporting rate of the zone within the last year was above the minimum expected national PHEM guideline 80% which was 99.87% governmental and 85.57% nongovernmental and private health facilities. Acceptability of surveillance system in governmental health facilities found in the zone was good which was 99.87% timely reporting rate, however, other health facilities were seems less likely compared to governmental health facilities which was 85.57% timely reporting rate.

Stability of surveillance system is the reliability and availability (ability to be operational when needed) of the surveillance system without interruption (4). Shortage of budget, lack of transportation and logistics specific to the system was hindering supervision and outbreak investigation following the procedure at zonal, districts and health facilities.

The representativeness of the surveillance system has related to the health service coverage, the reporting rate of the health facilities, the health seeking behavior of the community or health service utilization rate per capita, the type of surveillance performed, so on. The zone primary health care service coverage by health post was low (72%) compared to national minimum standards of health posts (1:5000) populations, per capita outpatient utilization rate (0.58) was below the national target (10), timely reporting rate was 99.87% and 85.57% governmental and nongovernmental or private respectively.

Limitations of the study

Sampling methods and sample size could be the limitations; due to this reason the findings presented here may not be representative and generalized for the entire West Gojjam Zone surveillance system.

Some of the surveillance attributes are qualitative and the surveillance system has not cut off points to evaluate the system; this might be biased for the results of the study.

Conclusion

The surveillance activities of outbreak investigation, data analysis, supportive supervision, feedback, emergency preparedness and response plan were not satisfactory. During the period of measles and pandemic influenza outbreaks line list of the cases were the major challenges of the zone.

There were a shortage of specific surveillance supportive supervision and feedback particularly at lower level of the system starting from the districts. We have also identified lack of recording and reporting format at all health posts which caused interruption of reporting and poor documentation. Although at zonal level both the governmental and other health facilities reporting rate was above the minimum target of national set; more effort needed to enforce on nongovernmental and private facility to report and include all health facilities in the system.

Absence of budget allocated for surveillance activities at zonal and district level was remains a major problem to run tasks of public health emergency management towards their objectives. Data quality was major gaps in all assessed health institutions in West Gojjam Zone.

There were no problems on the simplicity of the system regarding case definitions of selected diseases at health center level, flexibility, usefulness and acceptability but a great challenge of simplicity of reporting system and data analysis, sensitivity due to proportion of true cases detection, representativeness and stability of the system at all assessed sites.

Recommendations

- Budget and resources (computer, fax and internet) should be available at the district and health center level to improve the accomplishment of surveillance activities.
- Emergency preparedness and response plan should be prepared at all levels.
- The collected data should be analyzed by time, person and place and interpreted to be used for action and decision making at all levels.
- Sufficient amount of weekly reporting formats for health facilities should be distributed.
- Efforts should be exerted to improve the system mainly on supervisory activities, emergency preparedness, proper and timely feedback, data quality, completeness, stability, and analysis at all health facilities and district health offices.

References

1. World Health Organization. Integrated Disease Surveillance and Response in the African Region 2010 Technical Guidelines for 2nd Edition. 2010;
2. Ethiopian Public Health Institute. Public Health Emergency Management Guideline; 2012
3. Centers for Disease Control and Prevention (CDC). Principles of Epidemiology in Public Health Practice. Third Edition(CDC)
4. Andrea Saunders, Public Health Ontario Melissa Helferty, Ministry of Health and Long-Term Care. Evaluating Surveillance Systems – Let ' S Get Critical , Critical! 2015;
5. Ministry of Health. National Malaria Guidelines Third Edition. 2012;(January).
6. Ministry Of Health. National Strategic Plan For Malaria Prevention, Control And Elimination In Ethiopia 2014 – 2020.
7. Ethiopian Public Health Institute. Guideline On Measles Surveillance And Outbreak Management 2012.
8. European Centre for Disease Prevention and Control. Data Quality Monitoring And Surveillance System Evaluation. 2014.
9. European Centre for Disease Prevention and Control. Protocol for Case-Control Studies to Measure Influenza Vaccine Effectiveness in the European Union and European Economic Area Member States November 2009.
10. Westmoreland D, Office EP, Armstrong G, Birkhead GS, Epidemiologists T. Updated Guidelines For Evaluating Public Health Surveillance Systems 2001;50:1–40.
11. World Health Organization. Epidemiological Approach For Malaria Control. 2013;184.
12. World Health Organization. WHO Recommended Surveillance Standards. Second Edition.

CHAPTER IV: DESCRIPTION OF HEALTH PROFILE

4.1. Description of Health Profile Report in Ebinat District South Gondar Zone North West Ethiopia, 2016

Abstract

Background: Health Profile is designed to help local government and health services identify problems in their areas and decide how to tackle them. However, in Ebinat district, such valuable information is not complete, organized and updated comprehensive way of narrative description report. Therefore, the aim of the study was to generate information to support government and development agencies to address constraints and improve performance in the study area.

Methods: Cross sectional study was conducted in Ebinat district South Gondar zone North-West Ethiopia from 13-20 February 2016. We used purposive sampling method. Data were collected by interview and observation using semi-structured questionnaire. Data were entered and analyzed using Microsoft Excel 2010. Descriptive statistics was used to data summarization and presentation.

Results: Pneumonia was the first leading cause of morbidity at outpatient department followed by malaria in adults; in pediatrics non-bloody diarrhea was the first leading cause of morbidity followed by pneumonia. Tuberculosis detection rate, fully vaccination and skilled delivery were 48.1%, 96%, and 34.7% respectively. Only 65% of households had latrines and 59% were utilized. In 2014/2015, active trachoma and trachomatous trichiasis prevalence rate was 49.7% and 6.7% respectively. A total of 1438 (4.34%) under five severe acute malnourished children were admitted in outreach therapy program with 81.2% cure rate. Availability of transportation, water, regular electricity, and telecommunication were 60%, 30%, 30% and 30% at health facility respectively.

Conclusion: Generally, there is poor availability, accessibility, functionality, and quality of infrastructures. Long standing challenges were low performance of TB detection rate and skilled birth attended. High rate malnutrition and scabies outbreak occurred due to drought impact. The major health problems were preventable communicable diseases and nutritional disorders.

Keywords: Health profile description, Ebinat district, 2014/2015.

Introduction

Background

Health Profiles is a program to improve availability and accessibility for health and health-related information of health status in align with historical, geographical, demographical and economical background of the areas. The profiles give a snapshot overview of health for each local authority and stake holders of health and health related issues will access evidence based information from well compiled health profile.

Health profiles provide summary health information to support local authority members, officers, and community partners to lead for health improvement. Health Profile is designed to help local government and health services identify problems in their areas and decide how to tackle them. They provide a snapshot of the overall health of the local population, and highlight potential problems through comparison with other areas and with the national average.

Assessing the health profile of a community is very important to understand the health status of the community and clearly present their needs and issues. Based on that, possible to plan, prioritize public health action and interventions accordingly. Moreover it can give baseline information to other sectors of the community. Therefore, nowadays health profiles are an established part of planning for health improvement.

However, in Ethiopia particularly at district level, such valuable information is usually not complete, organized and updated comprehensive way of narrative description report.

Therefore, the aim of the study was compiled comprehensive health and health related profile of Ebinat district and identify the performance of health service delivery by comparing national targets and achievements.

Rationale of the study

Health Profiles /descriptions are important to help local government and health services identify problems and prioritizing in their areas and decide how to tackle them.

In related to this, there is no complete, organized, updated comprehensive way of narrative description report, and well documented profile data in Ebinat district in South Gondar zone of Amhara region. Therefore, describing the health profile of the district is helpful to give evidence

based information for prioritizing and planning appropriate public health interventions in the district.

Objectives

General objective

- To assess health and health related situations of 2014/2015 in Ebinat District, South Gondar Zone, North-West Ethiopia, 2016.

Specific objectives

- To assess human resources of the district 2014/2015.
- To assess the major causes of morbidity and mortality in the district, 2014/2015.
- To describe the performance of health service delivery in the district, 2014/2015.
- To describe magnitude of endemic diseases and other health related events in the district 2014/2015.

Methods and Materials

Study area and period: The study was conducted in Ebinat district South Gondar zone North-West Ethiopia from 13-20 February 2016.

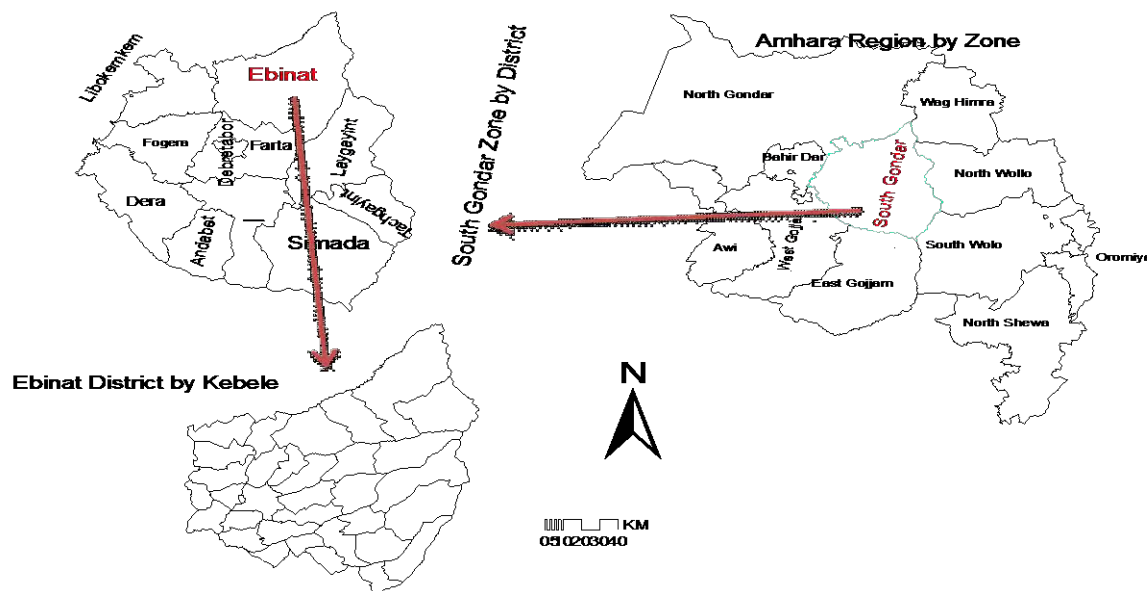


Figure 26: Location of Ebinat district in South Gondar zone, Amhara region, 2016.

Study design: Descriptive cross sectional study was conducted.

Source population: Total populations who lived in Ebinat district in 2014/2015.

Study population: Populations who got health and health related service in the district in 2014/2015.

Sample size and sampling technique: Convenient sampling method was used to select one administrative zone from the region, then Ebinat district were selected purposively based on drought affected areas.

Data sources: District health office, education office, water and energy office, and agriculture office.

Data collection instrument and procedure: Semi- structured questionnaire and checklist were adapted from CDC and used to collect data. I interviewed relevant officers of the district health, education, water and energy, agriculture, and others offices based on need of data. Observations and document reviews were conducted on the wall posted and documented.

Data quality control, processing and analysis: Data were reviewed and checked for completeness and consistency before data entry. Data were entered, cleaned, and analyzed using Microsoft Excel 2010. Descriptive statistics including Proportion, percentage, ratios, frequency tables and diagrams were used for summarizing and presenting the results.

Ethical Consideration: Official letter was obtained from Amhara regional health bureau PHEM unit. I explained the objectives of the study and confidentiality to different office heads and permission obtained.

Dissemination of the results: The results of the study was submitted and presented to the SPH-AAU and the respective district offices and regional health bureau with a hard copy and soft copy, and other stakeholders those who need to know and working with together.

Results

Geography and Climate: Ebinat is one of the 12 districts in South Gondar zone Amhara regional state with an estimated total surface area of 2498.40 square kilometers. The district is 122 kilometers far from Bahir Dar and 682 kilometers from Addis Ababa, capital city of Ethiopia. Its

altitude ranges from 1300-2500 meters above sea level. Climatic condition is 50% low land/kola/, 35% weina-dega, and 15% highland areas. Annual rain fall ranged 500-900mm/year and average annual temperature is 22-28c°.

Demographic situation: Ebinat is the second most populous district in South Gondar zone with a population of 251,787 (1.7% annual growth rate), with 4.3 family size per household based on 2007 census projection. The proportion of males is nearly 50.5% of the total population (M/F ratio ≈1:1). Composition of total population by age: under one years old children constitutes 7,831 (3.11%), under five 34,092(13.54%), women of child bearing age 59,371(23.58%), pregnant women 8485 (3.37%), population <15 years 107,337(42.63%) and population > 64 years are 13, 521(5.37). Young population dependency ratio 82: 100, old population dependency ratio 10.3:100 and total population dependency ratio are 92.3:100 (92.3 persons on 100 persons). The population density is 100 persons per square kilometers. The religion of the population is 96.5% Orthodox, 2.5% Muslim and the remaining 1% Protestant and others.

Table 8: Estimated population by sex and kebele in Ebinat district 2014/2015

| Kebele's name | Population | | | Kebele's name | Population | | |
|----------------|------------|--------|-------|----------------|------------|--------|-------|
| | Male | Female | Total | | Male | Female | Total |
| Ebinat_01 | 4006 | 3926 | 7932 | Adisgiesekonko | 3903 | 3826 | 7729 |
| Ebinat_02 | 4006 | 3926 | 7932 | Ajja | 4070 | 3990 | 8060 |
| D/abajalie | 2596 | 2545 | 5141 | Geday | 2788 | 2733 | 5521 |
| W/woftoma | 5539 | 5429 | 10968 | Eyadawuliha | 2488 | 2438 | 4926 |
| Jimandergiha | 5119 | 5018 | 10137 | M/medanealem | 2788 | 2732 | 5520 |
| Mechena | 2949 | 2890 | 5839 | Menadiq | 2479 | 2430 | 4909 |
| Ziha | 3813 | 3738 | 7551 | Wagieworigaja | 4381 | 4295 | 8676 |
| Serawudi | 1785 | 1749 | 3534 | Ababeqila | 3504 | 3434 | 6938 |
| G/matebiya | 2912 | 2854 | 5766 | Tarasenba | 2165 | 2123 | 4288 |
| Akuha | 3384 | 3317 | 6700 | Agissa | 2942 | 2884 | 5826 |
| Lusinaabegeldi | 4277 | 4193 | 8470 | Adiyaqurquara | 4126 | 4044 | 8170 |
| Aderseg | 3538 | 3468 | 7006 | Gibtsawit | 3819 | 3744 | 7563 |

| | | | | | | | |
|-------------|------|------|-------|-----------------------|--------|--------|--------|
| Balarb | 4363 | 4277 | 8640 | D/t/h | 3148 | 3085 | 6233 |
| Tigagie | 2040 | 2000 | 4040 | Gunagunaemba chiko | 4954 | 4856 | 9810 |
| Birkoch | 2163 | 2121 | 4284 | Wariba | 2542 | 2491 | 5033 |
| Aquashumoch | 2163 | 2121 | 4284 | Amistya | 2671 | 2618 | 5289 |
| Abina | 3531 | 3461 | 6992 | Niquara | 3582 | 3512 | 7094 |
| Selamaya | 4736 | 4642 | 9378 | Qita | 2568 | 2518 | 5086 |
| Shumgie | 5314 | 5208 | 10522 | Total | 127152 | 124635 | 251787 |

Ebinat 01 and Ebinat 02 are the only urban kebeles of the district.

Government and administration: Ebinat District has a total of 37 kebeles (35 rural and 02 urban). The decentralization of power to kebele governments and local community is the basis for all types of public service delivery. This approach is believed to bring closer community participation at a grass-root level.

Socio-economic situation: The district economy is agriculture based, of the total area of 249,840 hectares, 70,277(28.13%) hectares is fertile land mass suitable for agriculture. From the fertile land mass, 69,780 (99.3%) hectares cultivated for different types of crops such as cereals, fruits and vegetables in 2014/2015. From the overall 69,780 hectares cultivated in 2014/2015, a total of 1,249,072 quintals were harvested different crops and cereals in 2015/2016. The main crop produced like wheat (186,162), barley (167,384), teff (146,943), millet (68,339), maize (59,357), bean (17428) and Degussa (10,390). In addition to this from the total 4,265 hectares irrigated gardens, 567,243 quintals of different types of vegetables and fruits were harvested. The majority of the vegetables and fruits constitute tomatoes, orange, coffee, onions, cabbage, and potatoes.

Half of the land mass climatic condition is low land, there for most of the population is animal husbandry or livestock. Regards to animal husbandry there were 181,440 cattle, 100,583 goats, 115,564 hens, 11,849 bee-hives, 57,178 sheep and 31,931 equine were found.

In 2014/2015, natural disasters such as snow, flooding and drought were occurred. Due to this reason, the productivity of crop decreased by 40,154 (3.11%) quintals from estimated

production. The district was food insecure and the government gave different aids for the drought affected communities in 2015/2016.

Education situation: Ebinat district has a total of 204 schools, of these 100 pre-school, 100 primary and 04 secondary schools exist with a total of 63,012 students enrolled in 2014/2015. Female students were 46.5%. A total of 1382 teachers were registered. Student's dropout rate at primary school was 7.46 per 1000, and no dropout registered at secondary schools. Of 204 schools, 28 (13.7%) have access to safe water supply (protected hand dug wells and springs). Latrine coverage were 100%, of these 45.6% were not a standard latrine; it serves for temporary purpose only. The total adult's literacy rate (persons above 15 years who can read and write) was 38.7%. Of 204 schools; 64 elementary and 04 high schools have anti HIV/AIDS clubs, and adolescence peer education clubs. The school coverage in the district has been 80% and 75% primary and secondary schools respectively.

District health situation: Ebinat district has a total of 10 health centers, 43 rural health posts, 02 urban health posts and 01 under construction of district hospital. The district health system has provided basic health service using primary health care approach. Health posts are providing preventive and promotive aspect of health care. Health centers have delivered first line curative health care and technical support to health posts in their catchment areas. There are 1 medium, 06 lower private clinics, and 02 drug stores providing a wide range of health care service for the district population.

Health institutions to population ratio: The primary health care coverage by health center and health post is 97.94% (ratio to population 1:25527) and 84.12% (ratio to population 1:5562) respectively.

Additionally, three NGO working in health and related activities in the district: they are Carter center, Heal TB and Care Ethiopia.

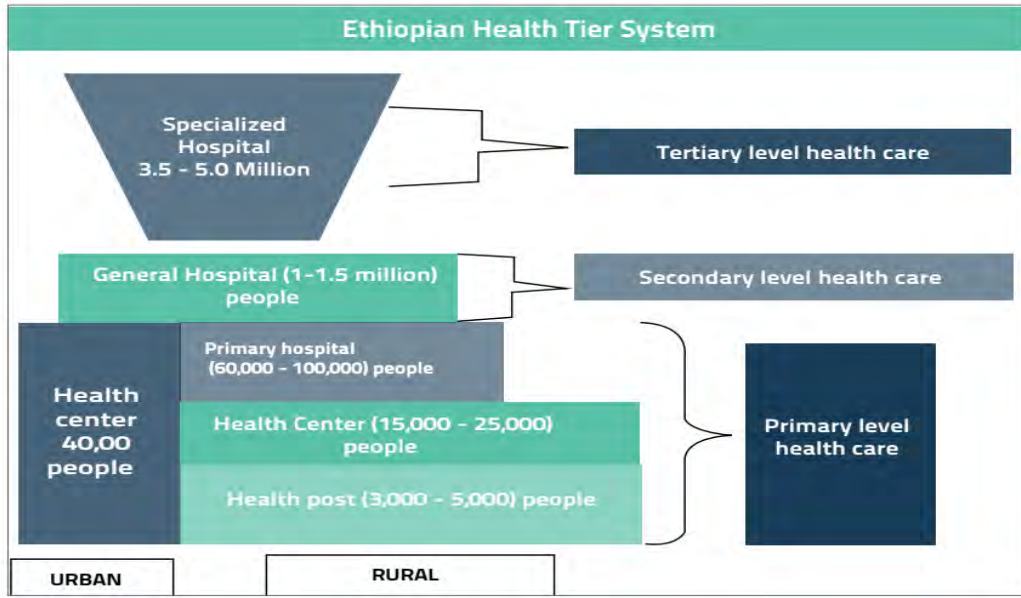


Figure 27: National Health Care Delivery Tier System in Ethiopia, 2016.

Source: Ministry of health HSTP, 2015/2016-2019/2020.

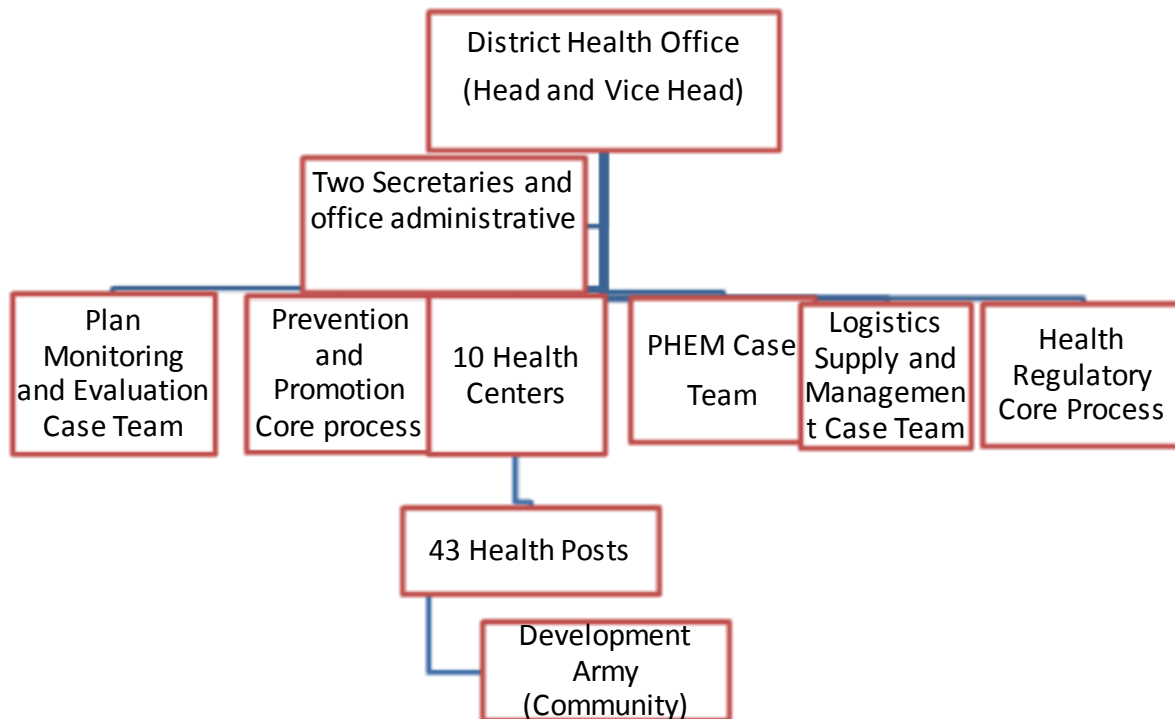


Figure 28: Ebinat health office structure, South Gondar zone North West Ethiopia, 2014/2015.

Source: Ebinat district health office.

The above figure depicts the district health office structure was organized under two core process and three case teams. Diseases Prevention and promotion core process led by vice head of the district health office, and health and health regulatory core process led by core process leader. In addition, case teams led by case team leaders.

Health Workforce: Effective health system is a function of multiple factors. Of which adequate numbers and mix of motivated and skilled human resources are essential at all levels of the health system. Hence sufficient number of health workers in each discipline is a very critical issue that should be addressed to bring what is targeted on health sector development program.

Table 9: Human resource in Ebinat district health office and health facilities 2014/2015

| Profession Type | Number | Specification | Ratio |
|--|--------|---------------|----------|
| Medical Doctors | 0 | | 0 |
| Health officers | 21 | | 1:12,156 |
| Laboratory/Technician/Technologist | 10 | | 1:25,527 |
| Pharmacy/technician/Pharmacist | 6 | 1 Pharmacist | 1:42,544 |
| Nurses (diploma + degree) | 63 | 6 BSC | 1:4052 |
| Mid wife (diploma + degree) | 25 | 3 BSC | 1:10,211 |
| Sanitarian/environmental health/ HEWs | 03 | | 1:85,089 |
| Administration staffs | 73 | | 1:3497 |
| Others | 101 | | NA |
| Total man power at district level | 07 | | NA |
| Total man power at district level | 309 | | NA |

NA= not applicable

Top ten leading causes of morbidity and mortality in OPD and IPD

On the basis of district health office report, the first leading cause of adult morbidity in outpatient department (OPD) were Pneumonia (10.74%) followed by malaria P.F (9.8%); whereas in under five children were non-bloody diarrhea (25.09%) followed by Pneumonia (20.47%) in 2014/2015. In 2014/2015, 88 adult patients were admitted in health centers and got health service. Of 88 admitted cases, the first leading causes were Pneumonia 56 (65.92%)

followed by anemia 21(23.86%). There was no death and under-five inpatient admitted cases in 2014/2015.

Table 10: Top ten leading cause of morbidity at OPD visited in Ebinat district, 2014/2015

| S.N | Diagnosis | Adults | | | Pediatrics | | | |
|----------------------|---|--------|-------|---------------------------|--|--------|-------|---------------------------|
| | | Number | (%) | % of cumulative frequency | Diagnosis | Number | % | % of cumulative frequency |
| 1 | Pneumonia | 5768 | 10.74 | 10.74 | Diarrhea non-bloody | 2557 | 25.09 | 25.09 |
| 2 | Malaria P.F | 5266 | 9.8 | 20.54 | Pneumonia | 2087 | 20.47 | 45.56 |
| 3 | AFI | 4989 | 9.29 | 29.83 | AURTI | 888 | 8.71 | 54.27 |
| 4 | Acute Upper respiratory tract Infection (AURTI) | 4390 | 8.17 | 38.01 | Infections of skin and subcutaneous tissue | 838 | 8.22 | 62.49 |
| 5 | Diarrhea non-bloody | 3926 | 7.31 | 45.32 | AFI | 752 | 7.38 | 69.87 |
| 6 | Helminthiasis | 3831 | 7.13 | 52.45 | Helminthiasis | 672 | 6.59 | 76.46 |
| 7 | Infections of skin and subcutaneous tissue | 3649 | 6.79 | 59.24 | Dysentery | 549 | 5.39 | 81.85 |
| 8 | Dyspepsia | 2739 | 5.1 | 64.34 | Malaria P.F | 317 | 3.11 | 84.96 |
| 9 | Malaria P.V | 2394 | 4.46 | 68.8 | Other unspecified | 255 | 2.5 | 87.46 |
| 10 | Trauma/injury | 1602 | 2.98 | 71.78 | Diarrhea with Dehydration | 249 | 2.44 | 89.9 |
| Total Leading causes | | 38,554 | 71.78 | 71.78 | Total Leading | 9164 | 89.9 | 89.9 |

| | | | | | causes | | | |
|-------|------------|--------|-----|-----|------------------|-------|-----|-----|
| Total | all causes | 53,708 | 100 | 100 | Total all causes | 10193 | 100 | 100 |

Source: Ebinat district health office eHMIS, 2014/2015.

PHEM weekly and immediately report able diseases

In addition to malaria and malnutrition, a total of 4 confirmed and 39 epidemiological linked measles, 07cutaneous anthrax, 549 diarrheas with bloody, 29 typhoid fevers, 01 neonatal tetanus, 07 maternal deaths and 01 acute flaccid paralysis cases were reported in 2014/2015.

Under one year's vaccination coverage

In 2014/2015, Ebinat District eHMIS report showed that vaccination coverage of Penta-3 and PCV-3 was 98.1%, measles, 98.4% and fully, 94% (see below figure). Penta-3 and measles dropout rate was 3.6 and 3.3 per 100 infants respectively.

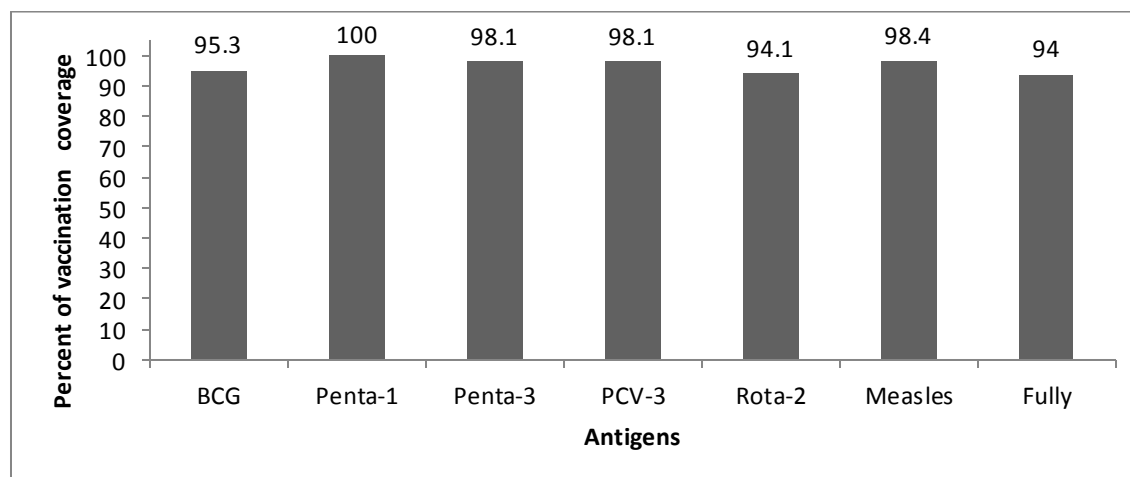


Figure 29: Vaccination coverage in Ebinat district, 2014/2015.

Maternal Health

According to eHMIS report, proportion of pregnant women received ANC first visit were 100%, ANC fourth visit, 34.5%, and skilled attendant delivery, 34.7% in 2014/2015 (see table below). Percentage of kebeles to achieved home delivery free were 16.2% in 2014/2015.

Table 11: Maternal health service delivery in Ebinat district from 2012/2013 to 2014/2015

| Description | 2012/2013 achievement | | 2013/2014 achievement | | 2014/2015 achievement | |
|---------------------------------|--------------------------|---------|--------------------------|---------|--------------------------|---------|
| | Number | percent | Number | percent | Number | percent |
| ANC 1 st | 7888 | 100 | 8159 | 100 | 8543 | 100 |
| ANC 4 th | 599 | 7.6 | 2607 | 32.5 | 2928 | 34.5 |
| Skilled attendant delivery | 946 | 13.2 | 1680 | 23.1 | 2950 | 34.7 |
| Delivery by HEW | 338 | 4.7 | 462 | 6.3 | 197 | 2.3 |
| PNC coverage | 3142 | 43.9 | 4155 | 57.1 | 4356 | 51.3 |
| PMTCT coverage | 2660 | 34.1 | 4263 | 84.8 | 7209 | 90.6 |
| Prophylaxis received | 19 | 17 | 20 | 20.8 | 22 | 25.8 |
| Long acting family planning | 216 | 1 | 937 | 3.9 | 3197 | 6.2 |
| Short acting family planning | 39907 | 185 | 23644 | 186 | 42106 | 82.7 |
| TT2+ pregnant | 5083 | 93.3 | 5616 | 89 | 4740 | 55.8 |
| TT2+ non pregnant | 14461 | 41.8 | 16017 | 31.8 | 9928 | 19.5 |

Sustainable development goal target diseases

Tuberculosis and leprosy: In 2014/2015, a total of 454 clients were planned to detect tuberculosis achieved 219 all forms of tuberculosis disease. Of these, 36 were smear positive, 66 smear negative and 117 extra pulmonary tuberculosis diseases with 48.1% case detection rate. Both TB treatment success and cure rates were 96% in 2014/2015. Defaulters and death cases were 1 and 10 respectively. Among those 219 tuberculosis diseases 100% of cases were screened for HIV; 9 patients were co-infection with HIV with 4.1% HIV prevalence rate among TB cases.

Two multidrug resistant TB cases were detected. TB cases fatality rate was 4.57%, and defaulter rate was 4.6 per 1000 cases. A total of 5 leprosy cases with 33.33% detection rate were reported.

Malaria: In 2014/2015, of 63,901 total patients visited at OPD, 25,411 (39.7%) were tested for malaria confirmation (B.F, 39.8% and RDT, 60.2%). Of 25,411 tested patients, 7,764 (30.5%) were positive for malaria. Of the total confirmed cases, 5360 (69%) were caused by Plasmodium falciparum (PF) and 2404 (31%) by Plasmodium vivax (PV). All malaria cases were confirmed. According to age group, the proportion were 350(4.5%) under five, 850 (11%), 5-14 years, 6,564 (84.5%), 15 years and above. Regarding to malaria intervention was taken; 249,456(99.4%) malaria risk population had access to LLINS and 17,906(96%) unit structure or 55,891(97%) people were protected by IRS in targeted malarious area in 2014/2015.

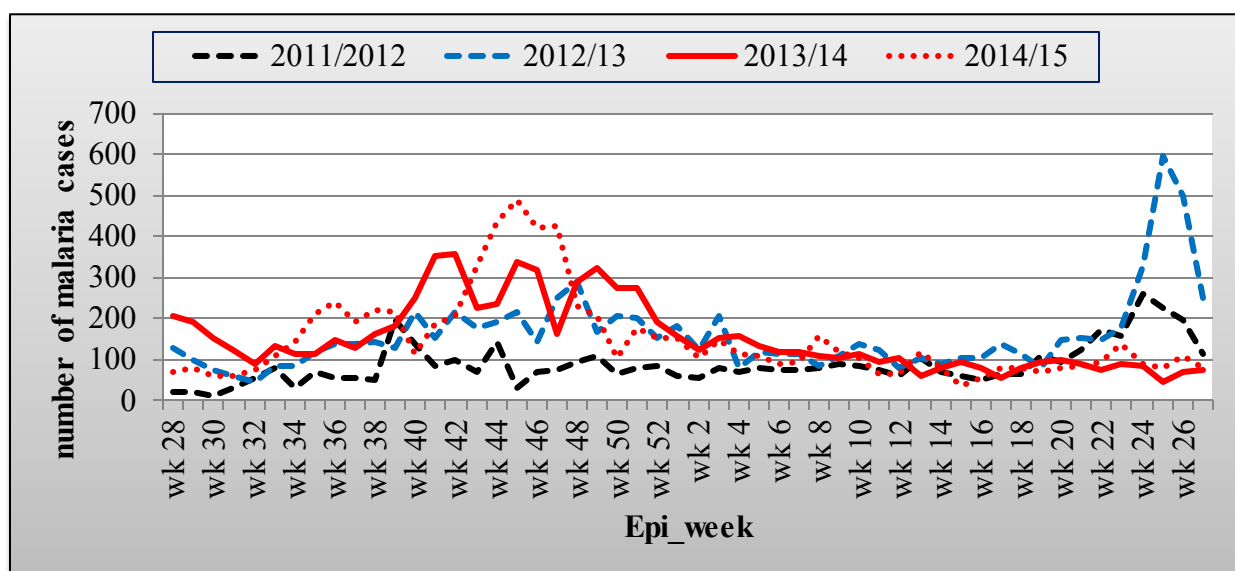


Figure 30: Trend of malaria cases in the last four years in Ebinat District, 2011/2012-2014/2015.

HIV/AIDS: As the result of HIV prevention, care and support services expansion in 2014/2015, 7910 (female, 45.5%) HIV counseling and testing services were provided. Of 7910 tested, 93 (females, 55.9%) were positive for HIV. In 2014/2015, estimated number of people living with HIV (PLHIV) was 1,156. Currently on ART have been 813 HIV/AIDS cases. A total of 491 cases of sexual transmitted diseases were screened for HIV. Females accounted 60.28% from total screened. But not documented separately how much of positive cases for HIV among sexual

transmitted diseases tested to HIV. Health education was given to 112,345 people and condoms were distributed to 45,117 male users. One health center in the district has given ART service.

Hygiene and environmental sanitation

Health Extension Program is one of the government's primary vehicles for driving sanitation improvement at the kebele level. Of the 16 packages, 7 of these cover hygiene and environmental sanitation. The sanitary conditions, only 38,457 (65%) of households had latrines and 35,200 (59%) used, 12,345 (20%) of the households had hand washing facilities. In the district, a total of 217(42.8%) government and religious institute have access to latrines. At district level the percentage of population with access to safe water supply has been 63%.

Neglected diseases

Trachoma: The trachoma survey carried out by the carter center in 2014/2015, revealed that 49.4% of active trachoma prevalence and 6.7% of trichomatous trichiasis (TT) in the district. Generally, 35 kebeles of the district are endemic to trachoma with 239,117 people being at risk of infection. A total of 9907 and 924 cases were treated for active trachoma and TT surgery.

Nutrition: Improving nutrition is one of the key interventions that are being undertaken to reduce the death of children. Ebinat district has 9 stabilization centers at health center level and 43 outreach therapeutic programs at health posts level. A total of 54 severe acute malnourished children admitted at therapeutic feeding unit who fulfills the criteria. Of these, 41(75.9%) of the cases were transferred to OTP. A total of 1438 (4.34%) under five severe acute malnourished children were admitted in OTP program in the year. Of these, the cured rate was 81.2% and 0.07% death rate. There was no supplementary feeding program in 2014/2015 at the district.

In addition to protein energy acute malnutrition, there were micronutrient deficiencies and helminthiasis problems in the district. The proportion of children who received vitamin A and deworming were 98.1% and 95.1% respectively.

Infrastructure and utilities: About 30% of health facilities have regular electricity and 50% has functional generator with fuel. However, only 3 health posts from 43 have regular electricity power sources. Among health centers 30% had access to water and 10% had access to telecommunication; 80% of health centers and 44% of health posts had access to mobile

network. The rest of health institute have not access of network but users have to travel some distance apart from their residential area in searching of network. Regarding transportation only 60% health centers and 34.5% health posts have regular transport facility, whereas the remaining few facilities have temporarily transport access during dry season. Thirty percent of health centers have e-HMIS computers but postal, internet and fax services are almost no available at health facilities.

Health sector expenditure and financing: Financial resource is a crucial input for provision of adequate and optimum quality health services. Hundred percent of all health centers implemented health care financing reform (HCFR) in the district. In 2014/2015, the amount of collected revenue in health facilities were 1,712,276 ETB and 1,646,190 ETB used from retained revenue for improved availability of essential medicines, diagnostic equipment, medical supplies, renovation and expansions of rooms such as delivery waiting rooms and staff housing.

From a total of 103,367,821 (91,373,808 salary) district budget 1,857,957(1,147,957 salary) were allocated to health sector. The proportion of allocated budget for health sectors from the total district budget was 5.9%.

Disaster situations in the district: In 2014/2015, there was an occurrence of drought in the district, 14 kebeles were highly affected by the drought. The impact of severe drought in the district attributed to scare of food and safe water source. Due to high level of drought condition increased malnutrition and outbreak diseases in the community like scabies.

In 2015/2016, a total of 17,516 moderate acute malnourished children, lactating and pregnant women were screened and admitted on supplementary feeding programs in the side of district health office; 949 severe acute malnourished children were treated at OTP and 28 children at SC program in the last six months with 79.9% cure rate. In addition to this, district agriculture sector was giving aid either financial or materials to drought affected community.

Ebinat district has been experiencing scabies outbreak in drought affected areas; where there is shortage of safe water for drinking and personal hygiene and immunity depressed as a result of malnutrition direct impact of the drought.

A total of 3,639 scabies patients are treated by sulfur lotion and ivermectine medicine. The majority of cases reported from: Sekonko, Adiya-qurquara, Deber-teklehaiymanot, Gibtsawit, Agissa, Abina, Qita, Niquara, Ajja, and menadiq kebeles. The cases were not line listed.

Discussion

The district economy is agriculture and livestock based; however, there was drought occurred in the last year before the study period (2014/2015), and the productivity and water source was minimized. Due to this reason, majority population exposed to malnutrition and scabies outbreak. It has limited infrastructure coverage such as electricity and transportation facilities in most of kebeles and health facilities.

Financial resource is a crucial input for provision of adequate and optimum quality health service delivery. However, the proportion of allocated budget to health sector at district level was low (5.9%) compared to regional (11.9%), and national (11.1%) budget allocated (Health and Health Related Indicator 2007).

When we look the district HP to population ratio 1:5,562 (89.8%) and HC to population ratio 1:25,527 (97.9%) were below the national standard (HSTP, 2015/2016-2019/2020). When we observe professional to population ratio, the district compared with national figures has been low which is 0.42/1000 population (health officer, nurse and midwife), (national target 2.3/1000 population minimum threshold), beside this, health extension, pharmacy and laboratory professional is low in the district.

Pneumonia was the first leading cause of morbidity at OPD followed by malaria PF in adults. In pediatrics, non-bloody diarrhea was the first leading cause of morbidity followed by pneumonia consistent with nationally reported (Health and Health Related Indicator 2007). Most of ten top leading cause of morbidity at OPD was communicable disease linked to poor sanitation. The district health service utilization rate was 0.25 per capita per year which was below the regional utilization rate (0.82) and national (0.48) per capita per year in 2014/2015 (regional annual report 2014/2015, national annual performance report 2014/15).

According to the district TB report 2014/2015, HIV prevalence incident TB cases (TB/HIV co-infection rate) was about 4.11% which is less than the study done in Amhara region (A. Mitku,

Z. Dessie, E. Muluneh et al, 2016), African and global average of 27.7%, 34% and 13% respectively . Tuberculosis is still among the major communicable diseases with huge public health significance, but 48% of detection of tuberculosis in the district was low compared to regional annual report (52.4%), national annual report (67.4%) and national target (76%) (Health and Health Related Indicator 2014/2015, Health Sector Development Programme IV). Thus, 52% of the total TB illness that are not detected is most likely causes death due to untreated.

According to eHMIS reports, proportion of pregnant women received ANC service at least once was 100% achieved above the target of 2014/2015 (Health Sector Development Programme IV). However, continuity of the service and the quality of care is not optimal as evidenced by low coverage of skilled delivery (34.7%), tetanus toxoid vaccination (55.8%), and postnatal care service (51.3%) compared with regional and national achievements (Health and Health Related Indicator 2014/2015).

The postnatal period is a critical phase in the lives of mothers and newborn babies. Most maternal and infant deaths occur during this time. However, the postnatal care service at the district was 51.3% below the national target which was 78% in 2014/2015 (quarterly health bulletin, April, 2014), and regional and national achievements (Health and Health Related Indicator 2014/2015).

Even if the proportion of skilled attendance delivery increased by 50% during in 2014/2015 from 23.1% in 2013/2014; there was still below the national targets (Health Sector Development Programme IV). Contraceptive prevalence rate and TT2 vaccination coverage pregnant and non-pregnant women were steepest decreased in 2014/2015 compared with 2012/2013 and 2013/2014 below the target set (Health Sector Development Programme IV). The key informants told me, the low performance of contraceptive prevalence rate and TT2 vaccination coverage was inaccessibility of logistics.

There was an increased performance of under-one year vaccination coverage in the district compared with national and regional achievements and national targets (Health and Health Related Indicator 2014/2015, EDHS 2016, Health Sector Development Programme IV).

Overall the prevalence of severe acute malnutrition in the district was higher than regional and national prevalence (EDHS, 2016)

The trend of the last four years malaria cases in 2014/2015 increased sharply following the main rainy season and 2012/2013 was increased following the minor rainy season. The average annual estimated malaria prevalence rate was 30.9 per risk population per year. According to national malaria stratification classified in to moderate level (malaria national strategic plan, 2014-2020). The district has the highest prevalence of active trachoma and trichiasis that remains as one of the major health problems and a leading cause of blindness in the district.

Limitations of the study

There was no compiled vital statistics report at health office as well as district vital statistic office for calculating annual mortality rate and birth rate.

There was a discrepancy and poor quality of data between eHMIS and each program officers.

There was no documented data available separately how much of positive cases for HIV among sexual transmitted diseases screened for HIV.

There was not found relevant information regarding district background and how it gets its name.

Secondary data source was less likely to generalize the source population.

Conclusion

Generally there is poor availability, accessibility functionality and quality of infrastructures to give quality of health service.

There was shortage of adequate number and skilled human resource at health facilities specially laboratory, pharmacy and health extension workers.

It has been lack of electricity, communication, and water supplies in the health institutions in the district. Health service coverage of health posts and health service utilization rate was low.

In the district, one of the long standing challenges of TB program was low case detection rate, 52% of the total TB illness was not detected; it is most likely and causes death. The number of births attended by skilled person in the district was low. The major health problems of the district were largely preventable communicable diseases and nutritional disorders.

Recommendation

Strong inter-sectoral collaborative effort is needed towards construction of roads, adequate safe water supply, installation of electricity, and to introduce ICT.

For effective health system delivery; the district should be fulfill adequate and skilled health professional and health extension workers.

Development of a joint plan between the water and health sector for the control and prevention of diarrhoeal diseases is recommended, the district should strength hygiene and sanitation activities by targeting all households.

Health professionals should sensitize community to improve institutional delivery.

Program and eHMIS officers should record the same reliable data in respect to achievement.

Reference

1. Action IFOR. Federal Democratic Republic of Ethiopia Ministry of Health POLICY AND PRACTICE. 2014;6(1).
2. Department NSH. Nova Scotia Health Profile Introduction Health Profile 2015 A Letter from the CPHO. 2015;
3. Federal Ministry of Health. Health Sector Transformation Plan in EFY 2008-2012.
4. Federal Ministry of Health. Health sector development programme IV 2010/11-2014/15. 2014;(October 2010).
5. Federal Ministry of Health. Federal Democratic Republic of Ethiopia Ministry of Health POLICY AND PRACTICE Quarterly Health Bulletin. 2014;6(1).
6. Federal Ministry of Health. HSDP IV Annual performance report in EFY 2007. 2015;1.
7. Ministry of Health and CSA. Ethiopia demographic health survey key indicators. 2016.
8. Mitku AA, Dessie ZG, Muluneh EK, Workie DL. Prevalence and associated factors of TB / HIV co-infection among HIV Infected patients in Amhara region , Ethiopia . 2016;16(2):588–95.
9. World Health Organization C. UPDATE | ETHIOPIA HIV / AIDS Progress in 2014. 2015;
10. World Health Organization. Strengthening Routine Immunization in ETHIOPIA Progress in 2014. 2015;
11. World Health Organization. Update Tuberculosis progress in Ethiopia. 2015;
12. World Health Organization Ethiopia Country Office. EPI Newsletter. 2015;1(2):1–5.
13. Federal Ministry of Health. National malaria program monitoring and evaluation plan 2014–2020. Federal Democratic Republic of Ethiopia Ministry of Health. Addis Ababa; 2014.

CHAPTER V: SCIENTIFIC MANUSCRIPTS FOR PEER REVIEWED JOURNALS

5.1. Influenza like Illness Outbreak Investigation in Jawi District, Awi Zone, North West Ethiopia, 2016

Fisseha Walle¹, Alemayehu Worku^{2*}, Mastewal Worku², Misganaw Ayalew²

¹Ethiopian Field Epidemiology Training Program, Addis Ababa University, Ethiopia

^{2*}Addis Ababa University, College of Health Sciences, School of Public Health

²Amhara Regional Health Bureau, Public Health Emergency Management Unit, Bahir Dar

Abstract

Influenza and influenza-like-illness (ILI) is the most contagious respiratory diseases having substantial public health problem. It is associated with higher morbidity and mortality during outbreak, especially among elderly and children. The aim of the study was to assess existence of outbreak, magnitude, associated factors with ILI to contain the outbreak. We conducted unmatched case-control study in Jawi district from 29 February through 10 March 2016. We selected 28 cases and 112 controls. We used face to face interview using structured questionnaire. Data were entered and analyzed using Epi-info and SPSS. We used logistic regression analysis to explore predictors of ILI. From 29 February through 10 March 2016, we identified 28 cases (attack rate, 20.55/100,000) and no death. From total cases, 4(14.29%) confirmed and 8 (28.6%) admitted cases were reported. Female cases were 67.9%. Majority affected age groups were <5 and ≥ 65 years with attack rates of 37.95 and 25.23 per 100,000 risk populations respectively. In multi variable analysis [AOR (95% CI)]: being female [3.76(1.23, 11.52)], family size ≥5 [4.56(1.24, 16.79)], having contact history with suspected ILI [5.57(1.64, 18.89)], living in ventilated house [0.14(0.04, 0.42)], and having knowledge to ILI [0.1(0.01, 0.91)] were associated factors. Most of the cases were females and under five children. Being female, living in large family size and having contact history with ILI were statistically significant risk factors; whereas living in ventilated house and having knowledge to ILI were protective factors. Health education should be continued to successfully contain the outbreak. The community should improve the ventilation status and room space of the house.

Key words: Influenza like illness, associated factors, Jawi district, Ethiopia

Introduction

Influenza is a contagious respiratory illness caused by the influenza virus. There are three types of influenza viruses A, B, and C. Influenza A viruses are divided into subtypes based on two proteins on the surface of the virus. Only some influenza A subtypes (i.e., H1N1 and H3N2) are currently in general circulation among people (1).

Common clinical symptoms of influenza include fever, cough, sore throat, headache, muscle aches, nasal congestion and weakness. Any person with acute respiratory infection with fever $\geq 38^{\circ}\text{C}$, and cough or sore throat and onset within the last 10 days is the standard case definition of influenza like illness (2). Most of the current surveillance systems for influenza are targeted on influenza like illness (ILI) in clinical settings with the aim of detecting influenza epidemics and to issue timely alerts (3). During an outbreak identifying the etiologic agent were used to apply disease specific control measures (4).

Influenza viruses are spread from person to person by respiratory droplets generated when an infected person coughs, sneezes, or talks in close proximity to an uninfected person and by touching contaminated objects (e.g. a doorknob). Most healthy adults who are ill with influenza may be able to infect other people beginning 1 day before symptoms develop and up to 5 to 7 days after becoming sick. Influenza usually comes on suddenly, 1 to 4 days after the virus enters the body (1).

Influenza viruses are a major source of morbidity and mortality worldwide. The World Health Organization (WHO) estimates that influenza results in 3-5 million episodes severe illness with estimated annual influenza associated mortality between 500,000 and 1,000,000 cases (median case fatality of 190 deaths per 100,000 person infected with influenza) (2, 5). It is an estimated 28,000–111,500 deaths annually among children aged <5 years, with 99% of these deaths occurring in developing countries. In Africa, respiratory infections rank among the leading causes of morbidity and mortality (6). Even in a non-pandemic year, influenza is estimated to cause between 250,000 and 500,000 deaths worldwide (7).

Influenza Surveillance in 15 countries in Africa, of the 69,860 ILI cases tested, 15,165 (21.7%) were positive for influenza (ranging from 6.7% in Angola to 40.4% in Madagascar), the proportion was highest in the aged 10–14 years (34%) and lowest in aged >65 years (17%) (5).

In April 2009, the novel influenza A (H1N1) pdm09 virus emerged in Mexico and then spread rapidly throughout the world. Influenza is generally a self-limiting infection with systemic and respiratory symptoms that usually resolve after 3–6 days. Most persons infected with the 2009 influenza A(H1N1)pdm09 virus experienced uncomplicated illness with full recovery within 1 week, even without medical treatment; severe progressive disease developed in only a small subset of patients (8).

The first 2 cases of pandemic influenza A virus subtype H1N1 were detected in Ethiopia in June 2009 and involved individuals who recently returned from travel to the United States, creating a sudden increase in demand for testing; however, the most frequently identified virus during this period was seasonal influenza A virus subtype H3N2 (6).

The overall test positivity rate of the influenza disease was 28.8% in Washington State (9), 21.7% in 15 countries of Africa (5), 13% in South Africa (10) and 6.8% in Ethiopia (6).

Risk factors associated with influenza diseases were being females, having contact with children and being smokers (8), having underline health issue (8, 11), family size ≥ 5 (11, 12), having contact with ILI patients (13), living in confined space (14). Whereas, preventive factors associated with influenza diseases were higher school grade, large room space and vaccination (11), having literate mothers (12), and living in open air space (15).

Influenza like illness is one of the priority diseases that are immediately reportable in Public Health Emergency Managements (PHEM) system in Ethiopia. On 29 February 2016, regional health bureau PHEM unit received ILI report from Awi zonal health department through the routine immediately surveillance report. From 29 February through 10 March 2016, investigation team conducted a case control study in Jawi district, Awi zone. The aim of the study was to verify existence of outbreak, to describe the magnitude of outbreak, to identify etiologic agents and risk factors, to guide disease prevention and control strategies and resource targeting for the outbreak response.

Methods and Materials

Study setting: The study was conducted in Jawi district. The district is located 250 KM from Bahir Dar and 670 KM from the capital city of Addis Ababa in the North-West part of Ethiopia.

The district is found in Awi zone. Administratively the district is divided in to 27 kebeles with an estimated population size of 136,228; 72,201 (53%) were males based on 2007 census projection. The actual population might be much bigger than the projection due to new inhabitants in Jawi Sugar Corporation and daily laborers. It has five health centers (91.76%) and 26 (95.4%) health posts which are currently on service.

Study design, period and population: We conducted 1:4 unmatched a case-control study from 29 February through 10 March 2016. Source populations were all population who lived in Jawi district, in 2016. Study populations were any resident of Jawi district who met the WHO case definition of influenza like illness during the study period consider as a case and any resident of Jawi district during the study period who did not develop signs and symptoms of influenza like illness during the study period considered as a control.

Sample size determination: All case-patients enrolled in the study due to small number of cases. We used significant increase in terms of precision or statistical power assumption. Selecting more than 1 control per case improve the statistical power of the study and precision, though including more than 4 controls per case is generally considered to be no more efficient. Thus, we used 1:4 case control ratios, and calculated a total sample size was 28 cases and 112 controls (140 study subjects).

Sampling procedure: We selected all cases in the affected district using line list. For controls, households were selected using simple random sampling method at each affected kebele on the sampling frame of community health information system family folder at health post level. If more than one eligible lived in the selected household, one control was selected by the lottery method.

Data collection method: A structured questionnaire was adapted thorough review of different literatures. The questionnaire was prepared in English then translated to local language. The questionnaire had different parts including demographic, clinical, exposure and knowledge information. We used face to face interview to collect data. We used the same procedures for collection of exposure data for cases and controls.

Variable of the study: Influenza like illness was dependent variable; whereas age, sex, marital status, educational status, occupation, family size, Contact history, travel history, house

ventilation status, hand washing, and knowledge about Influenza like illness were the independent variables.

Operational Definition

Case Definition: An Influenza-like illness (ILI), any individual with fever, cough, sore throat, shortness of breath, difficulty of breathing, chest pain AND/OR has history of contact during the 7 days prior to the onset of symptoms with sick or dead birds, including chickens (16).

Case classification: Possible case is any person meeting the clinical criteria (ILI). Probable case is any person meeting the clinical criteria (ILI) and an epidemiological link. Confirmed case is any person meeting the clinical (ILI) and positive results in a national influenza laboratory (17).

Well ventilated house is the room space and >5 window openness per week. Hand washing is a hand washing after physical contact between an infected and susceptible person, or by indirect contact with contaminated with virus-containing fomites on environmental surfaces.

Data processing and management: We produced data entry format template using EPI-INFO version 7. Data were coded and entered in to EPI-INFO version 7 and cleaned, then exported to SPSS version 20 and analyzed.

Data quality control: Data were collected only by principal investigator and co-investigator after discussion of the objectives, methods, tool and ethics of the study conducted. Regular meetings were held between the principal investigator and co-investigator together to identify faced problem during data collection and discussed to make correction. Questionnaires were checked for completeness and consistency daily.

Statistical analysis: We performed binary logistic regression analysis to identify associated factors; we used chi-square or a Fisher's exact test, and 95% confidence interval for statistical tests. Odds ratios at 95% confidence interval were used to see the significance of the study and the strength of association between study variables. Bivariate analysis was done to explore the crude association between different predictor variables and ILI. To control possible confounding factors, and to identify independently factors associated with ILI, multi variable analysis was performed for those variables with p value ≤ 0.25 in the bivariate analysis. Model goodness of fit

was assessed by the Hosmer-Lemeshow test. In multi variable analysis, we used a p value ≤ 0.05 and 95% of CI not including 1 to declare the presence of statistically significant association.

Ethical considerations/ Protecting human subjects: Outbreak investigation is one part of public health response, thus, no need of institutional review board approval. However, permission letter was obtained from Amhara regional health bureau and from Awi zone health department to Jawi district health office. We introduced ourselves and explained the purpose of the study using specific statements in a standard procedure. Verbal consent was obtained from participants or from their parents to participate in the study. Confidentiality was assured and no personal details was recorded or produced on this documentation.

Dissemination of the results: The result of the study was submitted to the SPH- AAU and the respective district, zonal and regional health bureau with a hard copy and soft copy, and other stakeholders those who need to know and working with together. We presented the abstract orally in Ethiopia Medical Association annual conference.

Results of the study

Descriptive epidemiology

From 29 February through 10 March 2016, we identified a total of 28 cases (4 confirmed and 24 epidemiologically linked). Overall attack rate was 20.55 per 100,000 risk populations.

Laboratory investigation: From ten ILI patients throat swab specimens were collected. Specimens were stored and shipped to national influenza laboratory in viral transport media (VTM) at 2-8C⁰, and tested by RT-PCR for influenza viruses. Four out of ten (40%) were positive for influenza A type. Regarding subtypes, 3 (75%) were pandemic influenza A (H1N1)2009, and 1 (25%) was no subtyped.

Case distribution by place: Among 27 kebeles, only 4 were affected. Attack rates per 100,000 risk populations were 7.19 in Addis Woyin, 0.46 in Argabo, 0.72 in Filfil, and 0.58 in Dek.

Case distribution by person: Cases and controls median age was 22 years (range 8 month-68 yrs) and 32 years (range 1 yr-74 yr) respectively. Female cases were 19 (67.9%). Less than five years were slightly more affected than the others (attack rate was 37.95 per 100,000 risk populations) and followed by aged ≥ 65 years was 25.23 per 100,000 risk populations (see below table). Of 28 cases, 8 (28.6%) were admitted and no death reported.

Table 12: Influenza like illness cases distribution by age group in Jawi district, 2016

| Age Group | Population at risk | Case frequency | Cumulative frequency | Relative frequency (%) | Cumulative relative frequency (%) | Age specific attack rate/100,000 |
|--------------|--------------------|----------------|----------------------|------------------------|-----------------------------------|----------------------------------|
| <5 | 18,445 | 7 | 7 | 25.00 | 25.00 | 37.95 |
| 5-14 | 41,100 | 4 | 11 | 14.29 | 39.29 | 9.73 |
| 15-64 | 72,719 | 16 | 27 | 57.14 | 96.43 | 22.00 |
| >=65 | 3,964 | 1 | 28 | 3.57 | 100.00 | 25.23 |
| Total | 136,228 | 28 | - | 100.00 | - | 20.55 |

Case distribution by time: We observed a triple peak in different times during the outbreak; this shows propagated source of transmission. The duration of outbreak starting from 29 February to ended March-08 with in short period of time.

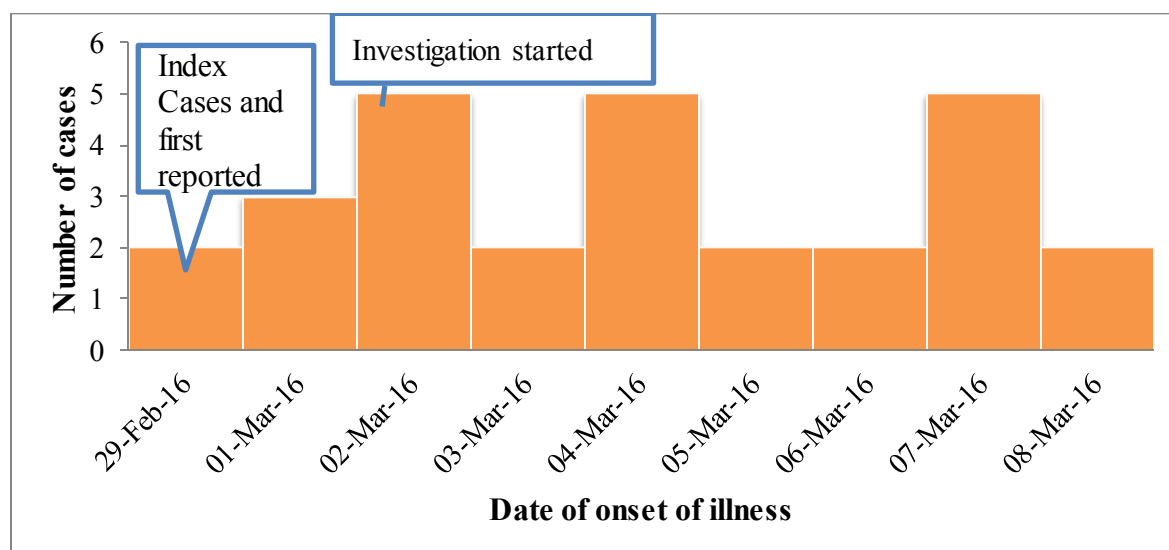


Figure 31: Influenza like illness outbreak epi-curve by date of onset in Jawi District, 2016

Clinical characteristics of influenza like illness: The major manifestation of the signs and symptoms during the outbreak was characterized by; high grade fever 100%, Cough (96.43%), headache (67.86%), sore throat.

Analytic epidemiology

In multi variable analysis [AOR (95% CI)]: being female [3.76(1.23, 11.52)], family size ≥ 5 [4.56(1.24, 16.79)], having contact history with ILI [5.57(1.64, 18.89)], living in ventilated house [0.14(0.04, 0.42)], and having knowledge of ILI [0.1(0.01, 0.91)] were statistically significant factors. After adjusting for all variables the association of age group with influenza like illness failed to resist.

Table 13: Logistic regression analysis to identify factors associated with ILI in Jawi district, 2016

| Variable | | Case status | | Bivariate analysis | | Multi variable analysis | |
|-------------|-----------|-------------------------|-----------------------------|----------------------|---------|-------------------------|---------|
| | | Case n=28 (Col %) | Control n=112 (Col %) | COR (95% CI) | P-Value | AOR (95% CI) | P-Value |
| Sex | Female | 19 (67.86) | 44 (39.29) | 3.26 (1.36,7.86) | 0.008* | 3.76 (1.23,11.52) | 0.02** |
| | Male | 9 (32.14) | 68 (60.71) | Ref. | Ref. | Ref. | Ref. |
| Age group | 0-4 | 7 (25) | 8 (7.14) | 14 (1.46,134.25) | 0.02* | 0.95 (0.05,19.08) | 0.98 |
| | 5-14 | 4 (14.29) | 12 (10.71) | 5.33 (0.53,54.03) | 0.16 | 0.76 (0.03,17.4) | 0.86 |
| | 15-64 | 16 (57.1) | 76 (67.9) | 3.34 (0.42,27.26) | 0.26 | 0.99 (0.08,12.87) | 0.99 |
| | ≥ 65 | 1 (3.57) | 16 (14.29) | Ref. | Ref. | Ref. | Ref. |
| Family size | <3 | 6 (21.4) | 47 (42) | Ref. | Ref. | Ref. | Ref. |
| | 03-04 | 5 (17.9) | 35 (31.2) | 1.12 (0.32,3.97) | 0.86 | 0.89 (0.2,3.99) | 0.88 |

| | | | | | | | |
|---------------------------------|---------|--------------|--------------|----------------------|--------|----------------------|---------|
| | >=5 | 17 (60.7) | 30 (26.8) | 4.44 (1.57,12.53) | 0.005* | 4.56 (1.24,16.79) | 0.02** |
| Marital status | Married | 16 (57.1) | 78 (69.6) | 0.58 (0.25,1.36) | 0.21 | 0.58 (0.18,1.91) | 0.37 |
| | Single | 12 (42.9) | 34 (30.4) | Ref. | Ref. | Ref. | Ref. |
| Contact history | Yes | 13 (46.4) | 20 (17.9) | 3.99 (1.64,9.67) | 0.002* | 5.57 (1.64,18.89) | 0.006** |
| | No | 15 (53.6) | 92 (82.1) | Ref. | Ref. | Ref. | Ref. |
| Travel history | Yes | 8 (28.6) | 20 (17.9) | 1.84 (0.71,4.77) | 0.21 | 1.98 (0.5,7.78) | 0.33 |
| | No | 20 (71.4) | 92 (82.1) | Ref. | Ref. | Ref. | Ref. |
| Living in well ventilated house | Yes | 10 (35.7) | 89 (79.5) | 0.14 (0.06,0.35) | 0.01* | 0.14 (0.04,0.42) | 0.001** |
| | No | 18 (64.3) | 23 (20.5) | Ref. | Ref. | Ref. | Ref. |
| Hand washing after shaking | Yes | 0 (0) | 9 (8) | 0.0001 (0.00,-) | 0.99 | NA | NA |
| | No | 28 (100) | 103 (92) | Ref. | Ref. | NA | NA |
| Having knowledge to ILI | Yes | 1 (3.6) | 37 (33) | 0.08 (0.01,0.57) | 0.01* | 0.1 (0.01,0.91) | 0.04** |
| | No | 27 (96.4) | 75 (67) | Ref. | Ref. | Ref. | Ref. |

N.B ** = statistically significant association in multi variable analysis

*= Statistically significant association during bivariate analysis

Ref= Reference

NA= Not met criteria to enter final multi variable model or p value > 0.25 in bivariate analysis.

Action taken: We conducted brief discussion with district administrative and health official, and then the team engaged in activating the district epidemic response task force to participate in active case detection and educating the community to control the epidemic. Throat swabs were taken from patients for confirmation of the outbreak; isolation of admitted cases in health facilities to prevent cross transmission; mobilizing Clinical management, investigation and social mobilization teams; technical guidance to strengthen the coordination mechanism to stakeholders (to involve sectors like education and communication); epidemiologic investigation conducted including a case control study; Distribution of infection prevention materials to patient and care providers (masks) and implementation of strike hand washing procedures, and media briefing in different areas to create awareness about prevention mechanisms, strength surveillance and supportive care at home.

Discussion, limitations, conclusions and recommendations

We identified a total of 28 ILI cases with attack rate of 20.55 per 100,000 risk population. Eight (28.6%) were admitted and no death reported in the affected area. Most of the cases were females (67.9 %) and under-five children with age specific attack rate of 37.95 per 100,000 risk population which was slightly higher than the overall attack rate, consistent with cross sectional study result in Djibouti city residents (15). The major manifestation of the sign and symptoms during the outbreak were also characterized by high grade fever, Cough, headache and sore throat. This is in line with different literatures (2, 16). Of 10 throat swabs were tested at national laboratory for etiologic cause confirmation for influenza; 4 (40%) suspected influenza like illness were positive for Influenza A; which were higher positivity rates compared with the study conducted in routine influenza sentinel surveillance in Ethiopia, 2008–2010 (6), South Africa 2014 communicable diseases surveillance bulletin (10), influenza Surveillance in 15 Countries in Africa, 2006–2010 (5), and Washington State influenza update, 2017 week 3 (9).

Our study found that attack rate was slightly higher in study subjects under 5 years old, however, in the multi variable model analysis, the difference with other age groups was not statistically significant ($P = 0.9$). Being female was significantly associated with influenza like illness; the odd of developing influenza like illness was 3.76 times among females compared to males. The

possible reason might be females were adjusted for living with children, or for daily contact with groups of children or care givers to patients at home. The study is also in line with online community cohort surveys study conducted in United Kingdom (8). Having family size equal or greater than five in house hold was significantly associated with influenza like illness; the odds of developing disease was 4.56 times higher compared with having family size less than three. The possible reason might be over condensed family size or confined space increased person density in the household and suitable to transmission of infection during sneezing, cough, or talk; consistent with the study done in Nicaragua, Kasuga City Western Japan, in Victoria Australia (11, 12, 14). People who had close contact history with suspected influenza like illness were 5.57 times more likely to develop influenza like illness than people had not contact history. The possible reason could in fact, cross contamination plays a great role in infectious diseases or direct contact may have increased impact on transmission via aerosols or by indirect contact with contaminated with virus-containing fomites on environmental surfaces consistent with other studies (13). Having knowledge of the mode of influenza like illness transmission and prevention significantly reduces the risk of acquiring ILI by almost 90% $|1-AOR|*100$ compared with others. Those people living in well ventilated house (good room space and window openness > 5 per week) were significantly reduced contracting of ILI by near to 86% $|1-OR|*100$ compared with living in closed or confined room space, similarly, the study conducted in, Kasugai City in Western Japan, and Djibouti City residents (11, 15).

Limitation of the study: The study design was prone to selection and recall bias, specifically in the control group. Sample size of the case group was small; due to this reason the representativeness of the findings may not be representative for the entire population.

Conclusion and Recommendation: Most of the cases were females and under five children. Three-fourth of the causative agent of the outbreak confirmed by PCR test was influenza A subtype (H1N1) pdm09. Being female, living in large family size and having contact history with ILI were statistically significant risk factors; whereas living in ventilated house and having knowledge to ILI were protective factors. Health workers should continue health education how to prevent and minimize the spread of the disease using different media to the people regularly. The community should improve the ventilation status and room space of the house.

Reference

1. Texas Department of State Health Services. FAQs Data Reporting Investigation Immunization Resources Monitoring, Infectious Disease Control Influenza Unit. 2016;(December, 14):1–5.
2. Kasper MR, Wierzba TF, Sovann L, Putnam SD. Evaluation of an influenza - like illness case definition in the diagnosis of influenza among patients with acute febrile illness in cambodia. 2010;2–7.
3. Ministry of Health. Operational Guideline for Influenza-Like Illness and Severe Acute Respiratory Infection Second Edi. 2014;
4. Arizona Department of Health Service. Guidelines for Investigating Outbreaks of Influenza-Like Illness or Respiratory Disease. 2013;(April 2011).
5. Radin JM, Katz MA, Tempia S, Nzussouo NT, Davis R, Duque J, et al. In fl uenza Surveillance in 15 Countries in Africa , 2006 – 2010. 2012;206(Suppl 1):2006–10.
6. Ayele W, Demissie G, Kassa W, Zemelak E, Afework A, Amare B, et al. Challenges of Establishing Routine In fl uenza Sentinel Surveillance in Ethiopia , 2008 – 2010. 2012;206(Suppl 1):2008–10.
7. Adler AJ, Eames KTD, Funk S, Edmunds WJ. Incidence and risk factors for influenza-like-illness in the UK : online surveillance using Flusurvey. 2014;
8. Season P, Lehnert N, Geis S, Eisenbach C, Neben K, Schnitzler P. Changes in Severity of Influenza from Pandemic to First. 2013;19(5).
9. Epidemiology CD. Washington state influenza update. 2017;1–8.
10. Cohen C, Dreyer A, Frean J, Treurnicht F, Iyaloo S, Ismail N, et al. Respiratory pathogens from influenza - like illness and pneumonia surveillance programmes , South Africa 2014. 2014;13(1).
11. Epidemic I. Various factors associated with the manifestation of influenza-like illness. 1992;2(3):574–82

12. Hirota Y, Takeshita S, Idek S, Ohkubo A, Fukuyoshi S, Takahashi K, and Kajiji M. Various factors associated with the manifestation of influenza-like illness. 1992;2(3):574–82.
13. Belser JA, Maines TR, Tumpey TM, Katz JM, Belser JA, Maines TR, et al. Influenza A virus transmission: Contributing factors and clinical implications. 2012;(December 2010).
14. Brown CR, Mccaw JM, Fairmaid EJ, Brown LE, Leder K. Factors associated with transmission of influenza-like illness in a cohort of households containing multiple children. 2015;247–54.
15. Andayi F, Crepey P, Kieffer A, Salez N, Abdo AA, Carrat F, et al. Determinants of individuals' risks to 2009 pandemic influenza virus infection at household level amongst Djibouti city residents - A CoPanFlu cross-sectional study. 2014;1–11.
16. Ethiopian Health and Nutrition Research Institute. Public health emergency management. 2012;
17. Health P, Communicable M, Group D. Public health guidelines 1 on the prevention and management of influenza outbreaks in residential care facilities in Ireland 2016 / 2017. 2017;(August 2016):1–58.

CHAPTER VI: ABSTRACTS FOR SCIENTIFIC PRESENTATION

6.1. Acute Watery Diarrhea Outbreak Investigation in Minjar Shenkora District North Shoa Zone, Amhara Regional State, Ethiopia, 2016

Fisseha Walle¹, Alemayehu Worku^{2*}, Mastewal Worku², Sisay Awoke³

^{1,3}Ethiopian Field Epidemiology Training Program, Addis Ababa University, Addis Ababa, Ethiopia

^{2*}Addis Ababa University, College of Health Sciences, School of Public Health

²Amhara Regional Health Bureau, Public Health Emergency Management Unit, Bahir Dar, Ethiopia

Abstract

Background: Acute watery diarrhea (AWD) is becoming a serious problem in Ethiopia. AWD outbreak is public health emergency which results in increased morbidity and mortality and put acute demands on the health system. Knowing the determinants of a disease enables us to design an effective intervention. The aim of the study was to identify existence of outbreak, etiologic agent, magnitude source of infection, and associated factors of the disease and to initiate appropriate control and prevention measures.

Methods and materials: We conducted unmatched case control study in Minjar Shenkora district from 22 July through 24 August 2016 G.C. We selected 51 cases and 51 controls. We conducted face to face interview using structured questionnaire. The collected data were entered and analyzed using Epi-info version 7 and SPSS version 20. We used logistic regression analysis to explore significant predictors of AWD.

Results: From on 22 July through 24 August 2016, 218 cases (attack rate 0.12), and no death were reported. *Vibrio cholerae* serogroup O1 was identified in stool and water cultures. Of 218 notified cases, 60.1% were men, and 62.84% were 15 - 44 years age group. In multi variable analysis; drinking river water and eating raw food were significantly associated risk factors, whereas drinking treated water and eating reheated food were significantly associated preventive factors.

Conclusion and recommendation: According to the findings of this study, river water consumption was the main source of infection in the district and drinking treated water and

eating reheated food were protective factors against infection. Water chlorination, case treatment and health education were main interventions undertaken. The district should provide water treatment chemicals and potable water supply to the community; raising community awareness about feeding practices to control diarrheal disease is necessary.

Key words: AWD outbreak, associated factors, Minjar Shenkora district, Ethiopia

6.2. Malaria Magnitude and Trend Analysis from 2011/2012 to 2014/2015 in South Gondar Zone, North West Ethiopia, 2016

Fisseha Walle¹, Alemayehu Worku^{2*}, Mastewal Worku²

¹Ethiopian Field Epidemiology Training Program, Addis Ababa University, Ethiopia

^{2*}Addis Ababa University, College of Health Sciences, School of Public Health

²Amhara Regional Health Bureau, Public Health Emergency Management Unit, Bahir Dar, Ethiopia

Abstract

Background: Malaria is a serious public health problem in many parts of the world. Even though malaria surveillance has been implementing in Ethiopia, there is limited regular dissemination of surveillance data analysis and feed back to health care providers. The aim of the study was to analyze malaria surveillance data making essential contributions to determine burden and trend over time and the impact of control measures.

Methods: We conducted cross sectional study from 29 January through 13 February 2016 at South Gondar Zone. We used semi-structured questionnaire and checklist. The collected data were reviewed and checked for completeness and consistency. Data were entered and analyzed using Microsoft Excel 2010.

Results: Between 2011/2012 through 2014/2015 GC, 40.29% of total patients visited at outpatient department (OPD), laboratory were done for malaria confirmation. There were 471,890 confirmed malaria cases with 45.1% test positivity rate. *Plasmodium falciparum* accounted 65.81%, and *vivax*, 34.19%. A total of 523,159 (9.86% clinical cases) malaria cases were reported. Average annual prevalence rate was 67.7 per 1000 risk population per year. The proportion of death in 2014/2015 was 0, and clinical cases, 0.02%. Regarding age groups were 8.88% under five, 15.08% 5-14, and 76.04% ≥ 15 years. Regarding to reporting time were 25.76% in 2011/2012, 38.52% in 2012/2013, 16.50% in 2013/2014, and 18.99% in 2014/2015.

Conclusion and recommendation: Malaria is still a major source of morbidity in South Gondar Zone among outpatient visits. Generally, there was intermittent trend of confirmed out-patient malaria cases in the last four years period. However, the clinical malaria cases, inpatient and death reached near to zero time to time in the study area. To evaluate control and prevention measures of malaria needs further assessment or operational research.

Keywords: Annual estimated malaria prevalence rate, malaria data analysis, south Gondar zone.

CHAPTER VII: NARRATIVE SUMMARY OF DISASTER SITUATION VISITED

7.1. Narrative Summary of Disaster Situation in Wagihemra and North Wollo Zones, Amhara Region, Ethiopia, 2016

Executive Summary

We conducted Meher assessment from November 22 to December 8, 2016 in two zones, 08 selected districts, 08 cluster health centers and 08 health posts. Assessment was done on food and non- food causes of hazards magnitude, severity, capacity to manage, identify risk factors and assistance needed for the upcoming six months, gaps/challenges and make recommendations to take reliable intervention measures that address problems encountered.

In both assessed zones there were AWD and Scabies outbreak in the last 3 months before the study. There is no ongoing outbreak of AWD and Scabies in Wagihemra and N/Wollo zones. Multisectoral epidemic task force committees at the zonal and district levels were existed but had no scheduled meeting. There were EPRP in each visited zone and some districts but not funded at zonal level. In both zones anticipated epidemics of malaria, AWD, scabies, measles, malnutrition and meningitis due to the risk factors being identified and existing experiences. In both assessed zones, there will be 1,823,648 and 2,935,930 risk population and 19,195,195 and 3,060,000 ETB budget required to address epidemics for N/Wollo and Wagihemra zone respectively.

Most of the leading causes of morbidity both under- five and above were communicable diseases and malnutrition with in the assessed Zones.

Regarding malnutrition, a total of 2726 SAM and 72650 MAM were reported in under-five children from May to October 2016 in N/Wollo; 5644 SAM and 107,769 MAM cases were reported in under-five children from May to October 2016 in Wagihemra zone. Overall GAM was 8.45% in North Wollo and 33.65% in Wagihemra zone. In the same manner, LPW 28.14 % and 58.13% of GAM were reported in N/Wollo and Wagihemra zones respectively. Generally the prevalence of malnutrition in Wagihemra zone was critical than North Wollo as well as the region.

Reactivation of multi sectorial PHEM coordination forum at all levels, strengthening surveillance and EPRP, capacity building, improving documentation, strengthening of malaria prevention and control activities, improving malnutrition screening and management especially close follow up Wagihemra zone were recommended.

Introduction

Background

The disaster risk management and food security sector (DRMFSS) under ministry of agriculture (MoA) and the regional DPPBS in collaboration with ministry of health, ministry of water and energy, ministry of education and partners which include UN agencies, NGOs and donors conducts a nationwide vulnerability assessment and risk mapping twice a year. These assessments are called Belg and Meher Assessments. The Meher assessment is always conducted following the main harvesting season to see the level of production and map the different hazards occurred and predict the potential economic, health and social threats. Health and nutrition emergencies are highly correlated with food production and climatic and environmental conditions like drought, flooding and conflict, generally natural and manmade disasters cause health and nutrition emergencies if early preparedness activities are not made.

In 2016 EDHS revealed that, overall 10% of children in Ethiopia were wasted, and 3% were severely wasted (below -3 SD) with 70.0% of those having MAM (moderate acute malnutrition). Regional variations exist, with Somali and Afar having the highest percentages of children who were wasted, 23% and 18%, respectively. In Amhara region, overall 9.8% of children were wasted, and 2.2% were severely wasted (below -3 SD) (1).

In 2016, two million cases of moderate acute malnutrition (MAM) in children under five and pregnant and lactating women had been treated with targeted supplementary feeding (TSF) as of October 2016. More than 217,400 (1.8%) SAM cases had been treated by the end of August 2016 (2, 3).

In Amhara region 2016, AWD, Scabies and suspected meningitis outbreaks were reported in the last 3 months. More than 5000 cases of AWD with a case fatality rate of around 1% were reported in the region during the outbreak which lasts from July to December 2016. More than

100 districts from all zones of the region were affected by this outbreak. The report indicated that a total of 8009 scabies cases and 35 meningitis cases (2 deaths, CFR=5.7%) were reported since August 2016 (4).

Currently nutrition situation in the region is unstable. Of the total 1,133,459 under- five children screened in October 2016, 5,064 (0.45%) SAM and 86,906 (7.67%) MAM cases were reported. The GAM was 8.1%. In the same manner pregnant and lactating women, of the total 217,584 screened, 63,258 (GAM, 29.1%) MAM cases were reported (4).

In 2017, an anticipated of 303,000 (2.5%) SAM cases and 2.7 million MAM cases (1,371,235 MAM children and 1,372,758 PLWs) are expected to be reached in Ethiopia. The total anticipated financial requirements are us\$ 105.6 million for nutrition supplies (MAM) and (SAM) and 42 million for health. In 2017, humanitarian health actors will continue and expand support to the Ministry of Health to prepare for and address epidemic-prone disease, including AWD, measles, dengue fever, skin diseases, and meningitis (2, 3).

In 2017, the region anticipated epidemics such as AWD, malaria, measles, meningitis, scabies and malnutrition based on the risk factors on the ground and current experience of outbreaks (4).

All activities should be based on regular assessment of public health risks, needs of affected populations and district capacities to prevent, control and/or respond to adverse health events. Thus, to mitigate the emergencies effect, health and nutrition rapid multi agency Meher assessment was conducted to forecast the magnitude of the emergency threats and accordingly to address the emergency health and nutrition need of the assessed zones. According to this, health and nutrition Meher need assessment was conducted in eight zones from zonal health department to health post levels. Therefore, our assessment was conducted in two zones (Wagihemra and North Wollo), eight districts, 8 health centers, 8 health posts.

The aim of the assessment was to identify areas where emergency health and nutrition assistance needed for the upcoming six months can help develop effective strategies for mitigating the effects of emergencies in the future and to determine the gap in the capacity of the health system in addressing anticipated risks so as to develop response plan and allowing public health and emergency managers to prioritize their response and distribution of resources accurately.

Justification of the study

Disease outbreaks and nutrition emergencies significantly increase the risks of mortality and morbidity if early preparedness and response activities are not made. The drought and flooding induced increase in household food insecurity will result in acute malnutrition and disease outbreaks. All activities should be based on regular assessment of public health risks and needs of affected population. Thus, to mitigate the emergency effect, health and nutrition rapid multi-agency Meher assessment was conducted to forecast the magnitude of the emergency threats, and accordingly to address the emergency health and nutrition need of the assessed zones. On the basis of the anticipated health and nutrition emergencies, the government and partners have done early preparedness plan for the upcoming six months to give quick response in order to recover quickly from shock, and to prevent further deterioration.

Objectives

General Objective

- To assess public health emergency situation, preparedness and need assistance to ensure appropriate and effective humanitarian planning and responses that will alleviate morbidity and mortality of vulnerable groups in Wagihemra and North Wollo zones, 2016.

Specific Objectives

- To assess multisectoral coordination during emergency response and preparedness.
- To identify occurred or anticipated hazard and the population affected by or at risk of any health and nutrition related hazard and existence of diseases outbreak.
- To determine the status of nutrition screening, TFP and TSFP performance and the gaps.
- To assess the adequacy of resources to carry out effective response activities for the potential occurrence of outbreaks during the coming six months of 2017.
- To estimate population in need of emergency response and the resource available and gaps to coming six months of 2017.

Methods and Materials

Assessment areas/ setting: The assessment was conducted in both North Wollo and Wagihemra zones, from each zone four districts health offices; four health centers and four health posts were selected based on emergency health and nutrition problems in consultations with the RHB, ZHDs and district health offices.

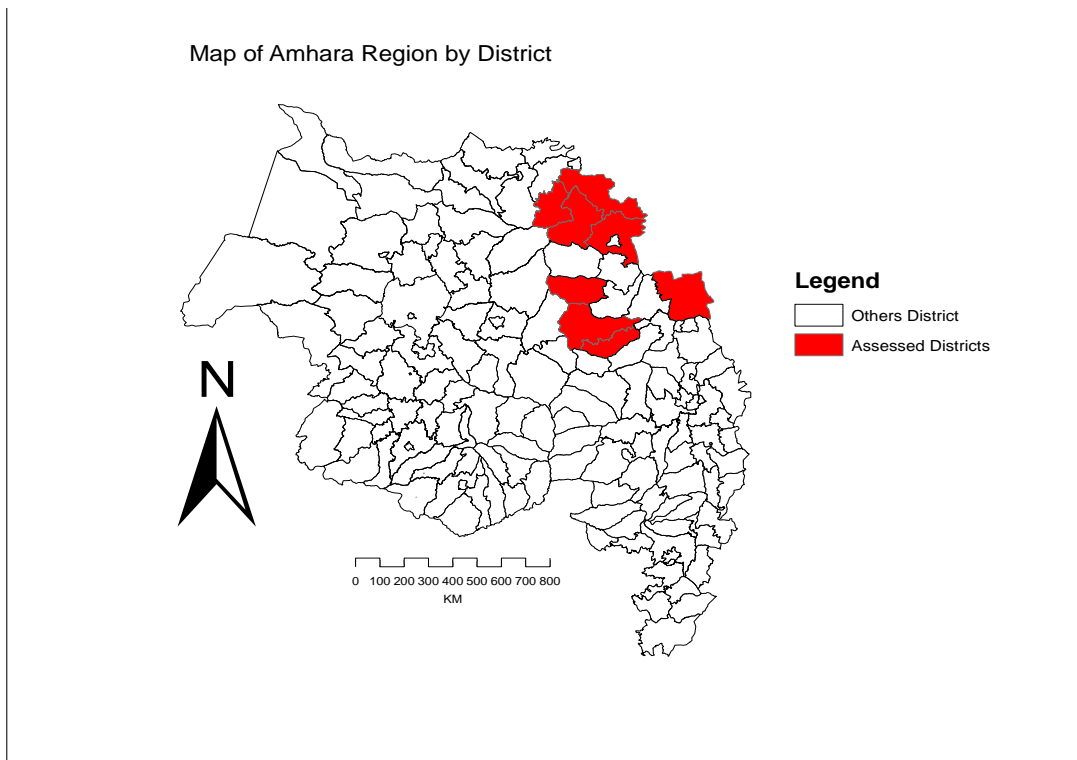


Figure 32: Map of Amhara region to indicate the assessed districts, North East Ethiopia, 2016.

Study design and periods: Facility based cross-sectional study was conducted from 22 November to 8 December 2016.

Sampling method and Sample size: We used purposive sampling method to select two zones, eight district health offices, eight health centers and eight health posts based on emergency health and nutrition problems in consultations with the RHB, ZHDs and district health offices.

Data Collection Tools and Methods: The assessment was done by face to face interviewing responsible officers from different units of health sector and reviewing health and nutrition documents using the check list developed by FMOH/EPHI/PHEM. Four different check lists

were used to collect health and nutrition related data at health post, health center, district and zonal level. Check lists addresses socio-demographic profile, health profile; status of epidemic prevention and control multisectoral coordination at all levels and goes through asking ongoing epidemic situation and check availability of emergency drug and preparedness at all respective levels. Briefing different sectors of the zone was the initial activity before departing to the selected districts and also debriefing by the assessment team was done at last and discussions were undergone about the findings of the assessment at district and zone level.

Data Quality Control, Processing and Analysis: The collected data was reviewed and checked for completeness and consistency before data entry and data were entered, cleaned and analyzed using Microsoft Excels 2010. Finally, descriptive statistics like frequency tables and diagrams were used for presenting the descriptive results.

Ethical Consideration: Official letter was obtained from Amhara regional state food security bureau. We explained the objectives of the assessment and confidentiality to the zones, respective districts and health facilities and obtained verbal consent.

Dissemination of the Results: The result of the study was been submitted to the Ministry of Health, SPH- AAU and the respective districts, zonal and regional health bureau with a hard copy and soft copy, and other stakeholders those who need to know and working with together.

Results

North Wollo Zones

Socio- Demographic Profile: Total population of North Wollo zone is 1,675,732, of which the proportion of females are 49.8%, under-five children, 13.54%, women of reproductive age, 23.58%, and pregnant women, 3.37%.

There are a total of 65 Health Centers currently functional in North Wollo zone. A total of 445 HEWs are actively working in their assigned 275 kebeles where health posts are available, although the total numbers of kebeles in the zone are 282.

Health Profile: PHEM –The zone public health emergency issues are coordinated by 03 PHEM officers in zonal health department, 12 PHEM officers at district health offices and 65 PHEM

focal persons in all health centers and all health extension workers. Three officers of the zone and 12 officers working at district health offices were trained on PHEM basic level training. There are RRT structures organized in the entire 12 districts and 65 health centers but not functional.

Although it is not conducted in a regular basis, a multisectoral health coordination forum has been conducted at zone level where all relevant government, partners and stakeholders were participating. The zone has a public health emergency preparedness and response plan but not budget supported.

All Visited districts have multisectoral coordination forum but conducted in unscheduled manner. EPRP was prepared in Raya kobo and Wadila but not in Meket and Bugina. Two of the visited districts have allocated budget - Raya kobo (54,000) and Bugina (100,000) ETB.

Disease outbreak: There was an outbreak of AWD in North Wollo zone which lasted for about two months from Aug to Sep 2016. A total of 48 cases were reported from the health institutions while no death reported from the outbreak. During the assessment, outbreak was confirmed in Raya kobo, Habru, Gubalafto and Wadila districts, and Kobo and Woldia town. Scabies has been also the major public health problem as surge of cases in the district like Meket 4000 cases were reported. In addition, there is an increment of malaria cases being reported from places like Raya Kobo, Habru, Bugna and Lasta districts and Kobo town.

Risk Factors for Epidemics: A hundred percent routine measles vaccination coverage for under-one year children reported in 2015/2016. There is no recent outbreak of measles in North Wollo zone. In addition, 628,480 (99%) children with the age of 6 month to 15 year have been vaccinated during supplementary immunization campaign which was conducted in April 2016. The coverage of vitamin A and de-worming supplementation for eligible children in North Wollo zone in October 2016 was only 16% and 14.6% respectively.

In 2015, top five causes of morbidity for all assessed districts under-five children were little different in their order and type; the most common diseases like non-bloody diarrhea, pneumonia, dysentery and acute febrile illness and dyspepsia; acute febrile illness and acute upper respiratory tract infection were the most common diseases of the above five years in the assessed four districts (see below table).

Table 14: Top five causes of morbidity by district, North Wollo zone, North East Ethiopia, 2015/2016.

| District | Morbidity U5 years | Morbidity above 5 years |
|-----------|---|--|
| Bugina | Non-bloody diarrhea | Dyspepsia |
| | Pneumonia | Acute febrile illness |
| | Acute febrile illness | Pneumonia |
| | Dysentery | Acute upper respiratory tract infection |
| | Acute upper respiratory tract infection | Others unspecified infection |
| Meket | Non-bloody diarrhea | Dyspepsia |
| | Pneumonia | Acute febrile illness |
| | Skin infection or subcutaneous tissue | Acute upper respiratory tract infection |
| | Dysentery | Skin infection or subcutaneous tissue |
| | Acute upper respiratory tract infection | Scabies |
| Raya kobo | Non-bloody diarrhea | Acute febrile illness |
| | Pneumonia | Acute upper respiratory tract infection |
| | Acute febrile illness | Dyspepsia |
| | Acute upper respiratory tract infection | Diseases of musculoskeletal system and connective tissue |
| | Trachoma | Non-bloody diarrhea |
| Wadila | Pneumonia | Dyspepsia |
| | Non-bloody diarrhea | Acute upper respiratory tract infection |
| | Skin infection or subcutaneous tissue | Diseases of musculoskeletal system and connective tissue |
| | Non-bloody diarrhea | Acute febrile illness |
| | Dysentery | Skin infection or subcutaneous tissue |

Risk factors analysis

Malaria: In the four assessed districts there are about 86 malaria endemic kebeles with an estimated risk population of 450,794 (27 %) of the total population of the zone. All the assessed districts have endemic kebeles, breeding sites, interrupting rivers and unprotected irrigations. However, all the assessed districts have LLINs and IRS coverage more than 90% at the target malarious areas. Considering the existence of a number of risk factors, there will be expected occurrence of malaria outbreak. This information was essential for making decisions to guide control and prevention activities.

There were 3299 and 2568 malaria cases and 0 deaths were reported from May to October 2015 and 2016 respectively. In 2015/2016, each assessed district the malaria cases were Bugina (1737 and 277), Wadila (179 and 87), Meket (984 and 484) and Raya kobo (1399 and 1720) were reported respectively. In general, the number of total malaria cases in the last six months was reduced by 22.2% compared with 2015 in the same months. However, compare by district and month there was increased malaria cases by 22.9% in Raya kobo district in the last six months and above threshold on the months of August and October (see below figure).

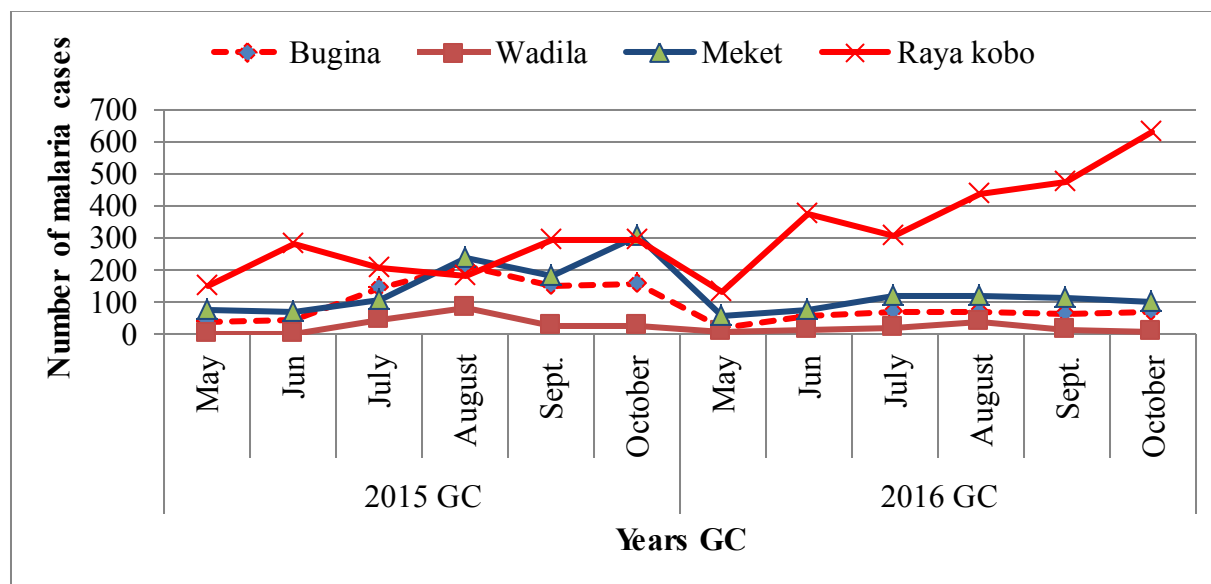


Figure 33: Comparing trends of 2015 and 2016 G.C. malaria cases with the same months of visited districts, North Wollo zone, 2016

Meningitis: All the visited districts and zone reported no meningitis epidemic in the last three years. Vaccination was conducted in the last year from age group 1 to 29 years but not documented data available the exact number of vaccinated population. However, there is potential of outbreak due to presence of meningitis outbreak in the neighborhood of the zone in the South Wollo zone and dry season will be risk of outbreak.

AWD: There was an epidemic in the last three months in some assessed districts like Raya kobo and Wadila and other districts found in the zone. Most are at risk of outbreak due to history of AWD in the last three months and low protected water coverage in all assessed districts below 60%.

Measles: All four assessed districts and zone were reported 100% measles routine vaccine coverage in under-one year children in 2015/2016 and >90% of Supplementary Immunization Activities (SIA) in all the assessed districts and zone. Fear of measles outbreak is still reported from the assessed districts and zone despite of routine vaccination coverage was 100%.

Table 15: Drugs and medical supplies required for six months North Wollo zone, North East Ethiopia 2017.

| Description | Specific items | Unit | Required | Available | Gap |
|-----------------|-------------------------------------|--------|-----------|-----------|-----------|
| Vaccines | Meningitis vaccine | Dose | 1,001,740 | 0 | 1,001,740 |
| Drugs | Coartem | Dose | 14,200 | 2000 | 12,200 |
| | Artesunate (rectal) | Dose | 0 | 0 | 0 |
| | Artesunate (Inj) | Vial | 300 | 200 | 100 |
| | Artemether IM | Vial | 200 | 0 | 200 |
| | Quinine (PO) | Dose | 350 | 0 | 350 |
| | Quinine (IV) | vial | 150 | 0 | 150 |
| | Chloroquine 150mg of 1000 tab | Tin | 70 | 0 | 70 |
| | Ceftriaxone | Tin | 3696 | 0 | 3696 |
| | Doxycycline 100 mg of 1000 Caps/TIN | Tin | 15 | 0 | 15 |
| | Ringer lactate | Bag | 6700 | 375 | 6325 |
| ORS | Sacket | 60,000 | 9,000 | 51,000 | |

| | | | | | |
|----------------------------|---------------------------|--------|-------|------|-------|
| | Vit A. | Tin | 960 | 456 | 504 |
| Nutrition supplies | F100 | Carton | 36 | 22 | 14 |
| | F75 | Carton | 36 | 22 | 14 |
| | RUTF | Carton | 1446 | 1446 | 0 |
| | Resomal | Carton | 80 | 0 | 80 |
| Laboratory supplies | RDT (Malaria) 25 test | PK | 1500 | 1000 | 500 |
| | Pastorex (Meningitis RDT) | Each | 200 | 0 | 200 |
| | LP set | Each | 200 | 0 | 200 |
| | TI bottle | Each | 200 | 0 | 200 |
| Kits | CTC Kit (AWD) | Kit | 60 | 02 | 58 |
| Medical supplies | Gloves, | Each | 4000 | 0 | 4000 |
| | Syringe | Each | 6250 | 0 | 6250 |
| | PPE | Each | 12480 | 0 | 12480 |

Nutrition

SAM Management

On the basis of October 2016 data, there are 53 (81%) stabilization centers in health centers of North Wollo Zone and OTP service is being delivered in all 275 HPs of the zone. Overall monthly reporting rate of OTP/SC facilities to the zone health department was 99% during May to Oct 2016 that will help to monitor TFP and to have quality data analysis in the zone. There are 200 health workers and all 445 HEWs trained on SAM management in North Wollo Zone.

The below graph is SAM admission performance in North Wollo Zone that shows inconsistency of admission trend between months of a year and between the same months of different year. July 2016 was the month where the highest admission was recorded in the past six months in contrast to July 2015, overall the highest admission was observed between May and October 2016 compared with 2015.

In the same manner inconsistency of trends in recovery, death and defaulter rate in consecutive months and between years were observed. For example, the percentage of cured children in some of the month is greater than the total number of SAM cases registered in that month and reliability of the data at this point is questionable.

A relatively higher defaulter rates were recorded as 5.6% in May 2016, 4.7% in August 2016 and 4.3% in October 2016 although they are within national acceptable rate. In the same manner, each of these months' rates was higher than the same months of 2015. Some of health institutes have serious SAM defaulter rate like in Debre Zebit health center clusters in Meket Districts where 42% defaulter was recorded in October 2016 as we observed on the assessment period.

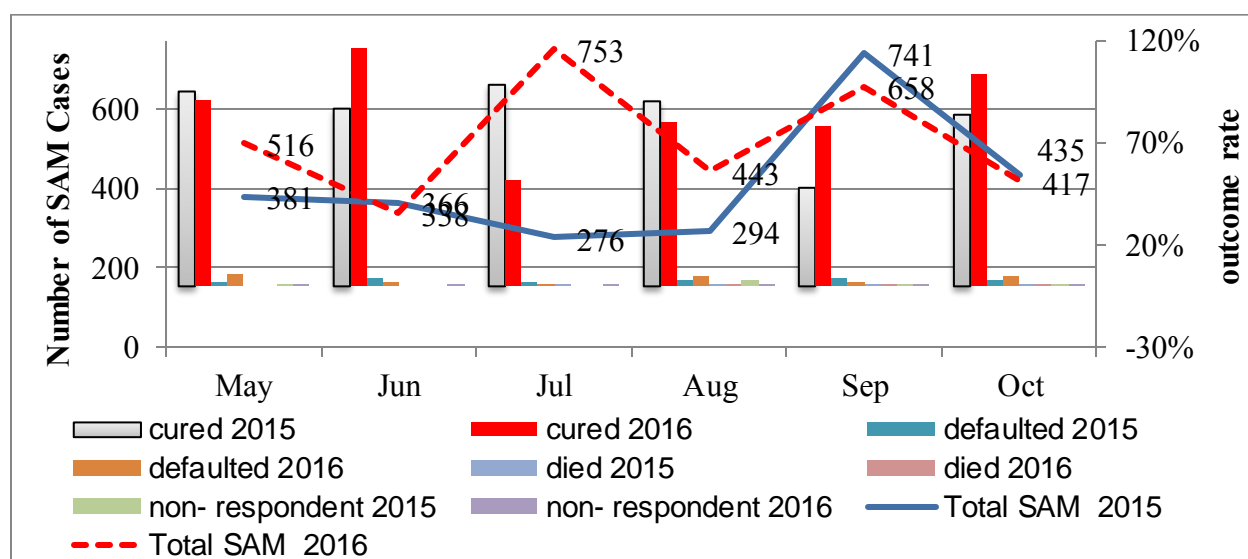


Figure 34: Comparing trends 2015 and 2016 TFP admission and performance of under-five years SAM management in North Wollo zone, 2016.

There are sufficient therapeutic supplies in North Wollo zone except 2nd line drugs for next 3 months. The main challenge in providing quality SAM management in the zone is low coverage of water supplies in the health centers as it will increase risk of infection to SC admitted children.

MAM Management

TSFP: Of the 9 rural districts of North Wollo zone, 8 were labeled as first priority districts in March 2016, and supplementary food has been distributed for the target group until last month. There are sufficient TSFP supplies in all districts that will last for at least 2 months and at zone level enough stock is available the next one month.

MAM admission

Screening: Nutrition status screening in North Wollo Zone has been conducted on a routine basis and continued until October 2016. At this moment, vitamin A and deworming coverage in

the zone reached only 16% and 14.6% respectively. These low rates were confirmed in some of visited areas like Debre Zebit health center and cluster health posts where vitamin A and deworming in last month (October 2016) was 0%. Low supplementation of vitamin A and deworming will be aggravating malnutrition events.

This assessment has targeted May to Oct 2016 data to analyze nutrition screening performance while June 2016 data was not available at zone level. The screening coverage in July was 74.2% which was the lowest in the past six months while the highest was recorded in October which was 85.4%. While some of the visited institutions have far below zone performance like in Debza Health Post which was 8.4% for children and 5.3% for PLW.

The average proxy GAM in the past six month excluding June is 8.5% and the highest was 8.7% and the lowest was 7.9% in July 2016 and August 2016 respectively. Estimated proxy SAM among screened children in North Wollo zone was stagnant at 2% continuously in the past six months (see below graph).

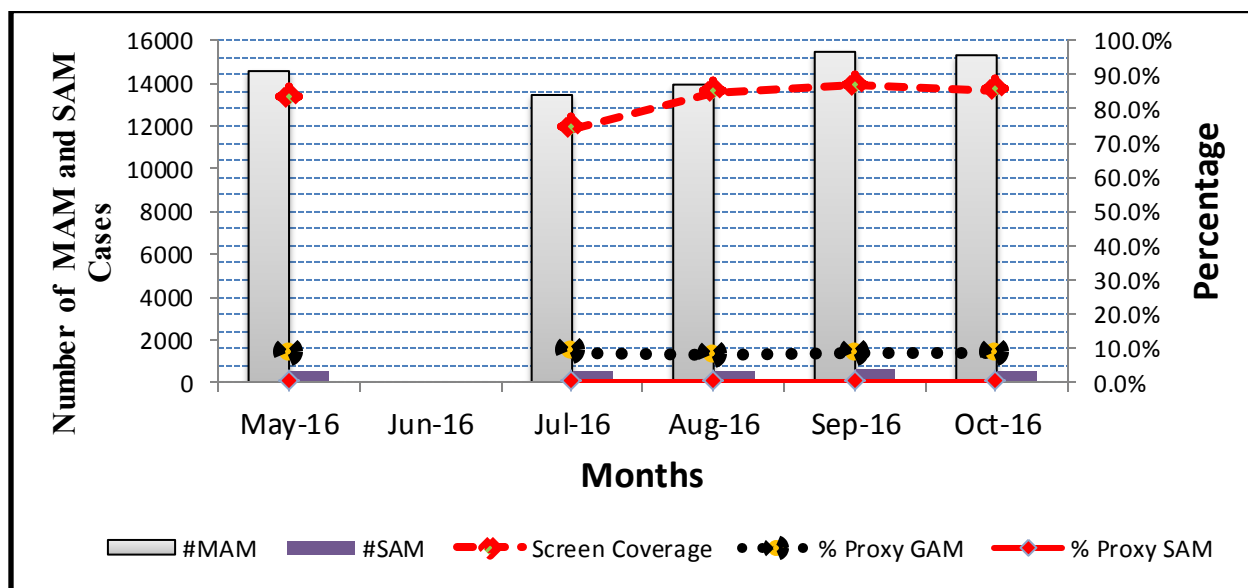


Figure 35: Screening performance of the last six months for 6-59 month children in North Wollo zone, 2016.

In the same manner to children screening, data for PLW screening was missing for the month of June 2016. A relative poor performance of screening of PLW was recorded in July 2016 which was 46.8% while the highest coverage was 73% observed in September 2016.

Proxy GAM of 69% in July 2016 was the highest in the last 6 months while the lowest was 19.5% in May 2016. Accordingly, proxy GAM figure has peaked in July and dropped sharply the next month by 72% which needs further investigation to understand the reason behind data inconsistency or program related. However, the screening coverage was increased by 49% from July to August 2016.

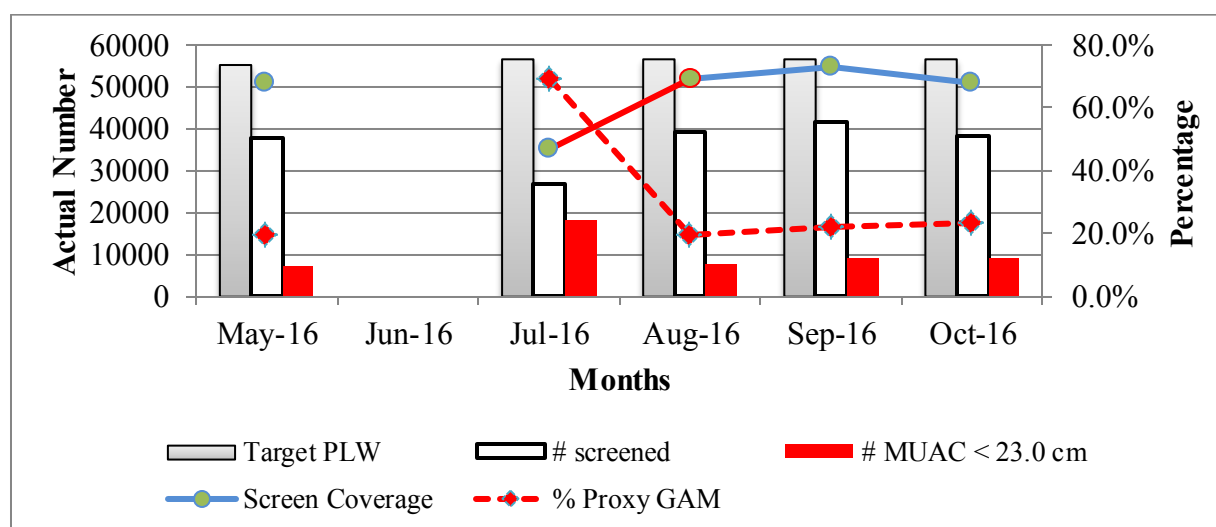


Figure 36: Screening performance of PLW in North Wollo zone May to October 2016.

Summary needs assessment for the Coming Six Months of 2017.

Table 16: Risk types and at risk population of upcoming six months in North Wollo zone North East Ethiopia 2017.

| Districts at risk | Type of risk | At risk population |
|-------------------|--------------|--------------------|
| Raya kobo | Malaria | 125,000 |
| Habru | AWD | 110,000 |
| Gubalafto | AWD | 55,000 |
| Raya kobo | Measles | 45,000 |
| Lasta | Measles | 140,000 |
| Dawunt | Measles | 75,000 |

Table 17: Estimated beneficiaries and required finance of upcoming six months in North Wollo zone, North East Ethiopia 2017.

| Type of Health and Nutrition Emergencies | Total Estimated Beneficiaries | Required Finance ETB |
|--|-------------------------------|----------------------|
| Nutrition | 25,176 | 800,886 |
| AWD | 6424 | 125,426 |
| Measles | 700,518 | 4,320,892 |
| Meningitis | 1,001,740 | 3,326,246 |
| Malaria | 11,580 | 356,420 |
| Scabies | 78,210 | 10,265,324 |

Challenges, Limitations and Recommendations

Challenges and Limitations of the Assessment

- Poor data documentation, under reporting and low quality of available data. For example, Kon health post in Wadila District didn't report total number of patients and SAM data through PHEM; and all the visited districts did not have documentation on the last year performance of measles and meningitis vaccination campaign.
- Zone level nutrition screening data for June 2016 was unavailable which has affected data analysis.
- Unable to obtain HEWs in some visited HPs (Gedemeyu Kebele, Raya Kobo District).
- Actual population number at the ground disagrees with figures from central statistics agency which affected projecting the coverage and performance of health and nutrition service delivery.
- There was shortage of time to collect data from targeted institutes as it demands to acquire the data from HPs, WHOs and ZHDs.
- We used Non-probability Sampling method to select the institutions.
- There is a dependency syndrome in the community.

Recommendations on future multi-agency assessments

- Assessment protocol that will standardize data collection and analysis and improve communication with all stakeholders before the actual assessment conducted.
- Reviewing data collection checklist specially avoiding redundant questions and improving the template to enable precision.
- Sending the formats to zones, districts and health facilities before the actual assessment conducted or to communicate the sector at all level and have time to be ready before the assessment started.
- Work on potential capacity of the sector to improve quality of documentation, archiving, and reporting rate of health and nutrition related data at health institution and management level.

Recommendations on Health & Nutrition

- Improving access and quality of WASH services by supporting extension program to scale up coverage and utilization of latrines, hand washing and environmental hygiene and explore different options in prioritizing and providing water schemes for communities with low coverage.
- Construct health posts in the remaining 7 kebeles to attain 100% health service coverage.
- Designing a strategy and mobilizing a resource to enable health centers access protected water in their vicinity.
- Plan and engage on high quality of care to improve program performance of TFP including SAM cure rate and defaulter rate.
- Increasing routine nutrition screening coverage in order to identify malnourished children and vitamin A and deworming coverage in the zone should be improved
- Expansion of stabilization centers in all health centers should be done.
- Strengthen epidemic preparedness and response plan
- Supplies and logistics should be continuously available at health facilities.
- Strengthening SBCC activities to raise awareness on appropriate utilization of therapeutic foods to decrease defaulter and readmission rate.

Wagihemra Zone

Socio- Demographic Profile: Total population of Wagihemra zone is 540,600 (females account 49.8%). There are 73,197 (13.54 %) under five children, 125,960 (23.58%) women of reproductive age (age 15-49 yrs.), and 18,218 (3.37%) pregnant women in the zone.

One hospital, a total of 31 health centers and 125 health posts are available in the zone. Health care services are provided in all institutions except in two health posts. A total of 236 HEWs are actively working in health posts found in 122 kebeles while 3 HPs are not functional at this moment due to lack of HEWs. Among the 31 HCs only five (16%) of them are accessing water which puts health center clients to nosocomial infection (hospital acquired diseases).

Health Profile

PHEM: In Wagihemra zone public health emergency issues are coordinated by the zone health department having 39 personnel dedicated to PHEM of which 1 officer, 7 officers and 31 PHEM focal persons are working at zonal, district and HC levels respectively. All assessed district health offices and PHEM focal persons at health facilities responded that all the district and health facility staffs working on surveillance units have got short term training.

There was a multisectoral health coordination forum at zone level where all relevant government, NGOs and UN agencies were represented. However, RRT and epidemic preparedness committee at zone and district levels didn't have scheduled meetings during outbreak. The zone had a public health emergency preparedness and response plan although the plan was not budgeted/ funded. At district level, multisectoral coordination forum have been conducted during outbreak period and EPRP was prepared in most of visited districts. Some of visited districts allocated emergency budget with the range of 250,000-550,000 ETB. Most of all the assessed districts and health facilities are reporting to the next level regularly.

Disease outbreak: AWD outbreak has been a public health concern of the zone since September 2016, where 74 cases and 2 deaths were reported from the health institutions. We observed documents and line lists in some visited districts such as Abergele during the assessment period. AWD deaths were reported based on clinical symptoms, but no laboratory

confirmed. In addition, there was a rise of malaria cases as observed on the report at all assessed districts.

Risk Factors for Epidemics

Malaria: Of the total populations, 196,405 (36.3%) are at risk of malaria residing in 70 (55.6%) kebeles. Of total malaria risk populations, 117,061(59.6%) had below 80% LLINs coverage, and IRS coverage in targeted areas was 94% in household structures.

A total of 3168 and 6228 malaria cases were reported from May to October 2015 and 2016 respectively. However, there was no death reported. Each assessed district, Sekota Zuria (443 and 614 cases), Sehalá (1025 and 1526 cases), Abergele (917 and 1623 cases) and Ziquála (783 and 2465 cases) were reported in 2015 and 2016 respectively. There was increment of malaria cases in all assessed districts in the last 6 months (May to October 2016) compared with the same months in the last year 2015. In general, the number of total malaria cases in the last six months was increased by 96.6% compared with 2015G.C. in the same 6 months (see below graph).

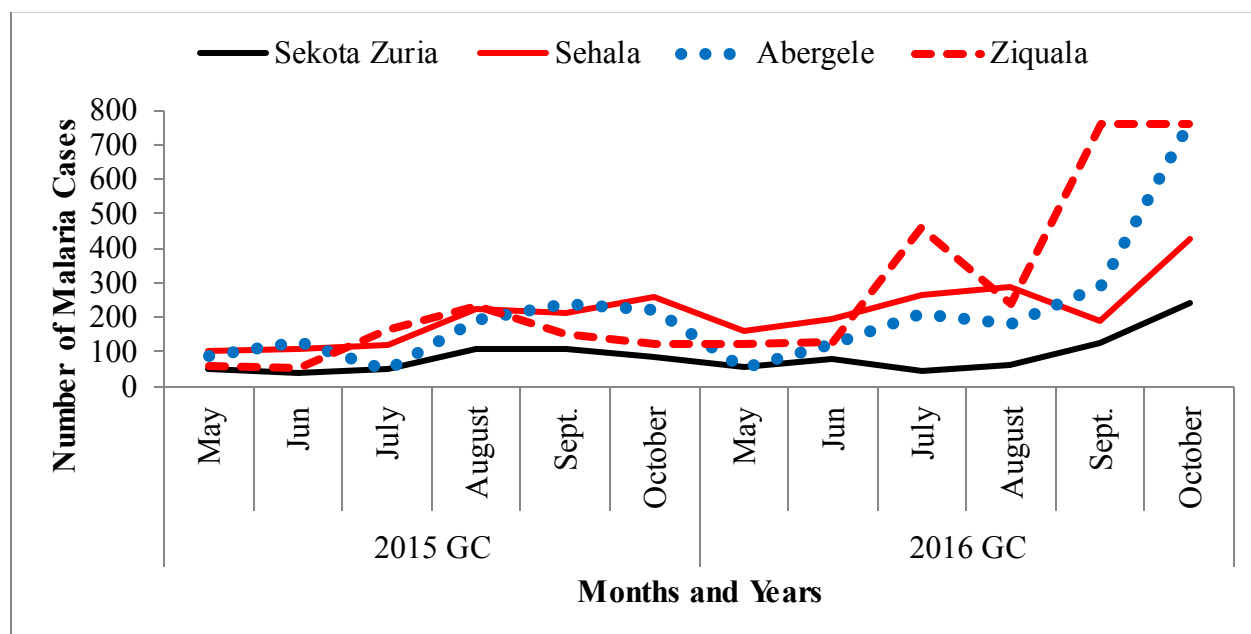


Figure 37: Comparing trends of 2015 and 2016 GC malaria cases with the same month of visited districts, Wagihemra zone North-east Ethiopia.

Meningitis: Mass vaccination for meningitis was conducted in October 2013; 332,488 (99%) individuals of 1-29 year age group were vaccinated, and no epidemic of meningitis was reported in the last three years.

AWD: AWD outbreak has been occurred in Wagihemra zone since September 2016 and cases being reported are continued until November 2016. A recurrent drought and the recent rain failures might affect ground water sources that resulted to low protected water access in the zone which was 55.4% indicate the administrative report. Due to this reason, AWD outbreak will be occurred in the upcoming six months of 2017.

Measles: In relation to measles, no outbreak was occurred in the last three months in Wagihemra zone. A total of 15,030 under-one year children (91%) were vaccinated in 2015/2016 through routine immunization service. In addition, 206,188 populations (99%) with the age of 9 month through 15 year have been vaccinated during supplementary immunization campaign which was conducted in April 2016.

The data from visited districts are agreeing with the general picture of the zone, because of (58%) of the districts of the zone were visited. For example, there are no enough anti-malaria drugs and RDTs; and low latrine utilization (Sehala, 7%) and low measles vaccination coverage in some districts (Sehala and Ziquala below 85%) of the zone. In addition, most of the top five diseases among all age groups in the visited districts are due to communicable diseases and malnutrition.

Table 18: Top 5 morbidities in the visited districts of Wagihemra zone, North East Ethiopia, 2015/2016

| District Name | Morbidity of U5 Children | Morbidity of age 5 and above |
|---------------|--------------------------|------------------------------|
| Ziquala | Non-bloody diarrhea | Helminthiasis |
| | Pneumonia | Acute febrile illness |
| | Acute febrile illness | Malaria |
| | Skin infection | Acute URTI |
| | Acute URTI | Dysentery |
| SAM | | Malaria |

| | | |
|----------|------------------------------|-----------------------|
| Sehala | Malaria | Pneumonia |
| | Dysentery | Typhoid fever |
| | Pneumonia | SAM |
| | Acute febrile illness | Scabies |
| Abergele | Malaria | Malaria |
| | Pneumonia | Helminthiasis |
| | Acute febrile illness | Acute febrile illness |
| | Acute URTI | Dyspepsia |
| | Others unspecified infection | Acute URTI |

In conclusion, due to different risk factors including low latrine coverage and utilization, low water accessibility and insufficient drugs and medical supplies, increased trend of diseases such as malaria, AWD, meningitis, measles and malnutrition are the anticipated epidemics or case buildups in most districts of the zone.

Table 19: Drugs and medical Supplies required for six months Wagihemra zone, 2017.

| Description | Specific items | Required | Available | Gap |
|-----------------|---------------------|--------------|-----------|-------|
| Vaccines | Meningitis vaccine | 37842 vial | 0 | 37842 |
| Drugs | Coartem | 200 CTN | 0 | 200 |
| | Artesunate (rectal) | 50 CTN | 0 | 50 |
| | Artesunate (Inj) | 6000 VIAL | 0 | 6000 |
| | Artemether IM | 3000VIAL | 0 | 3000 |
| | Quinine (PO) | 50 TIN | 0 | 50 |
| | Quinine (IV) | 2000 VIAL | 0 | 2000 |
| | Chloroquine | 300 TIN | 0 | 300 |
| | Ceftriaxone | 500 VIAL | 0 | 500 |
| | Oily CAF | 500 VIAL | 0 | 500 |
| | Doxycycline | 500 TIN | 0 | 500 |
| | Ringer lactate | 3000 BAG | 300 | 2700 |
| | ORS | 44000 SACKET | 88500 | 0 |

| | | | | |
|----------------------------------|--------------------------------|----------|-----|------|
| | Vit A. | 684 TIN | 684 | 0 |
| Nutrition supplies | F100 | 49 CTN | 14 | 35 |
| | F75 | 61 CTN | 16 | 45 |
| | RUTF | 2536 CTN | 747 | 1789 |
| | Resomal | 100 CTN | 0 | 100 |
| Laboratory supplies | RDT (Malaria) | 114 CTN | 0 | 114 |
| | LP set | 50 | 0 | 50 |
| | TI bottle | 50 | 0 | 50 |
| Kits | CTC Kit (AWD) | 10 | 1 | 9 |
| Medical supplies | Gloves, | 600 CTN | 0 | 600 |
| | Syringe | 300 CTN | 0 | 300 |
| | PPE | 66 | 0 | 66 |
| RH medical supplies/drugs | Individual Clean Delivery Kits | 1260 | 0 | 1260 |

Nutrition

SAM Management

Number of stabilization centers reached to 23 (74.5%) in October 2016 and 122 HPs have provided OTP service in the zone. Overall monthly reporting rate of OTP/SC facilities to the zone health department was between 97-99% during May-Oct 2016 (88% in July). The information on SAM has been included in the weekly PHEM report as it was observed on health facilities and districts documentation. There were 123 health workers and 236 (100%) HEWs trained on SAM management in Wagihemra Zone.

In Wagihemra, SAM admission shows an increasing trend from May to Oct of both 2015 and 2016 and the highest admission was observed in September of both years. In most months admission was higher in 2016 where compared with the same month of 2015 except July and August.

Cure rate during May to October of both 2015 and 2016 was within the range of 81-98% which was higher than the acceptable rate; all the six months of 2016 had 90% and higher recovery rate with better performance than in 2015 except for the month of June. Defaulters, caretakers and community attitude to remain enrolled in the program continuously, and sharing habit of RUTF among household members are affecting recovery rate performance.

Defaulter rate in 2016 was less than the same months of 2015. The highest defaulter rate in 2016 was seen in May (4%) followed by in Oct. which was 3%. All defaulter rates reported were within the acceptable range which was below 15%.

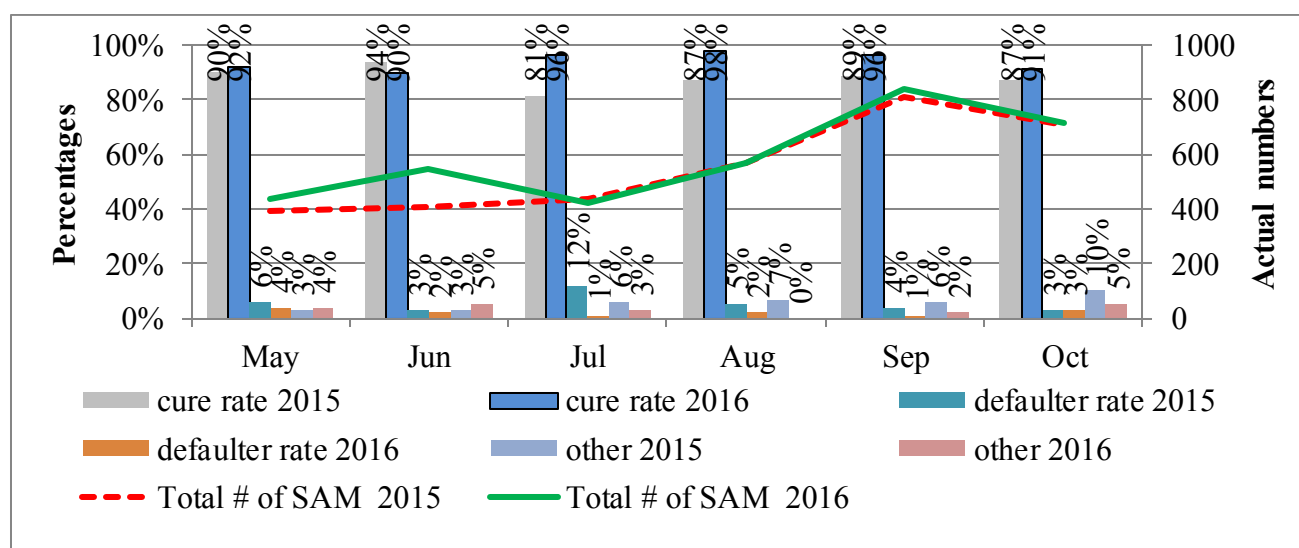


Figure 38: Comparing trends 2015 and 2016 TFP admission and performance of under-five years SAM management in Wagihemra zone.

They have been sufficient therapeutic supplies in the zone including RUTF, F100, F75 and 2nd line drugs for about 3 months. The main challenge in providing quality SAM management in the zone was low coverage of water supplies in the health centers (16%) as it will increase risk of infection to SC admitted children.

MAM Management

TSFP: All the six rural districts of Wagihemra zone were first priority districts classified in March 2016; and distribution of supplementary food is continued until last month. There is

sufficient TSFP supplies for the next one month and all districts are supplied with at least for 2 month stock.

MAM admission: Until July 2016, the intervention data for MAM in the zone was not available, however, starting from July 2016, MAM admission increased from 1,871 in July 2016 to 17,994 in Oct 2016.

In August 2016 and its previous months, there was a gap between the number of children identified as MAM and admitted to TSFP while in Sep and Oct 2016, all MAM cases were admitted to TSFP.

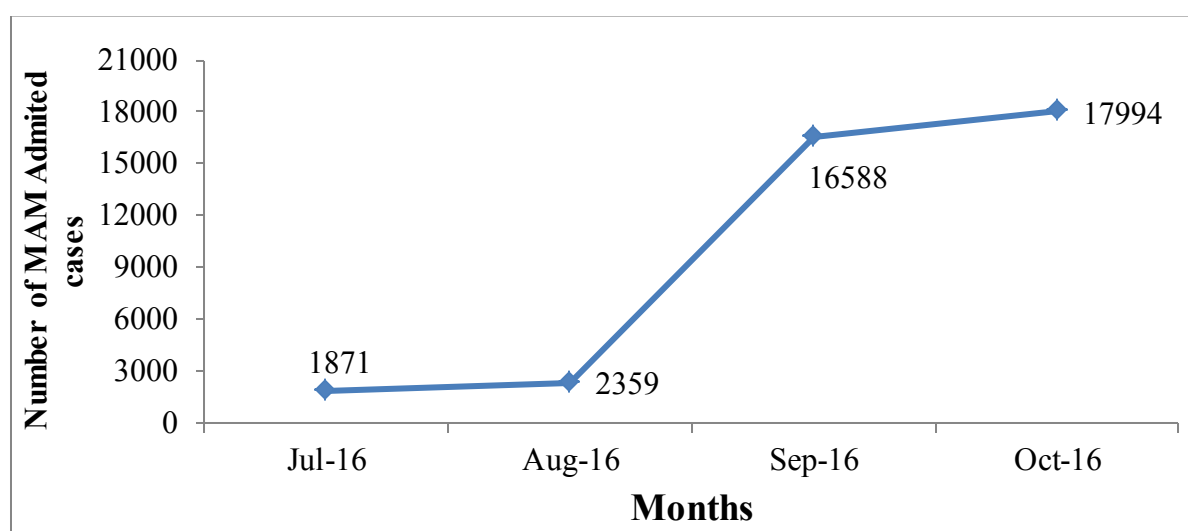


Figure 39: Trend of MAM admission in TSFP in the last four months (July to October), in Wagihemra zone, North-East Ethiopia, 2016.

Screening: In Wagihemra zone, screening has been conducted in a routinely base, and that enables vitamin A and de-worming coverage to reach 69% and 75% respectively.

The number of screened children increased from 48,135 in July to 57,975 in Oct 2016 that made the coverage to be 83%. Proxy GAM was 34.5% in August and 36.4% in Jun 2016 was the highest recorded in the past six months. Among the screened children, 2% SAM was estimated in most of the past six months (see below graph). Although all HPs in some districts are providing OTP service, under five children and PLW screening performance was very low like

in Sehala where it was 21% and 27% respectively. Generally under- five children, in all months the prevalence of malnutrition was critical.

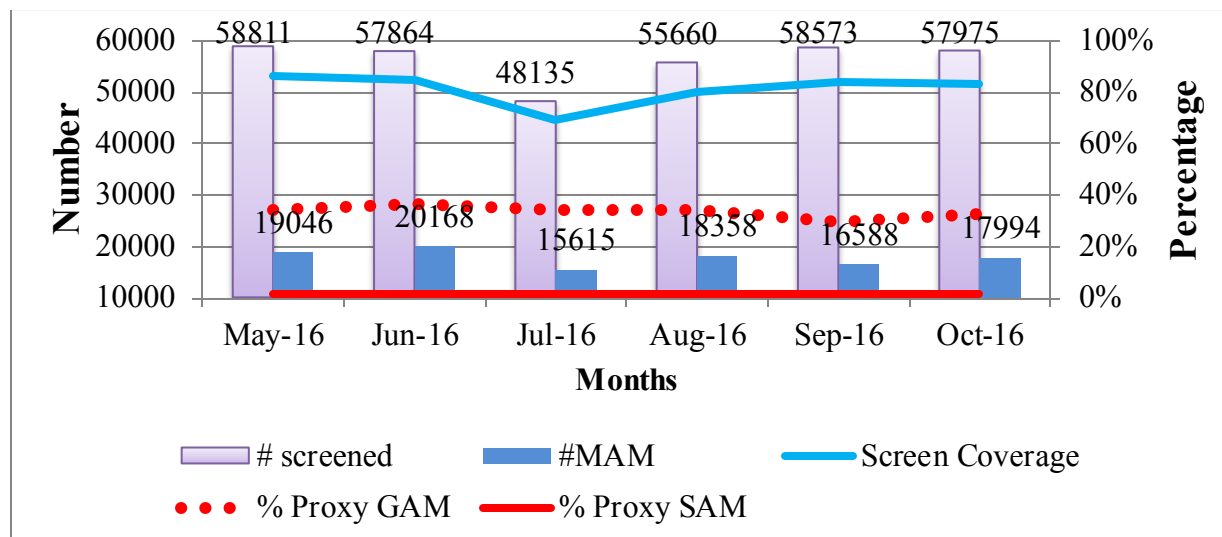


Figure 40: Screening performance of the last six months for 6-59 month children in Wagihemra zone, North-East Ethiopia, 2016.

Screening coverage for PLW was within the range of 74-90% from May to October 2016. Proxy GAM of 71.6% in Oct 2016 was the highest in the past six months while the lowest was 31.3% in July 2016 (see below graph).

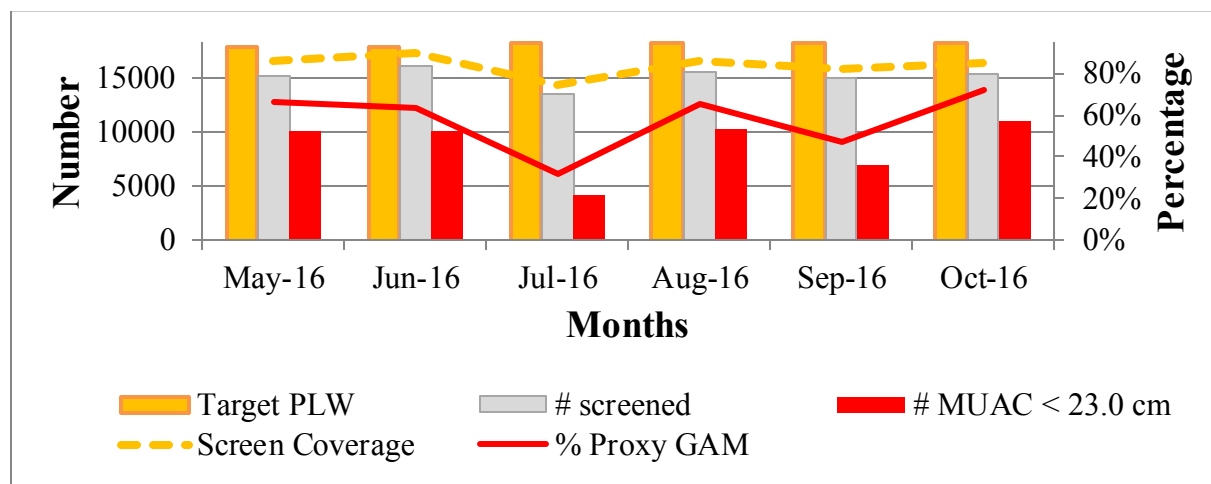


Figure 41: Screening performance of PLW in Wagihemra zone May to October 2016.

Table 20: Summary needs assessment for the Coming Six Months in Wagjhemra zone, North East Ethiopia, 2017.

| District at Risk | Type of Risk | At risk Population | Total estimated beneficiaries | Required finance ETB |
|------------------|--------------|--------------------|-------------------------------|----------------------|
| Four districts | AWD | 232930 | 78 | 310,000 |
| Seven districts | Scabies | 540600 | 7964 | 160,000 |
| Seven districts | Rabies | 540600 | 67 | 50,000 |
| Seven districts | Meningitis | 540600 | 378420 | 1,260,000 |
| Seven districts | Malnutrition | 540600 | 103717 | 1200000 |
| Seven districts | malaria | 540600 | 3802 | 80,000 |

Challenges, Limitations and Recommendations

Challenges and Limitations of the Assessment

- Poor data documentation, under reporting and poor quality data.
- Actual population number at the ground disagrees with figures from central Statistics agency which affected projecting the coverage and performance of health and nutrition service delivery.
- There was shortage of time to collect data from targeted institutes as it demands to acquire the data from HPs, HCs, district health offices and ZHDs.
- We used non-probability sampling method to select the institutions.

Recommendations on Health & Nutrition

- Designing a strategy and mobilizing a resource to enable health centers access protected water in their vicinity.
- Plan and engage on high quality of care to improve program performance of TFP including SAM cure rate and defaulter rate.
- Increasing routine nutrition screening coverage.
- Expansion of stabilization centers in all health centers.
- Strengthen epidemic preparedness and response plan.
- Strengthening SBCC activities to raise awareness on appropriate utilization of therapeutic foods to decrease defaulter and readmission rate.

Reference

1. Ministry of Health and CSA. Ethiopia demographic health survey key indicators. 2016.
2. Ethiopian Joint Government and Humanitarian Partners. Humanitarian requirements document. 2017;
3. Government J. Ethiopia : initial summary of humanitarian response planning for 2017. 2017;1–11.
4. Amhara Regional Health Bureau. Amhara regional health bureau six months summary report of meher assessment 2016. 2016.
5. Federal Ministry of Health. Protocol for the management of severe acute malnutrition. 2007;
6. Government and Humanitarian partner. Weekly humanitarian bulletin exacerbated. 2017;(November 2016):2016.
7. Unit ENC, Department EW, Development MOA and R. Guidelines for emergency nutrition surveys in ethiopia,interim new version, September 2008 EFY. 2016.
8. Sea R. Humanitarian requirements document. 2016.

Annex

Table 21: Meher assessment team members in Wagihemra and North Wollo zones, 2016

| Name | Organization | Responsibility |
|----------------|-------------------------------|--|
| Fisseha Walle | Amhara Regional Health Bureau | Field Epidemiology resident |
| Gizaw Berhanu | Food for Hunger | Monitoring and evaluation coordinator |
| Solomon Gamene | Save the Children | Early Warning and Nutrition Specialist |

Table 22: List of zones and districts, HCs and HPs visited in Wagihemra and North Wollo zones, 2016.

| Zones | Assessed District Health Offices | Health Centers | Health Posts |
|-----------|--|--------------------------------------|--|
| N/Wollo | Meket, Wadila, Raya kobo, Bugina | Ayina , Abuare, Debire-Zebit, Kon | Zebilo , Dabza Gedemeyu , Kon-Geter |
| Wagihemra | Sekota zuria, Ziquala, Sehala, Abergele | Newrak, Mesheha, Siriël, Tsitsika | Addis Zelay, Ariga, Siriël, Nestanet Melkam |

CHAPTER VIII: PROTOCOL/PROPOSAL FOR EPIDEMIOLOGIC RESEARCH PROJECT

8.1. Prevalence of Acute Malnutrition (Wasting) and Associated Factors Among Children Age 6-59 Months in Ziquala District, Wagihemra Zone, Amhara Region, Ethiopia, 2017

Addis Ababa University

College of Health Sciences

School of Public Health

Master of Public Health Research Project Submission Form

This Proposal Submitted to the School of Public Health Addis Ababa University in Partial Fulfillment of the Requirements for Degree of Masters in Ethiopian Field Epidemiology Training Program Department.

| | |
|------------------------------------|---|
| Name of investigator | Fisseha Walle Tsegaw |
| Name of advisor(s) | 1. Professor Alemayehu Worku 2. Mrs. Mastewal Worku |
| Full title of the research project | Prevalence of Acute Malnutrition (Wasting) and Associated Factors Among Children Age 6-59 Months in Ziquala District, Wagihemra Zone, North East Ethiopia, 2017 |
| Duration of project | From March to June, 2017 |
| Study area | Ziquala district, Wagihemra zone, North West Ethiopia |
| Total cost of the project | 50,757 ETB |
| Address of investigator | Tel: +251-910296695 E-mail: fwale95@gmail.com |

Abstract

Background: In Ethiopia, child acute malnutrition is one of the most serious public health problem and the highest in the world. According to 2016 Ethiopia DHS, 10 % of children are wasted (3 % severely wasted) in the country and in Amhara region 9.8 % of children are wasted (2.2 % severely wasted), in the study area, 20.7-34% of children are wasted (1-7% severely wasted). The study district is one of the government concerned area in Wagihemra zone. Although a lot of studies on the prevalence and determinants of acute malnutrition aged 6–59 months children have been conducted in Ethiopia, there is need to examine if the same factors are responsible for acute malnutrition among children under-five years in the district of Ziquala hence forming the research gap. The aim of the study will provide information that could be used for nutritional surveillance and targeting programmes that would focus more on populations at risk particularly aged 6–59 months.

Objective: To identify prevalence and associated factors of acute malnutrition among children aged 6–59 months in Ziquala district, North-West Ethiopia, 2017.

Methods: A cross sectional study will be conducted in Ziquala district North-West Ethiopia from March to June, 2017. A sample of 530 participants will be selected by using simple random sampling technique. We will use pre-tested structured questionnaire to collect data. Data will be entered to EPI-INFO version 7 and analyzed by SPSS version 20. We will perform binary logistic regression analysis to explore significant predictors of acute malnutrition based on p-value ≤ 0.05 with 95% confidence interval.

Work plan and Cost of the project: A total of 50,757 Birr is required to carry out the study. The study will divide in to different phases which are proposal development, training of data collectors and supervisors, data collection, entry, processing and analysis, and report write up and presentation or submission. Overall research will be conducted from March to June, 2017.

Introduction

Background

Acute malnutrition is a recent and severe weight loss (wasting) as a result of acute food shortage or mal-absorption utilization of nutrients and/or illness and is measured by weight for height or mid upper arm circumference (MUAC); the magnitude of wasting is substantial and persistent in the Sub-Saharan Africa (SSA), including Ethiopia where many children are suffering from the effects of acute malnutrition (1, 2, 3). Generally, acute malnutrition in young children continues to be a major health problem in low-income countries (1).

Acute malnutrition includes both moderate acute malnutrition (MAM) and severe acute malnutrition (SAM) where; MAM is $MUAC \geq 11.5 \text{ cm} \ \& \ < 12.5 \text{ cm}$ and SAM is defined by visible severe wasting or by the presence of bilateral pitting edema of nutritional origin $MUAC < 11.5 \text{ cm}$ in children aged 6–59 months, is also an indicative of severe acute malnutrition (4). Wasting and oedema are due to acute malnutrition. Acute Malnutrition is classified into severe acute malnutrition¹ (SAM) and moderate acute malnutrition (MAM) according to the degree of wasting and the presence of oedema. It is severe acute malnutrition if the wasting is severe ($W/H < 70\%$ NCHS median or a low MUAC) or there is oedema. Acute Malnutrition is defined as moderate acute malnutrition if the wasting is less severe (W/H between 70% and 80% NCHS median); oedematous cases are always classified as severe (5).

Malnutrition is not only an important cause of mortality and morbidity, but also leads to physical and mental impairment in children. Health and physical consequences of prolonged states of malnourishment among children were delay in their physical growth, lower intellectual quotient, poor cognitive ability, decreased economic productivity, decreased reproductive performance, poor school achievement and poor school performance, greater behavioral problems and deficient social skills, and susceptibility to contracting diseases (2, 6).

Statement of the problem

Globally, an estimated of 52 (8%) million children under-five years of age were wasted in 2011 and 11% decreased from an estimated 58 million in 1990. Seventy percent of the world's wasted children live in Asia, most in South-Central Asia. These children are at substantial increased risk

of severe acute malnutrition and death (6, 7). Despite continued prevention efforts, child acute malnutrition remains a major public health problem in Sub Saharan Africa, including Ethiopia (3, 8). Malnutrition continues to be a major public health problem throughout the developing world, particularly in southern Asia and sub-Sahara Africa (9).

Ethiopia DHS 2016 data showed that, overall 10% of children in Ethiopia are wasted, and 3% are severely wasted (below -3 SD) with 70% of those having MAM (moderate acute malnutrition). Regional variations exist, with Somali and Afar having the highest percentages of children who are wasted, 23% and 18%, respectively (10).

Despite of the Federal Government of Ethiopia has been working to reduce acute malnutrition significantly through public education and providing nutritional supplements and financial support to vulnerable families, levels of acute malnutrition (wasted) were not decreased significantly. The three consecutive EDHS and one EMDHS report showed that, wasting was 12% in 2005, 10% in 2011, 10% in 2016 and 9% in 2014 (10, 11, 12).

EDHS 2016, overall 9.8% of children in Amhara region are wasted, and 2.2% are severely wasted (below -3 SD) (10). According to Wagihmra zone 2016 monthly administrative reports showed that, a range of 48,135 (69%) -58,811 (86%) children aged 6-59 months were screened for nutritional status. Among those screened children, a range of 17,596 (30%)-21,060 (36%) were wasted and 825 (1.5%) -1,088 (2%) were severely wasted. Accordingly Ziquala district 2016 monthly reports, a range of 5,012 (69%)-6,062 (84%) children aged 6-59 months were screened for nutritional status. Among those screened children, a range of 1,049 (20.7%)-1,872 (34%) were wasted and 74 (1%) -360 (7%) were severely wasted (13). According to Ethiopia classification of malnutrition levels, the study area is critical (14).

Ziquala district is one of the government concerned area in Wagihemra zone. Although a lot of studies on the prevalence and determinants of acute malnutrition aged 6–59 months children have been conducted in Ethiopia, there is need to examine if the same factors are responsible for acute malnutrition among children aged 6-59 months in the district of Ziquala, hence forming the research gap. Therefore, this study design to assess the prevalence of acute malnutrition and its associated factors in children aged 6–59 months in Ziquala district Wagihemra zone North-West Ethiopia direction.

Literature Review

A study conducted in Davangere City 2014 showed that socio demographic factors like early marriage (<18 years), mother's literacy status, lower socio economic status, occupational status of mothers' and reproductive factors such as antenatal weight gain < 10kgs and birth spacing less than 2 years are found to be the major maternal determinant factors of acute malnutrition (15).

A study conducted among under -five children, in East Rural Ethiopia 2012 showed 7.4% prevalence of acute malnutrition and associated with household poverty and poor access to health facilities were important predictors of wasting (16). A cross-sectional survey conducted in Gubo Sayo district, East Wollega, Ethiopia 2014 revealed that family income, family size, and family education were significantly associated with acute malnutrition (17).

A cross sectional study conducted among children aged 6-59 months in Mai-Aini Eritrean Refugees' Camp, Northern Ethiopia in 2014 revealed that 24.6% of the children were wasted and associated factors were being male, children age, and receiving pre-lactating food were associated with acute malnutrition (18).

A Case Control Study conducted among children aged 6-59 Months in Konso, Southern Ethiopia in 2015 revealed that, education of mothers, number of children in the household, preceding birth interval, child's age, duration of breast feeding and frequency of complementary diet feeding were associated with severe acute malnutrition in children below the age of 5 years (19).

A case control study conducted in Oromia region West Ethiopia 2015 showed significantly associated with diarrheal and febrile illness in the previous two weeks, lack of maternal education, hand washing & sub optimal breastfeeding practices, larger family size, and absence of latrine (3).

A cross sectional study conducted in Shinille district, Ethiopian Somali 2014 revealed that prevalence of wasting was 20% and the main associated factors of wasting were family size, child's sex and monthly income of the households and immunization status (20).

A study conducted in East Belesa North-West Ethiopia in 2014 revealed that 16 % of children were wasted and children who received butter as pre-lacteal food were risk factors (21).

A study conducted in Burie town 2015 revealed that overall prevalence of wasting among children below five years of age was 11.1% and 4.4% severe wasting. Maternal educational status, parental educational status, monthly income, diarrhea, acute respiratory tract infection, preterm, and absence of antenatal follow-up were factors associated with wasting [11].

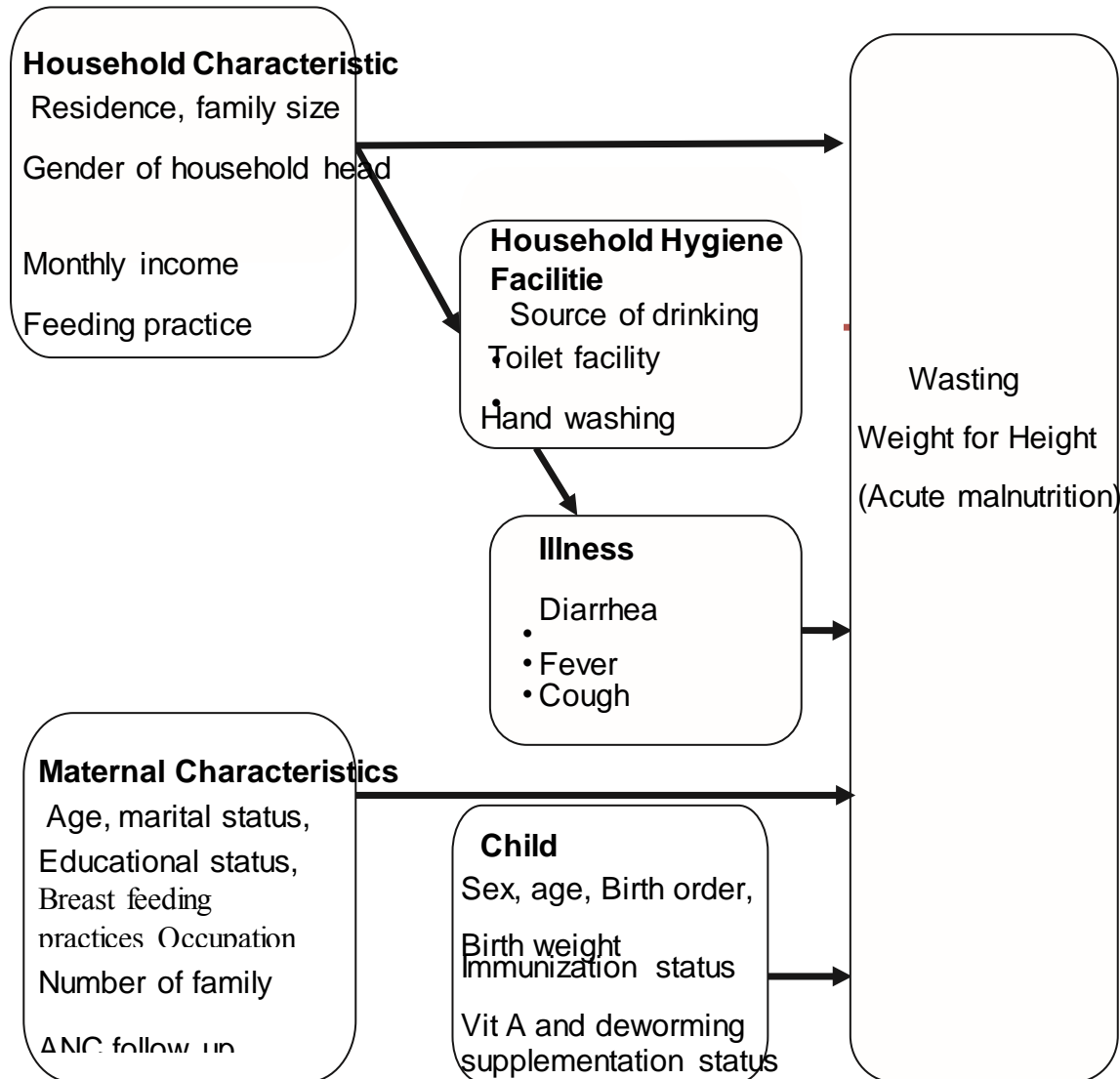


Figure 42: Conceptual framework on prevalence and associated factors of acute malnutrition among children aged 6-59 months in Ziquala district, North East Ethiopia summarized from literature review, 2017.

Significance of the study

In Ethiopia, as well as in Ziquala district, acute malnutrition remains an extensive and seemingly embedded problem. Although different studies conducted to identify acute malnutrition and its associated factors in different part of Ethiopia, the factors associated with the problems of acute malnutrition may differ among regions, zones, districts and communities, as well as over time. In the study area, no study has ever conducted to identify prevalence and associated factors of acute malnutrition (wasted) among in children aged 6-59 months. Therefore, this study designed to identify acute malnutrition and its associated factors in children aged 6-59 months in Ziquala district, North West Ethiopia. Identify and know the risk factors related with nutritional status of children aged 6-59 months in the study area will enable to guide public health planners and policy makers in determining priorities, in designing appropriate and effective nutritional intervention programs to address the problem and its associated consequences in order to help to reduce child mortality and morbidity.

Objectives

General objective

- ❖ To assess prevalence and factors associated with acute malnutrition among children aged 6–59 months in Ziquala district, Wagihmra zone, North West Ethiopia, 2017.

Specific objectives

- To determine the prevalence of acute malnutrition among children aged 6–59 months in Ziquala district 2017
- To identify associated factors of acute malnutrition among children aged 6–59 months in Ziquala district 2017

Materials and Methods

Study area/ Setting: The study will be conducted in Ziquala district, Wagihmra zone which is located 545 KM from Bahir Dar and 685 KM from the capital city, Addis Ababa in the North West Ethiopia. The current study site, as one of the drought prone site needs further emphasis and investigation of the problem. The district administratively divided in to 15 kebeles (smallest administrative units in Ethiopia) with an estimated population size of 56,825 and 29,030 (51.08%) and 7319 (12.88%) are females and 6-59 months children respectively based on 2007

census projection. The district has 1 district hospital, 5 health centers (>100% health care coverage) and 15 (>100% health care coverage) health posts. However, the population settlement is highly dispersed. The district has 3 stabilization centers at health center and hospital levels and 15 outreach therapeutic programs at health post levels providing health service of severe acute malnutrition. The leading causes of morbidity among the under five children in the Out Patient Department of the study district were helminthiasis, acute febrile illness, malaria, Acute URTI, and bloody diarrhea. Subsistence farming and husbandry is the dominant form of livelihood in the area.

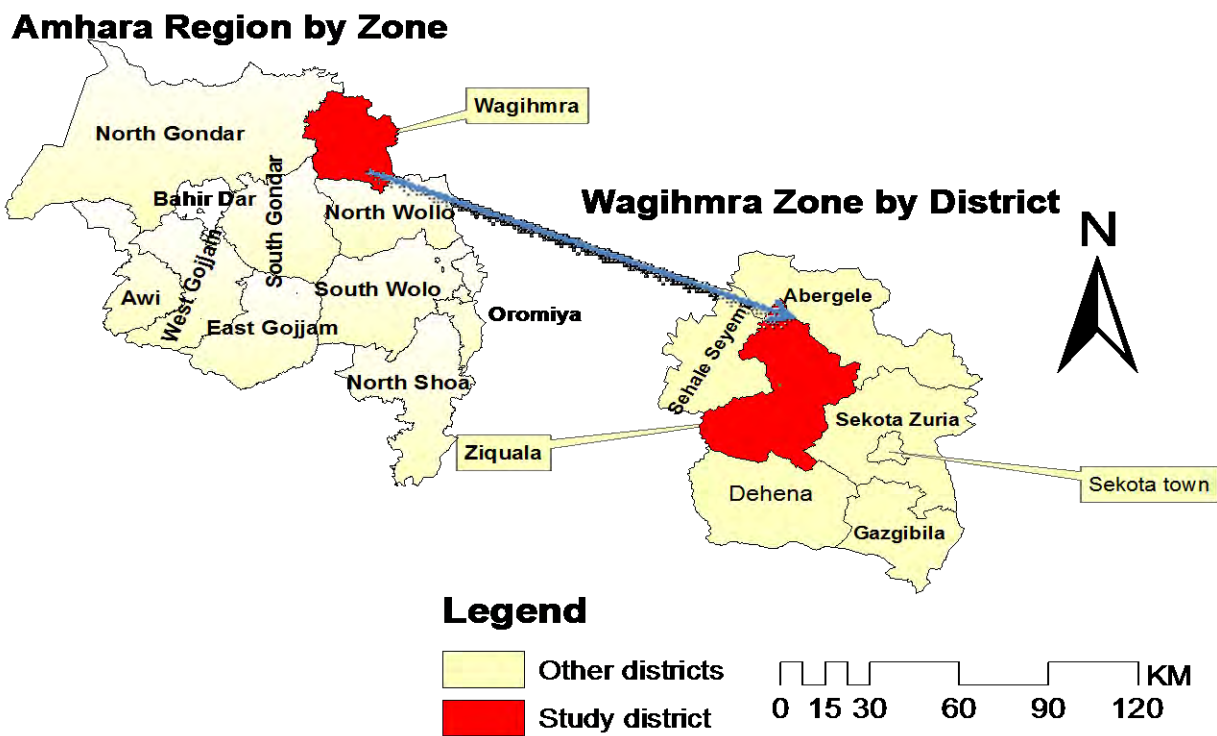


Figure 43: Map of Wagihmra zone to indicate Ziquala district, Northwest Ethiopia, 2017.

Study design and period: Community based cross sectional study will be conducted from March to June 2017.

Source population: The source population will be aged 6-59 months children who have lived in Ziquala district at least lived six months. Under-five children are most sensitive to acute

nutritional stress among children is a critical problem because its effects are long lasting and go beyond childhood (12, 14).

Study population: The study population will be children aged 6-59 months in the selected kebeles at least lived six months during study period.

Inclusion and exclusion criteria

Inclusion Criteria: All children aged 6-59 months and their mother/caregiver in the selected kebeles and accept to participate will be included in the study.

Exclusion criteria: Those children aged 6-59 months who are severely ill and/ or whose mother or care giver or house hold head is severely ill or unable to respond for the questionnaire, those children who have physical deformities which make anthropometric measurements inconvenient, and those who have mental/intellectual problem will be excluded from the study.

Sample size determination: The sample size is determined using single population proportion formula for the first objective which is to determine the prevalence of acute malnutrition. We use the following assumptions: 95% level of confidence, prevalence of acute malnutrition in rural settings of Amhara region East Belesa district conducted 16% (21), 5% margin of error (desired precision between sample and population parameter), and contingency of 10% for possibilities of non-response rate.

$$n = (z_{\alpha/2})^2 p(1-p)/d^2 = 207$$

For possible non-response during the survey the final sample size is increase by 10% to $n = 207 + 0.1 * 207 = 228$; Thus a minimum number of 228 children aged 6-59 months will be the required sample size in the study.

Sample size for associated factors of acute malnutrition is calculated using difference in proportions formula in case control study by taking associated variables in the other study (3).

$$n = \left(\frac{r+1}{r} \right) \frac{(\bar{p})(1-\bar{p})(Z_{\beta} + Z_{\alpha/2})^2}{(p_1 - p_2)^2}$$

Where, n = sample size in the case group

$Z_{\alpha/2}$ for 95% confidence level = 1.96

For 80% power, Z_{β} = 0.84

Ratio of controls to cases (r) = 2

P1= Proportion exposed in the case group

P2= Proportion exposed in the control group

$(p1+p2)/2$ = Average proportion

Non-response rate= 10%

| Variable | Assumption | Sample size |
|--|--|-------------|
| Family size ≥ 5 | AOR= 2.59, P1= 68.14%, P2= 46.9%, r= 2, power= 80%, CI= 95% , non-response rate= 10% | 211 |
| No latrine | AOR= 2.99, P1= 22.12%, P2= 11.95%, r= 2, power=80%, CI=95% , non-response rate= 10% | 530 |
| Illiterate mothers | AOR= 2.16, P1= 49.56%, P2= 16.37%, r= 2, power= 80%, CI= 95% , non-response rate= 10% | 78 |
| Presence of diarrhea in the last 2 weeks | AOR= 3.94, P1= 38.93%, P2= 25.22%, r= 2, power= 80%, CI= 95% , non-response rate= 10% | 450 |
| Less or greater than 6 months exclusively breast feeding | AOR= 2.63, P1= 68.14%, P2= 39.38%, r= 2, power= 80%, CI= 95% , non-response rate= 10% | 117 |
| Hand washing habit of mothers less frequently | AOR= 14.39, P1= 65.49%, P2= 11.95%, r= 2, power= 80%, CI= 95% , non-response rate= 10% | 33 |

Since sample size for associated factors of no latrine (absence of latrine) is (530) larger than others associated factors and single population proportion, therefore, the largest sample size is will be the sample of the study.

Sampling procedure: Initially, simple random sampling technique will be conducted to select 10 kebeles from the total in the district. Finally, the households in each kebele will be selected

Using simple random sampling from the sampling frame of community health information system folder based on proportional to size of children aged 6-59 months in selected kebeles to give equal chance. The study population will be drawn from the randomly selected households in each study kebele/village proportional to the maximum sample size allocated for the study. If more than one aged 6-59 months children lived in the selected household, one child will be selected by the lottery method.

Variables of the study: Acute malnutrition (SAM or MAM) in terms of MUAC <12.5 cm, or W/H < 80% National Centre for Health Statistics of USA (anthropometric standards) (NCHS) median or presence of bilateral pitting oedema of nutritional origin in aged 6-59 months children are considered as **dependent variables** in this study.

Socio demographic variables (family size, occupation, and parental education, household head, ethnicity, religion and place of residence); economic status (monthly income); maternal characteristics (age, hand washing, number of under five children, ANC follow up,); child characteristics and caring practices (sex, age, immunization status, feeding practices, hygiene, Vit. A, and deworming supplementation), health related characteristics (health care seeking, and morbidity status), and community factors (distance and sanitation of water supply, health facility access) are considered as **independent variables**.

Operational Definition

Malnutrition: Any condition caused by excess or low intake of food energy or nutrient that causes health problems. It is classified into under and over nutrition.

Severe Acute Malnutrition (SAM): Description of malnutrition level encompassing children 6-59 months with < -3 z-scores, and/or MUAC < 11.5 cm, and/or bilateral pitting nutritional oedema.

Moderate Acute Malnutrition (MAM): Description of malnutrition level encompassing children 6-59 months with < -2 to \geq -3 z-scores and/or MUAC \geq 11.5 and < 12.5

Anthropometry: The study and technique of human body measurement. It is used to measure and monitor nutritional status in an individual or population group. Body measurements include: age, sex, weight, height, oedema (fluid retention) and Mid Upper Arm Circumference (MUAC).

MUAC: Mid Upper Arm Circumference. It is a measurement of nutritional status by determining the mid upper arm circumference in cm or mm.

Standard Deviation (SD) or Z-score: The deviation of the anthropometric value (weight, height etc.) for an individual from the median value of the reference population.

Z-score - Indicates how far a measurement is from the median – also known as the standard deviation (SD) score. The reference lines on the growth charts (labeled 1, 2, 3, -1, -2, -3) are called Z-score lines; they indicate how far the measurement is above or below the median (= Z-score of 0) (4).

Diarrhea: A child having three or more loose or watery stools per day.

Acute Respiratory Infection (ARI): A child with cough, fast breathing or difficulty in breathing and fever.

Low family income: Households earning monthly income below 750 ETB.

Hand washing frequently: Those who wash hands at all activities such as after latrine, before preparing food, before serving food, after cleaning child feces etc.

Hand washing less frequently: Those who do not wash their hands at activities such as after latrine, before preparing food, before serving food, after cleaning child feces.

Data collection instrument and procedure: Pretested and structured questioner will be adapted to collect data related to the objectives of the study. The questionnaire will be translated from English to Amharic (Local Language) by fluent speakers of both languages to maintain its consistency. Amharic questionnaire is used to collect the data using interview method. Data will be collected from all eligible children mothers/care givers by data collectors. The data will be collected under close supervision of the assigned supervisors and principal investigator.

Anthropometric measurements (MUAC and W/H) is also taken from all children after the proper training and standardizing procedures (MUAC will be measured on the left arm using standard numbered insertion tapes to the nearest 0.1cm; Length/height measurements will be taken using a locally produced UNICEF measuring board with a precision of 0.1 cm, and children are weighted by using a 25 kg hanging sprint scale designed and manufactured under the guidance of

UNICEF with 100 gram precision). Oedema will be diagnosed if a bilateral depression (pitting) remained after the pressure is released.

Data quality control: Four data collectors (experienced health extension workers) and 2 supervisors (senior clinical nurses) will be trained for two days and standardized particularly in objective, methods, tool, and ethics of the study. Data quality will be controlled through conducting a pre-tested questionnaire. Important modifications will be made on the basis of the pretest findings before the actual survey. Data collectors will be paired during data collection to ensure quality of the data. The data collection will be supervised by supervisors and principal investigator on daily basis. Regular meetings will be held between the data collectors, supervisors and the principal investigator. Questionnaire will be checked for completeness and consistency and completeness daily. Incomplete data will be discarded before data entry.

Data processing and analysis: Data will be checked for completeness, coded and entered to Epi-Info version 7 and ENA software and cleaned, then export to SPSS version 20 for statistical analysis. Data entry will be made by the principal investigator. We use binary logistic regression to identify factors associated with acute malnutrition. A chi-square statistic or a Fisher's exact tests and 95% confidence interval will be used to test statistically significant association. The degree of association and significance of the study between study variables will be assessed using odds ratio with 95% confidence interval. However, bivariate and multi variable logistic regression used to assess the association between the study variables and to control the possible confounding. Therefore, multi variable logistic regression analysis will be performed for those variables with $p \text{ value} \leq 0.20$ in the bivariate analysis. The goodness of fit of these models is assessed by the Hosmer-Lemeshow test. Having a $p \text{ value} \leq 0.05$ with 95% confidence interval not including 1 will be used to declare the presence of statistically significant association.

Protecting human subjects (Ethical consideration): The study protocol is reviewed and ethical clearance will be obtained from Institutional Review Board (IRB) of Addis Ababa university ethics committee and a formal letter of permission will be obtained from Amhara Regional Health Bureau. The purpose of the study will be explained for the participants. Informed verbal consents will be obtained from the parents/care givers of the children before the interview. Mothers/care givers of children with acute malnutrition will be advised on how to prevent and

treat it and for those cases that do not begin treatment appropriate link will be made to therapeutic feeding centers.

Dissemination and utilization of result: The results of the study will be submitted and presented to the SPH- AAU and the respective district, zonal and regional health bureau with a hard copy and soft copy, and other stakeholders those who need to know and working with together. Efforts will be made to present the results on scientific conferences within the country (EPHA annual conference) in the continent (AFENET) and across a globe (TEPHINET) and peer reviewed journal publications will be considered.

Work Plan and Budget breakdown

| Task performed | Responsible | March | | | | April | | | | May | | | | June | |
|-------------------------------------|----------------|-------|---|---|---|-------|---|---|---|------|---|---|---|------|---|
| | | Week | | | | Week | | | | Week | | | | Week | |
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 |
| Topic selection | P.I | | | | | | | | | | | | | | |
| Proposal development and submission | P.I | | | | | | | | | | | | | | |
| Ethical clearance | E.R.C | | | | | | | | | | | | | | |
| Preparation of supplies and tools | P.I | | | | | | | | | | | | | | |
| Training and Pre-test of questioner | P.I, D.C, S | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|--|-------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Actual Data collection, entry and processing | P.I, D.C, S | | | | | | | | | | | | | | |
| Data analysis, result writing and submit | P.I | | | | | | | | | | | | | | |

NB: P.I. = Principal investigator, D.C. = Data Collectors, S= Supervisor, E.R.C= Ethical review committee

Figure 44 Gantt chart showing the work plans on the prevalence of acute malnutrition and associated factors among children age 6-59 months in Ziquala district, Northwest Ethiopia, 2017

Table 23: Budget break down for the study on prevalence and associated factors of acute malnutrition among 6- 59 months children in Ziquala district, Wagihmra zone, Northwest Ethiopia, 2017

| S. n | Budget Category | Unit Cost | Multiplying factor | Total Cost(ETB) |
|------|---------------------------------|---------------------------------|---|-----------------|
| 1 | Personnel | Daily Wage (including per Diem) | Number of staff days (Number of staff x Number of working days) | |
| | Principal investigator per diem | 300 | 1*15 | 4,500 |
| | Supervisors' per diem | 300 | 2*15 | 9,000 |
| | Data collectors | 200 | 4*15 | 12,000 |
| | Data entry clerk | 200 | 1*7 | 1,400 |
| | Secretarial work | 200 | 1*7 | 1,400 |
| | Sub total | | | Personnel total |
| 2 | Transportation | Cost per way | 6*300 | 1,800 |
| | Sub total | | Transport total | 1,800 |
| 3 | Supplies | Cost per Item | Number | |

| | | | | |
|---|---------------------------|---------------------------|----------------------------|------------|
| | Questionnaire duplication | 2 | 5*530 | 4,460 |
| | Clip board | 500 | 1 | 500 |
| | Flip chart paper | 25 | 10 | 250 |
| | Pen (Lexi) | 5 | 30 | 150 |
| | Pencil | 1 | 30 | 30 |
| | Eraser | 10 | 5 | 50 |
| | Sharper | 10 | 5 | 50 |
| | Marker (pack) | 50 | 5 | 250 |
| | Printing paper(pack) | 150 | 10 | 1,500 |
| | Sub total | | Total supplies | 8,240 |
| 4 | Training | Cost per item | Number of days | |
| | Hall rents | 1000 | 5 | 5000 |
| | Tea/coffee | 100 per participatory/day | 5*10 | 5000 |
| | Sub total | | Total training | 10,000 |
| 5 | Total | | (Total 1+2+3+4) | 4,8340 |
| 6 | Contingency (5% x Total) | | 5%*48340 | 2,417 |
| 7 | Grand Total | | Total (5) +Contingency (6) | 50,757 ETB |

References

1. Fuchs C, Sultana T, Ahmed T, Hossain MI. Factors Associated with Acute Malnutrition among Children Admitted to a Diarrhoea Treatment Facility in Bangladesh. 2014;1–6.
2. Tsedeke W, Tefera B, Debebe M. Prevalence of Acute Malnutrition (Wasting) and Associated Factors among Preschool Children Aged 36-60 Months at Hawassa Zuria , South Ethiopia : A Community Based Cross Sectional Study. 2016;6(2).
3. Ayana AB, Hailemariam TW, Melke AS. Determinants of acute malnutrition among children aged 6 – 59 months in Public Hospitals , Oromia region , West Ethiopia : a case – control study. BMC Nutr [Internet]. BMC Nutrition; 2015;1–11. Available from: <http://dx.doi.org/10.1186/s40795-015-0031-9> 1.
4. Ethiopia Ministry of Health. Guidelines for the Management of Acute Malnutrition. 2016;
5. H Ethiopia– Federalministryofhealt. Protocol For The Management Of Severe Acute Malnutrition. 2007;
6. Pal A, Pari AK, Sinha A, Dhara PC. ScienceDirect Prevalence of undernutrition and associated factors : A cross-sectional study among rural adolescents in West Bengal , India. Int J Pediatr Adolesc Med [Internet]. Elsevier Ltd; 2016;(September):1–11. Available from: <http://dx.doi.org/10.1016/j.ijpam.2016.08.009>
7. Bank UW, Wardlaw T, Newby H, Brown D, Cai X, Onis M De, et al. Child Malnutrition.
8. Degarege D, Degarege A, Anmut A. Undernutrition and associated risk factors among school age children in Addis Ababa , Ethiopia. ??? [Internet]. ???; 2015;1–9.
9. Müller O, Krawinkel M. Malnutrition and health in developing countries. 2005;173(3):2000-3.
10. Ministry of Health and CSA. Ethiopia demographic health survey key indicators. 2016.
11. Amare D, Negesse A, Tsegaye B, Assefa B, Ayenie B. Prevalence of Undernutrition and Its Associated Factors among Children below Five Years of Age in Bure Town , West Gojjam Zone , Amhara National Regional State , Northwest Ethiopia. 2016;2016.

12. Birhanu MM. Systematic Reviews of Prevalence and Associated Factors of Under Five Malnutrition in Ethiopia : Finding the Evidence. 2015;4(4):459–64.
13. Office WZ and ZDH. Zonal and district six months report from May to October, 2016.
14. Unit ENC, Department EW, Development MOA and R. Guidelines for Emergency Nutrition Surveys in Ethiopia. 2008;(September).
15. Ranjitha A, Angadi N, Mahabalaraju DK. Study to Assess the Maternal Factors Influencing Undernutrition among 3 to 6 Year Old Children of Davangere City. 2016;7(11):890–3.
16. Egata G, Berhane Y, Worku A. Seasonal variation in the prevalence of acute undernutrition among children under five years of age in east rural Ethiopia : a longitudinal study. BMC Public Health [Internet]. BMC Public Health; 2013;13(1):1. Available from: BMC Public Health
17. Wollega E. Prevalence of Wasting and Associated Factors among Preschool Children in Gobu Sayo. 2015;(June).
18. Sci JNF. Journal of Nutrition & Food Sciences Prevalence of Acute Malnutrition and its Associated Factors among Children aged 6-59 months in Mai-Aini Eritrean Refugees ' Camp ,. 2015;5(1):1–7.
19. Eshetu A. Determinant of Severe Acute Malnutrition among Children Aged 6-59 Months in Konso , Southern Ethiopia : Case Control Study. 2016;24:181–6.
20. Ma A, Birhanu D, Melaku S, Tolossa D, Mohammed Y, Gebremicheal K. Magnitude and factors associated with malnutrition in children 6 – 59 months of age in Shinille Woreda , Ethiopian Somali regional state : a cross-sectional study. BMC Nutr [Internet]. BMC Nutrition; 2016;1–12. Available from: <http://dx.doi.org/10.1186/s40795-016-0079-1>
21. Fentahun W, Wubshet M, Tariku A. Undernutrition and associated factors among children aged 6-59 months in East Belesa District , northwest Ethiopia : a community based cross-sectional study. BMC Public Health [Internet]. BMC Public Health; 2016;1–10. Available from: <http://dx.doi.org/10.1186/s12889-016-3180-0>

CHAPTER IX: OTHER ADDITIONAL OUTPUT REPORTS

9.1. Situational update of Acute Watery Diarrhea (AWD)

Acute watery diarrhea is an infectious, highly communicable and severe disease with rapid onset, high attack and case fatality rates, and fast progression to death if left untreated. More than 5000 cases of AWD with a case fatality rate of around 1% were reported in the region during the outbreak which lasts from July to December 2016. More than 100 districts from all zones of the region were affected by this outbreak. The risk factors for the occurrence of AWD epidemic are diverse but there are a number of risk factors that are historically associated with previously occurred AWD epidemics in the region. These factors are; high population mobility, critical water shortage, limited basic sanitation and compromised hygiene practices in some districts, development corridors, holy water sites and possibility of contamination of water sources. In the region there are 12 holy water sites identified as having public health importance by the regional health bureau. Most of these sites are active throughout the year and an estimated more than one million people attended the sites per year. According to the regional health bureau report; holy water sites such as Wonqeshet, Shenkora Yohanis, Tsadkane Mariam and Andasa reported a large number of AWD cases and were responsible for the spread of AWD to other parts of the region. For instance, from July to November, 2016 there was AWD outbreak in Andassa holy water site and spread to 60 districts of the region.

Taking this into consideration, the regional health bureau has identified a package of interventions aimed at stopping further AWD transmission within the affected districts and spread of the disease to other districts.

Package of the intervention

1. Coordination
2. Surveillance
3. Case management
4. WASH
5. Communication
6. Capacity building

9.2. Supportive supervision on acute watery diarrhea

Assessed zone: South Gondar zone and its districts

Team members:

- Mr. Zewudu Zeleke
- Dr. Melisew Abeje
- Mr. Fisseha Walle
- Zonal and district PHEM officers

The main objectives of supportive supervision was to identify source of infection, assess community awareness and hygiene sanitation condition, to assess surveillance system, case management and infection prevention in the cholera treatment centers, to organize the coordination system, to train health workers for containment of the outbreak in 2016.

Methods and materials

The assessment was conducted in South Gondar zone, North-West Ethiopia from August 26 to September 27, 2016. The zone administratively divided into 10 districts (locally termed –woredas”) and 02 town administration with total population of 2,442,603 (2,296, 047 rural and 146,556 urban) including 330,729 under-five years children residences based on 2007 census projection. The zone has four hospitals, 93 health centers, 11 medium clinics and 377 health posts. We developed organized check list which contained the point on Coordination, Surveillance, Case management, WASH, Communication and Capacity building. We used organized check list to assess the cholera treatment centers at hospital and health center level by interview, observation and focus group discussion. We collected qualitative and quantitative data at cholera treatment center, health post and community levels. The quality of data were checked by asking triangulation questions and reviewed by documents. Quantitative data were entered in Microsoft office spread sheet 2010 and analyzed and the qualitative data were summarized in narrative ways.

The results of the supportive supervision

Acute watery diarrhea that started since 8/12/2008 in South Gondar zone by different districts continues to evolve. From 8/12/2008 to 14/01/2009 EFY, a total of 155 AWD suspected cases

reported in the zone. There were 55 CTC site established in the zone, however, the quality of the CTC was under questioned. Most of the cases were males (55.5%) and aged 15-44 years (70%). Majority of cases were reported in Fogera District followed by Farta Districts.

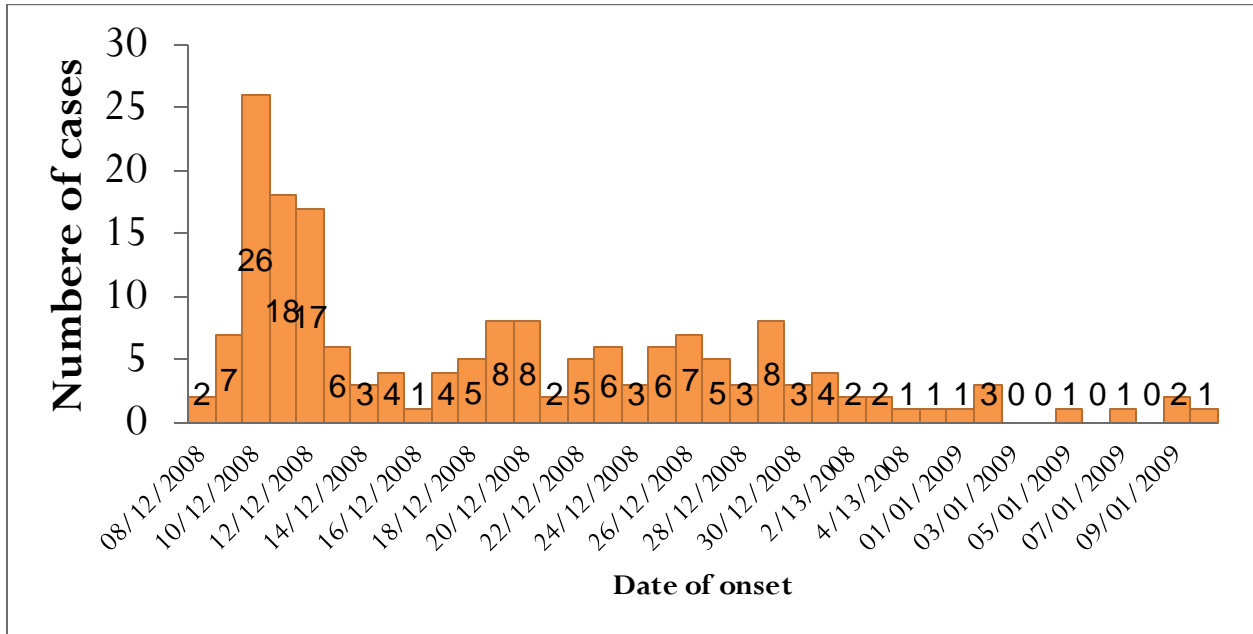


Figure 45: AWD cases epi-curve by date of onset in South Gondar zone from 8 /12/2008 to 14/01/2009 EFY.

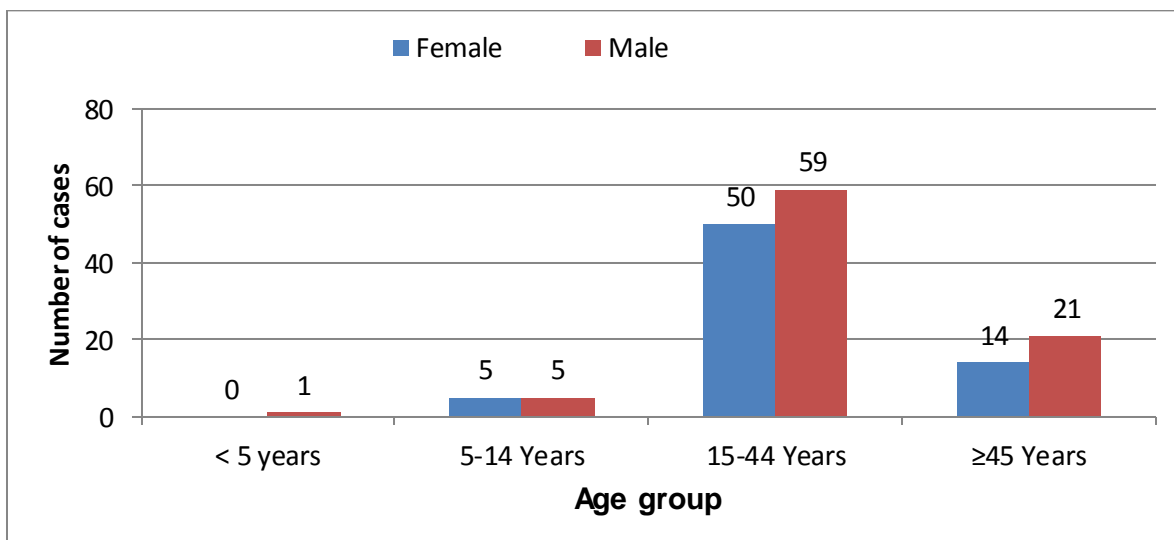


Figure 46: AWD cases distribution by age and sex in South Gondar zone from 8 /12/2008 to 14/01/2009 EFY.

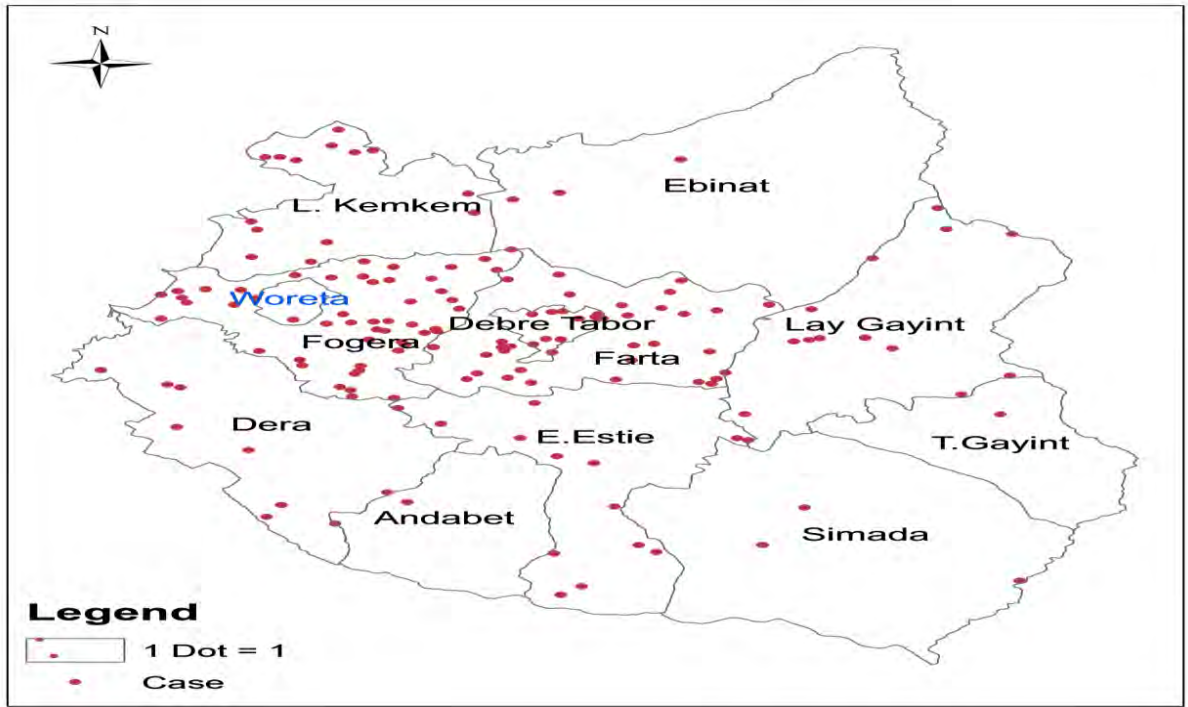


Figure 47: Spot map of AWD cases distribution by district from 8/12/2008 to 14/01/2009 EFF.

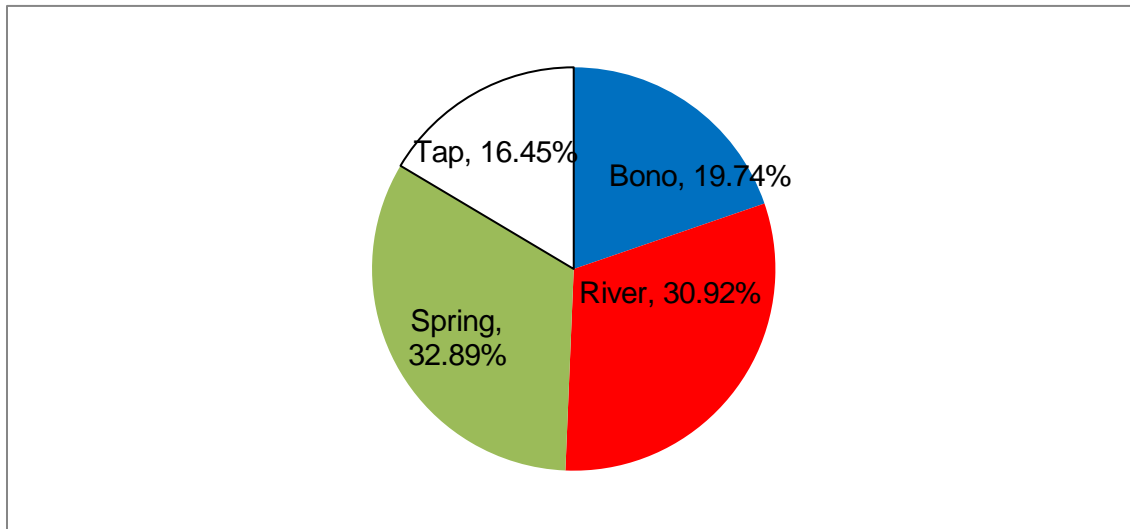


Figure 48: Water source of AWD cases in South Gondar zone, 2016.

Challenges or Gaps

- Weak coordination to other sectors in the zone and the district level
- Poor case management quality in the CTC
- Poor infection prevention in the CTC level
- Shortage of required drugs in the CTC
- Poor infection source identification
- There was no active surveillance in the community
- The community didn't have awareness for AWD

Recommendation

- ✓ The coordination should be active in the zone and districts as well as health facility levels.
- ✓ Short term training should provide to health worker as per national guideline
- ✓ Active surveillance should be done in the community to early detection and measures taken.
- ✓ Awareness creation should be continued in the community

Training on AWD: We provide training for 120 health workers in South Gondar zone and 110 health workers in North Shoa Zone.

Training schedule on AWD in South Gondar zone duration of course- Sep 24 to 25, 2016.

| Date | Time | Topic | Facilitators | |
|----------------|----------------|----------------------------------|---------------|---------------|
| | | | Group one | Group two |
| Sep 24,2016 | 8:30_9:00 Am | Registration and welcome | IMC | |
| | 9:00_10:00 Am | Surveillance | Fisseha Walle | Alie Ayal |
| | 10:00_10:30 Am | Epidemiology and case management | Dr. Melisew | Fisseha Walle |

| | | | | |
|----------------|-----------------|--|-------------------|---------------|
| | | | Abeje | |
| | 10:30_10:45 Am | Tea break | IMC | |
| | 10:45_12:30 Am | Epidemiology and case management | Dr. Melisew Abeje | Fisseha Walle |
| | 12:30Am_2:00 Pm | lunch | Individual | |
| | 2:00_3:30 pm | Outbreak investigation | Ali Ayal | Fisseha Walle |
| | 3:30_3:45 Pm | Tea break | IMC | |
| | 3:45_5:30 Pm | CTC establishment and infection prevention | Zewudu Zeleke | Endager |
| Sep 25,2016 | 8:30_9:30 | Wash | Endager | Zewudu Zeleke |
| | 9:30_10:30 | Preparedness plan | Fisseha Walle | Alie Ayal |
| | 10:30_10:45 Am | Tea break | IMC | |
| | 10:45_11:30 Am | Monitoring and evaluation | Ali Ayal | Fisseha Walle |
| | 11:30_6:30 Am | General discussion and closing | Zone head | |



Figure 49: Source of AWD infection in Aember village Fogera district 2016



Figure 50: Cholera treatment center in Aember health center, Fogera district 2016.



Figure 51: Assessment of community awareness and hygiene sanitation condition in Fogera district, 2016.

9.3. Tachi Armachiho's team supervision briefing report

Team members:

1. Mr. Getnet Abie
2. Mr. Bizuayehu Shimekaw
3. Mr. Sisay Awoke
4. Mr. Fisseha Walle

Situational update

AWD cases: Acute watery diarrhea since started on 6 March 2017 in Tachi Armachiho district continues to evolve. As of 23 March 2017, a total of 113 cases and 02 deaths had been reported from all three CTC (Asherie, Musiebamb and Saja) sites. Most of the cases reported from Asherie health post cholera treatment center. Out of 113 cases 96 were discharged from cholera treatment center.

Case management: During assessment period 02 medical doctors and 16 health professional including officers were providing case management service in Asherie CTC with minor errors supported by RHB team, WHO staff Doctor Achenef and UNICEF staff Mr. Getachew.

Treatment comprises oral fluids, doxycycline, and intravenous fluids and varied among case-patients. We observed most of the cases received oral fluids.

Cholera treatment centers: Cholera treatment centers were established at Asherie, Musiebamb and Saja. They were still functional at the time of the visit. The CTC had been divided in three rooms as plan A, plan B and Plan C for treatment of AWD cases and also has water storage, disinfectant (hand washing footbath), shower, latrine and store available but did not have a designated site for washing clothes(disinfecting patient clothes).

Logistics: Various supplies were available except kcl to treat hypokalemia patient; due to lack of kcl one death occurred and also there is shortage of car for transportation of cases from holy water site to the CTC.

Source of infection: As we know all suspected AWD cases treated in the CTC coming from holy water. The estimated numbers of holy water beneficiaries are 2000-3000 population. There was no latrine, protected water source for drinking and poor environmental hygiene and sanitation condition. The population defecated on the top of drinking water source and holy water. The general hygiene in the holy water was poor.

Health promotion and regulatory: The advocacy, communication and social mobilization group has developed strategies to contain AWD which were health education given at holy water site, CTC, and at community level using microphone, especially suitable area for transportation. Food and drinking institutions are inspected by regulatory committee supported by police officers.

Surveillance: Active case search contact tracing and line list were ongoing by health workers and community committees.

Wash and IP: Water chlorination has conducted at source in Asherie Town and chemicals distributed to the community to treat water at house hold level. Even though water purification chemicals at house hold level were being distributed to affected communities (holy water

beneficiaries), there was not used appropriately. More-or-less the infection prevention has done at the cholera treatment centers and at living area of holy water beneficiaries. Water chlorine residual of Asherie was below the normal level tested by zonal water bureau during our visit.

Coordination: Four working teams were established and overall activities coordinated by head and vice head of district health office supported by district leaders. Political leaders and other sectors fully engaged to prevent and control the epidemic in the district.

Recommendation

- Latrine construction should be performed at holy water area.
- Protected potable water source should be constructed at holy water area.
- ORPs must be established at holy water site to prevent severe dehydration
- Patient clothes disinfection site must be designed
- Zones must strongly support the district to prevent and control the epidemic.

9.4. Coordinating & supporting scabies mass drug administration campaigns in Ebinat district, South Gondar zone, North-West Ethiopia, 2016.

Introduction

Scabies: Human scabies is caused by an infestation of the skin by the human itch mite (*Sarcoptes scabiei* var. *hominis*). The microscopic scabies mite burrows into the upper layer of the skin where it lives and lays its eggs. The most common symptoms of scabies are intense itching and a pimple-like skin rash. When a person is infested with scabies mites the first time, symptoms may not appear for up to two months after being infested. However, an infested person can transmit scabies, even if they do not have symptoms. Scabies usually is passed by direct, prolonged skin-to-skin contact with an infested person. However, a person with crusted scabies can spread the infestation by brief skin-to-skin contact or by exposure to bedding, clothing, or even furniture that he/she has used. Scabies is prevented by avoiding direct skin-to-skin contact with an infested person or with items such as clothing or bedding used by an infested person. Scabies treatment usually is recommended for members of the same household, particularly for those who have had prolonged skin-to-skin contact. All household members and other potentially exposed persons should be treated at the same time as the infested person to

prevent possible reexposure and reinfestation. Bedding and clothing worn or used next to the skin any time during the 3 days before treatment should be machine washed and dried using the hot water and hot dryer cycles or be dry-cleaned. Items that cannot be dry-cleaned or laundered can be disinfested by storing in a closed plastic bag for several days to a week. Scabies mites generally do not survive more than 2 to 3 days away from human skin. Children and adults usually can return to child care, school, or work the day after treatment. Persons with crusted scabies and their close contacts, including household members, should be treated rapidly and aggressively to avoid outbreaks.

Distribution: Scabies occurs worldwide and affects people of all races and social classes. Scabies affects people from every country. However, it is the most vulnerable, young children and the elderly in resource-poor communities who are especially susceptible to scabies as well as to the secondary complications of infestation. The highest rates occur in countries with hot, tropical climates, where infestation is endemic, especially in communities where overcrowding and poverty coexist.

Description of the district: Ebinat is one of the twelve districts in South Gondar zone. The district is the second most populous in the zone with a population of 251,787 based on 2007 census projection. The district has a total of 37 kebeles of which 35 rural and 02 urban. The district has a total of 10 health centers and 45 health posts. In 2016, there was an occurrence of drought in the district; fourteen kebeles were highly affected by the drought. The impact of severe drought in the district attributed to scare of food and safe water source. High level of drought condition increased malnutrition and potential for diseases outbreak in the communities like scabies.

Scabies situation update: In October 2016, scabies outbreak significantly increased throughout the whole kebeles. Significant numbers of cases were reported in PHEM weekly report. Therefore, the regional health bureau, zonal health department and district health office discussed to control and prevent the outbreak.

Action taken to control and prevent the outbreak

- We provided capacity building trainings for health workers and HEWS about scabies case management, control and surveillance to contain outbreak.

- Cases were identified and recorded by house to house visit for prevalence measure. According to national guideline, which kebeles had prevalence rate greater than 15 % and less than or equal to 15 % to decide the modality of treatment either mass drug administration or case contact treatment.
- We quantified the drugs based on the data and requested the region drug stores.
- We discussed with Kebele leaders and district leaders and office heads and mobilized the community to take the drug, prevent and control the diseases.
- Scabies campaign was conducted in two second doses (second rounds).
- National guidelines were provided to the health professional to guide the treatment.
- Ten kebeles were provided mass drug administration, and 27 kebeles were treated by case contact treatment modality in the first round; the second round 12 kebeles were provided mass drug administration and 25 kebeles case contact treatment.
- Health education was given to the community how to apply the drug and supplementary activities such as clothes washing and bathing etc.
- The campaign was conducted by 102 drug provider teams and supersized by 12 district health officers, 04 zonal health officers and 01 regional field epidemiology resident.

Prevalence rate of the scabies and drug received during the campaign

There was a total of 251,787 risk population for scabies in the district. A total of 26,212 scabies cases were reported during campaign. The overall prevalence rate was 10.41% in the district. A total of 80,476 populations (26,212 cases and 54,264 contacts) were treated during the campaign periods. Scabies cases were managed as per WHO recommended guideline during the campaign. The main drugs provided to the cases and contacts were 5% permethrin (7.9%) and 5-10% sulphur ointments (2.7%) and oral ivermectin (89.4%). Most of the cases and contacts were received oral ivermectin. The complicated scabies cases were treated using appropriate antibiotics or antiseptics.

Challenges/gap: One of the major gaps was that the disease was not reported early enough. Furthermore, due to the nature of the highly contagious disease, it did not take long for outbreaks to occur. The population were not washed their clothes and body after taking the drugs. Line list

of cases data entry to the computer was the main challenges. There was poor surveillance system for scabies disease. The populations were not given intense to the scabies outbreak.

Recommendations: The surveillance system should be active to early detection and response. The population should be actively participating in control and prevention activities.

9.5. Weekly Epidemiological Bulletin provided to the zones and EPHI

AMHARA NATIONAL REGIONAL STATE HEALTH BUREAU
PUBLIC HEALTH EMERGENCY MANAGEMENT (PHEM) CORE PROCESS
WEEKLY PHEM BULLETIN

Editor In-Chief: Teklehaimanot C./hiwot <waggyour@gmail.com, Mobile: +251 914608041, Office Tele: +251 582221714, Fax: +251 58226 23 96.

Editor: Fisha wale <fwale95@gmail.com and Aberemuchie <aberemuchie@gmail.com> EFETP Resident, Bahir Dar

Vol II-15| Week 15 April 03– April 09, 2017|

Major issues in the bulletin:

- Weekly surveillance report completeness and timeliness
- Weekly malaria trend in the region
- Regional PHE situation
- Other issues

Malaria Case by District (Woreda)

Regionally Number of malaria cases were decreased by 209 (6.4%) as compared with the previous week. Malaria case decrement was seen in the majority of the zones except Bahirdar town, Gondar town, North Wollo, Oromia, Wag Himra and South Gondar zones. From the total malaria cases reported in this week, 1225(40%), 399(13%) and 359(11.7%) were reported from North Gondar, West Gojjam and Awi zones respectively. When we see the malaria cases by woreda, 62(41%) of the woredas in the region had shown case increment (from one case to 35 cases) and 65(43%) of the woredas in the region had reported case decrement (from one case to 50 cases), where as the remaining 25(16%) woredas had reported the same number of cases with the previous week. Kobo Kotema, Takusa, Jabitehinan, Dera, Gendawuha, North Achefer, Abergelle, Farta, Jilertinga, Kemisie town, Mekadella, Artamafursi, Fogera, Bahir Dar town, Argosa, Dembecha, Jansorra and Gondar Zama were woredas where malaria case increment by 10% and above was seen as compared with the previous week. Top ten woredas by increment of cases in this week as compared with the previous week were presented in figure 3 below.

Figure 3: Top ten woredas with malaria case increment in week 15 as compared to week 14, Amhara Region.

I. Introduction: This bulletin represents the reporting period of week 15 and serves to provide information on public health emergencies and surveillance activities for evidence based decision making. It also gives a chance for partners working on public health to engage in priority issues of the region. The bulletin shows surveillance report completeness and timeliness. Malaria situation and other PHEM targeted disease in the region.

II. Weekly Surveillance report:

The overall completeness of the reporting units in week 15 was 98.9%. Completeness was above 90% in all zones. Completeness was decreased in Awi, South Gondar and South Wollo zones as compared with the previous week. The completeness in Private health facilities was 89.4%.

Figure 1: Completeness by zone in week 15, 2017, Amhara region.

III. Diseases and conditions

1. Malaria: A total of 3071 malaria cases (1.3% of the total out patient cases) with positivity rate of 12.2% were reported in week 15. From the total positives, *Plasmodium falciparum* *Plus mixed* and *Plasmodium Vivax* constituted 37% and 43% respectively. The proportion of malaria cases from total cases (3.1%) was high in North Gondar zone where as proportion of Pf from total Positives (68%) and positivity rate (24%) were high in Wag himra zone. As it is shown in figure two, the total malaria cases in this week were lower as compared with the same week of the previous four years.

Figure 2: Regional malaria trend by week from 2005 to 2009 EFY.

Comparison of 2008 & 2009 EFY malaria cases, WK13 –WK 15

In this sub topic 2009 malaria data is compared with the same week of 2008 EFY, and 2009 malaria cases were high in Dessie town, South Wollo and Wag Himra zones.

Table 1: 2008 & 2009 EFY malaria cases comparison by zone, Week 15.

| Zone | 2008 Malaria cases | | | 2009 Malaria Cases | | | Change from 2008 to 2009 | | |
|-----------|--------------------|---------|---------|--------------------|---------|---------|--------------------------|---------|---------|
| | Week 13 | Week 14 | Week 15 | Week 13 | Week 14 | Week 15 | Week 13 | Week 14 | Week 15 |
| Awi | 706 | 662 | 647 | 424 | 380 | 359 | -282 | -282 | -288 |
| Bahir Dar | 41 | 37 | 36 | 33 | 20 | 28 | -8 | -17 | -8 |
| Dessie | 11 | 8 | 1 | 2 | 4 | 3 | -9 | -4 | 2 |
| E/Gojjam | 297 | 306 | 333 | 194 | 148 | 139 | -103 | -158 | -194 |
| Gondar | 75 | 41 | 69 | 27 | 23 | 28 | -48 | -18 | -41 |
| N/Gondar | 2889 | 2332 | 2264 | 1623 | 1471 | 1225 | -1266 | -861 | -1039 |
| N/Shewa | 203 | 206 | 156 | 145 | 113 | 104 | -58 | -93 | -52 |
| N/Wollo | 175 | 140 | 132 | 84 | 82 | 103 | -91 | -58 | -29 |
| Oromia | 223 | 190 | 237 | 105 | 92 | 115 | -118 | -98 | -122 |
| S/Gondar | 1297 | 1072 | 1492 | 317 | 315 | 331 | -980 | -757 | -1161 |
| S/Wollo | 134 | 113 | 107 | 93 | 121 | 121 | -41 | 8 | 34 |
| W/Gojjam | 847 | 794 | 854 | 417 | 398 | 399 | -430 | -396 | -455 |
| Wag Himra | 122 | 69 | 71 | 115 | 113 | 116 | -7 | 44 | 45 |
| Region | 7020 | 5970 | 6399 | 3579 | 3280 | 3071 | -3441 | -2690 | -3328 |

NB: The red colored Numbers in the table show case increment in 2009 as compared with the same week of 2008 E.C.

Annex: Questionnaire

Annex 1: Influenza like illness outbreak investigation questionnaire

Code _____ date of data collection _____ District _____ kebeles _____ village _____

1. Socio-demographic Characteristics

| S. No | Questions | Alternatives |
|-------|---|-----------------------------|
| 1.1 | Sex | 1.Male 2.Female |
| 1.2 | Age | year _____ Month _____ |
| 1.3 | If female, is she currently pregnant? | 1. Yes 2. No 3. Do not know |
| 1.4 | Occupation | |
| 1.5 | Educational level | |
| 1.6 | Marital status | |
| 1.7 | Family size | ----- |
| 1.8 | Is there any sick person with fever, cough , headache , running nose/vomiting in the family | 1. Yes 2. No |
| 1.9 | If yes, number of sick person | ----- |

Clinical History of Diseases:

| | | |
|-----|--------------------------------|---|
| 2.1 | Case status | 1. Case 2. Control if the answer is control go to question No.3.1 |
| 2.2 | Date of illness onset | ------(dd/mm/yy) |
| 2.3 | Date seen at health facility | |
| 2.4 | Date of Admission if inpatient | ------(dd/mm/yy) |

| | | | |
|-----|-------------------------|--|--|
| 2.5 | What was the symptom? | 1. Cough 2. Fever 3. Sore throat 4. Shortness of breath 5. Difficulty in breathing 6. Vomiting 7. Diarrhea | 8. Sneezing 9. Chest pain 10. Joint pain 11. Chills 12. Headache 13. Other (Specify)----- |
| 2.6 | Did you take treatment? | 1. Yes 2. No | |
| 2.7 | Outcome | 1. Cure 2. improved 3. died 4. Referred 5. on treatment | |

Risk factors

| | | |
|-----|---|------------------------|
| 3.1 | Did you have any travel history before 7 days to areas with active influenza like illness cases before onset of symptoms? | 1. Yes 2. No |
| 3.2 | Do you have any contact history with Someone else with suspected or confirmed Flu patient(s)? | 1. yes 2. No |
| 3.3 | Do you have any contact history with sick or dead animals (wild or domestic): | 1. Yes 2. No |
| 3.4 | 2. Did you wash your hands after touching the dead animals, birds and shaking hand to suspected person? | 1. Yes 2. No 3. Unknow |
| 3.5 | was there death of birds/chicken in the kebeles | Yes 2. No |
| 3.6 | Is your house well ventilated?/Room space and window availability and openness | 1. Yes 2. No |
| 3.7 | Number of windows | |
| 3.8 | How many times do open windows per week | |
| 3.9 | Did you have participated at the wedding ceremony or people gathering area? | Yes 2. No |

| | | |
|------|--|-----------|
| 3.10 | Did you have eaten or drunk at the ceremony? | Yes 2. NO |
|------|--|-----------|

Knowledge of patient on influenza like illness

| | | |
|-----|--|--|
| 4.1 | Do you hear about influenza like illness? | 1.Yes 2.No |
| 4.2 | From whom did you heard | 1.Friends 2.Family member 3 HEW 4 Teacher 5. Health workers 6. other _____ |
| 4.3 | Do you know about influenza like illness prevention and control methods and cause? | 1.Yes 2.No |
| 4.4 | If Yes? What is the cause? | 1. Virus 2.bacteria 3.contaminate food 4. From God 5. related to weather condition 6.Don't know 6.Others (Specify) _____ |
| 4.5 | What are the Signs and symptoms of influenza like illness? | 1.cough 2.Fever 3.Headache 3. Nasal discharge 4. Fatigue 5. Chills 6. Chest pain 7. vomiting 8. Diarrhea 9. Loss of appetite 10.Don't know |
| 4.6 | How do you think this disease transmit from person to persons (none proving)? | 1. sneezing/coughing 2.Contact with patient 3.wind 4. Don't know 5.Other(specify) |

| | | |
|-----|---|--|
| 4.7 | What are the prevention methods of ILI? | 1. Limit your contact with others 2. Hands washing 3. Cover mouth and nose during coughing and sneezing? 4. Don't touch any dead poultry 5. Hot fluid drinking 6. Don't know 7. other specify----- |
|-----|---|--|

Annex 2: AWD outbreak investigation questionnaire and informed consent form

Title: Suspected Acute Watery Diarrhea Outbreak Investigation-----Zone/woredas, Ethiopia, in year of-----

Introduction: Hello, my name is..... . I am a member of AWD outbreak Investigation team. Thank you for taking the time to speak with us today. We are investigating AWD outbreak occurred in-----zone/District or town/kebele.

Purpose: To determine the risk factors for contracting AWD outbreak and to make recommendations for interventions.

Procedure: If you agree to take part, this interview will take about 30 minutes of your time. There are two parts. First, we will ask you about demographic information of you and your family, knowledge you have on acute watery diarrhea, your history of acute watery diarrhea, water, sanitation and hygiene information and your feeding practice.

Second, we will ask you for a stool and drinking water samples to test for acute watery diarrhea causative agents in your stool and drinking water. We need only small amount of samples. The samples will be tested at Ethiopian Public Health Institute using a code so that no one will know about your results. All information collected during this study will be kept private and will only be known by the investigators.

Benefits: This project will help you and other people living in-----

We will use these results to prevent and control AWD outbreak in the woreda.

Risks: there is no risk to you from answering the questions or allowing us to take water and stool samples.

Privacy: we will keep information about you private. We will not collect your name. Only the investigators will have access to the data and only for investigation purpose. We will not use any information that might identify you when we present or publish the study's results.

Payment: there is no cost to you for being part of the project.

Participant Agreement: The project has been explained for me and my house hold members. I have been given a chance to ask questions. I feel that all my questions have been answered. Being in this study is my choice. I may change my mind and leave the study any time during the interview.

Name of principal investigator-----

Signature principal investigator _____ Date _____

Thank you For Your Cooperation!

[Acute watery diarrhea outbreak investigation questionnaire](#)

| No. | Question | Coding Classification | Go To |
|----------------------|-----------|---|-------|
| 1. Demography | | | |
| 1.1 | Status | 1 Case 2. Control | |
| 1.2 | Responder | _____ | |
| 1.3 | Address | Region _____ Zone _____ Woreda _____ Kebele _____ Got _____ House No _____ | |
| 1.4 | Ethnicity | 1. Amhara 2.Afar 3.Tigre 4.Oromo 5 .Other(Specify) _____ | |
| 1.5 | Age | _____ Year (s) _____ Month(s) | |
| 1.6 | Sex | 1.Male 2.Female | |

| No. | Question | Coding Classification | Go To |
|----------------------------|---|--|-------------------|
| 1.7 | Occupation | 1.Farmer 2.Merchant 3.Student 4. House wife 5.Unemployed 6. Pastoralist 7. Gov't Employee 8.Private Employee 9. Daily Laborer 10.Other _____ | |
| 1.8 | What is your religious | 1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. other _____ | |
| 1.9 | What is your marital status? | 1. Single 2. Married 3. Divorced 4. Widowed 5. NA | |
| 1.10 | Level of Education | 1.Illiterate 2.Read and writing only 3.Elementary school(1-8) 4.Secondary School(9- 12) 5.Tertiary School(college+) | |
| 1.11 | How many family members residing with you? | _____ | |
| 2. Knowledge of AWD | | | |
| 2.1 | Do you know acute watery diarrheal disease? | 1.Yes 2.No | If No skip to 3.1 |
| 2.2 | How do you think acute watery diarrheas transmit from person to persons (none proving)? | 1.Contaminated food 2.Contaminated water 3.Contact with patient 4.Other(specify) _____ | |
| 2.3 | What are you doing when you face acute watery diarrhea (none proving)? | 1. Go to health facility 2.Seek traditional healer 3.Use ORS 4.Use holy water 5. stay at home 6 .Other(specify) _____ | |
| 2.4 | Do you think acute watery | 1.Yes | |

| No. | Question | Coding Classification | Go To |
|--|---|--|------------------------|
| | diarrhea treatment center is source of infection/possible risk factor for AWD transmission? | 2.No 3. I don't know | |
| 2.5 | Do you think AWD is preventable disease? | 1. Yes 2.No 3. I don't know | If 2 or 3 skip to Q2.7 |
| 2.6 | How do you prevent AWD (none proving)?? | 1.Using toilet 2.Eating cooked food 3.Using purified water 4.Hand washing 5.Vaccine 6.Other(specify) _____ | |
| 2.7 | How long does it take you to walk to the health facility from your house? | 1. <10 m 2. 10-30 m 3. 30 m – 1 hr 4. >1 hr 5. >2 hr | |
| 3. Clinical Pictures(Current infection) | | | |
| 3.1 | Do you have of acute watery diarrheal disease recently? | 1.Yes 2.No | If no, skip to Q 3.9 |
| 3.2 | When did the symptoms begin? | _____ dd/mm/yyyy _____hour | |
| 3.3 | Frequency of defecation per day | _____ | |
| 3.4 | Do you have the following symptoms? | 1.Watery diarrhea 2.Vomiting 3.General body weakness 4.Loss of consciousness 5.Muscle cramp 6.Other(specify)_____ | |
| 3.5 | Was there sample taken for confirmation? | 1. Yes 2. No | |
| 3.6 | What was the result? | 1. O1 2. O139 3. Negative 4. Unknown | |
| 3.7 | Have you been treated | 1.Yes 2.No | |

| No. | Question | Coding Classification | Go To |
|---------------------------------------|---|---|---------------------|
| | with antibiotic for your recent complaints? | | |
| 3.8 | What antibiotics did you take? | 1. _____ 2. I don't know | |
| 3.9 | Where did you take the antibiotics? | _____ | |
| 3.10 | Where did you admit | 1. CTC 2. Hospital 3. Health center 4. Private clinic 5. Others, _____ | |
| 3.11 | Is there any sick other person in your house? | 1. Yes 2. No | |
| 3.12 | If yes, is that before or after your symptoms began? | 1, Before, 2 After 3. At the same time | |
| 3.13 | Is there AWD sick person in your village? | 1. Yes 2. No 3 I don't know | |
| 3.14 | Did you have contact history with the same compliant in the past 7days before your symptoms onset | 1.Yes 2.No | |
| 4. Travel and Exposure History | | | |
| 4.1 | Did you travel in the past 7days outside of your village before your symptoms onset? | 1.Yes 2.No | |
| 4.2 | If, yes where | _____ | |
| 4.3 | Did you participate in | 1.Yes 2.No | If no skip to Q No. |

| No. | Question | Coding Classification | Go To |
|----------------|--|--|-------------------------|
| | funeral ceremony of AWD death | | 4.6 |
| 4.4 | When did you participate in funeral ceremony of AWD death | _____ dd/mm/yyyy | |
| 4.5 | Where did you participate in funeral ceremony of AWD death | _____ | |
| 4.6 | Did you attend other public ceremonies /events(wedding, religious, bather) | 1.Yes 2.No | If No skip to Q No. 5.1 |
| 4.7 | What kind of food did you served at the ceremonies/ event? | _____ | |
| 4.8 | What kind of drink did you served at the ceremonies/ event? (if water mention sources) | _____ | |
| 5. WASH | | | |
| 5.1 | Where do you defecate? | 1. Toilet 2. open field | If No Skip to Q 5.4 |
| 5.2 | If answer to Q5.1 is "toilet" who own it? | 1. Private 2. Communal 3. Public | |
| 5.3 | show me the toilet | 1. Clean 2.Unclean 3.Ventilated 4.Sign of utilization | |
| 5.4 | If the answer to question number 5.1 is OFD, can you tell me the reason? | 1. No toilet 2. Culture 3.Bad odor 4. Fear of falling down 5.Too far from my house 6. Physically damaged (toilet) 7.Other(specify)_____ | |

| No. | Question | Coding Classification | Go To |
|------|---|--|---------------------|
| 5.5 | Is there facility to wash your hand after defecation near toilet? | 1.Yes 2.No | |
| 5.6 | When do you wash your hand (none proving)? | 1.After toilet 2.Before food 3.After cleansing child 4.Before preparing food 5.Before feeding child 6.Other(specify) _____ | |
| 5.7 | What items are you using for hand washing? | 1. Plain water 2. Soap 3. Ash 4.Other(specify)_____ | |
| 5.8 | What is the water source for your house hold for drinking purpose? | 1.Pipe water 2.Spring 3.Hand dug well 4.Deep well 5.Pond 6.River 7. Lake 8. Bottled water 9.Other(specify) _____ | Local mane _____ |
| 5.9 | What is the water source for your house hold for washing utensils? | 1.Pipe water 2.Spring 3.Hand dug well 4.Deep well 5.Pond 6.River 7.Lake 8.Other(specify) _____ | |
| 5.10 | What is the water source for your house hold for cooking food? | 1.Pipe water 2.Spring 3.Hand dug well 4.Deep well 5.Pond 6.River 7.Lake 8.Other(specify) _____ | |
| 5.11 | How many hours/minutes will take you or your family to fetch water from the water source? | _____ hours _____ minute I cannot estimate | |
| 5.12 | What type of container are you using to fetch water from the source? | 1.Jerry cane 2.Bucket 3.Ensira(Gan) 4.Other(specify) _____ | |
| 5.13 | What type of water container are you/your | 1.Jerry cane 2.Bucket 3.Ensira(Gan) 4.Rotto | |

| No. | Question | Coding Classification | Go To |
|-------------------|---|---|---------------------|
| | family is using in your house for storage? | 5. Other(specify) _____ | |
| 5.14 | How was the water accessed from the storage container? | 1.Pour 2.Dip with cup 3.Other(specify)_____ | |
| 5.15 | Does the container have cover/lid (observe)? | 1.Yes 2.No | |
| 5.16 | Do you clean your water containers regularly? | 1.Yes 2.No | If No skip to Q5.19 |
| 5.17 | What materials do you use to wash your water containers? | 1.Soap 2.Only water 3.Ash 4.Other(specify) _ | |
| 5.18 | How often do you wash your water containers? | 1.Every day 2.Every other day 3.Once per week 4.Other(specify) _____ | |
| 5.19 | Do you think the water you are using is safe? | 1.Yes 2.No | |
| 5.20 | Could you purify the water? | 1.Yes 2.No | |
| 5.21 | What methods of water purification do you use (none proving)? | 1.Boiling 2.Filtration 3.Sedimentation 4.Water chemicals 5.Other(specify)_____ | |
| 5.22 | For what purposes do you purify water (none proving)? | 1.For drinking 2.For cooking 3.For washing hand 4.For cleaning food utensils 5.Other(specify) _____ | |
| 5.23 | Is there water purification chemical available in your community? | 1.Yes 2.No | |
| 6. Feeding | | | |
| 6.1 | What is the cultural food | 1.Rice 2.Enjera with wot 3.Porridge | |

| No. | Question | Coding Classification | Go To |
|------|---|---|---------------------|
| | in your area? | 4. Bread 5. Other(specify) _____ | |
| 6.2 | Do you eat raw/uncooked food? | 1.Yes 2.No | If No skip to Q 6.4 |
| 6.3 | In the past 7 days of your symptoms onset what kind of uncooked food did you eat? | 1. Raw meat 4. Raw green vegetables 2. Raw tomato 5. Raw fish meat 3. Raw milk 6. Other(specify) _____ | |
| 6.4 | What kind of cooked food did you eat in the past 7 days of your symptoms onset? | 1.Enjer with wot 2.Roasted meat 3.Other(specify) _____ | |
| 6.5 | Do you re-heat cooked food if not eaten immediately? | 1.Yes 2.No | |
| 6.6 | Where do you keep the cooked food? | 1.Room temperature 2.Refrigerator 3.Other(specify) _____ | |
| 6.7 | What are you doing with the leftover foods (none proving)? | 1.Reheat and eat 2.For domestic animals 3.Giving for beggars 4.Street children 5.Dump in waste substance 6.Other(specify) _____ | |
| 6.8 | Is there fish supply in your village? | 1.Yes 2.No | |
| 6.9 | Do you eat raw fish? | 1.Yes 2.No | |
| 6.10 | Did you eat food from other house in the past 7 days of your symptoms | 1.Yes 2.No | |

Annex III: Surveillance System Evaluation Questionnaire

Zonal Level Questionnaire

Identifiers:

Region _____ Respondent _____

Zone _____ Date _____ Tele. _____

General

Total pop. _____ Male _____ Female _____ u5yrs _____

Rural pop. _____ urban pop. _____

Total Kebeles _____ Urban _____ Rural _____

Hosp. _____ H.Cs _____ Hps _____ All types of private clinics _____

Other private health facility _____ NGOs H.F. _____

Total # of malarious Woreda _____ Total # of malarious kebeles _____ Total pop at risk for malaria _____

I. Availability of a National Surveillance Manual

1. Is there a national PHEM manual/ guideline for surveillance? Yes / No
2. *If yes*, describe (last update, diseases included, case definitions, surveillance and control, integrated or different for each disease):
3. What are the objectives of surveillance? _____
4. What are the strengths of your surveillance system? _____
5. What are the weaknesses of your surveillance system? _____

II. Case Detection and Registration

6. Do you have standard case definitions for the Country's priority diseases like AFP (polio), malaria, and measles? Yes / No / Unknown / Not applicable
7. If the answer is yes for Q #6, observe the presence of the standard case definition for each priority disease. Yes No Unknown Not applicable

III. Data reporting:

Presence of recommended reporting forms in the zone at all times over the past 11 months

8. Are the Federal/ Regional health bureau responsible for providing surveillance forms to the health facilities? Yes No Unknown Not applicable
9. *If yes*, have you lacked appropriate surveillance forms at any time during the last 11 months? Yes No Unknown Not applicable
10. What are the reporting entities for the surveillance system?
- a. Public health facilities
 - b. NGO health facilities
 - c. Military health facilities
 - d. Private health facilities
 - e. Others
11. Was there any report of the immediately reportable diseases in the past 1 month? Yes/ No
What was the disease _____?
12. If yes, for Q 11, with in what time is the report received after detection of the diseases?
- a. Less than 1 hour
 - b. 2-24 hour
 - c. 1- 2 days
 - d. 3- 7 days
 - e. After 1 week
13. Percent of districts that have means for reporting to next level by e-mail, telephone, fax or radio _____
14. How do you report weekly, monthly and other formations to higher level?
- a. Mail
 - b. Fax
 - c. Telephone
 - d. Radio
 - e. Electronic
 - f. Other

15. Did you have address of regional PHEM officers? Yes /No

16. How frequently are you communicating with the regional PHEM officers on emergencies and other daily activities?

A) Daily

B) Weekly

C) Every 2 week

D) Monthly

E) Quarterly

F) Every 6 month

G) Yearly

H) Others _____

17. Did you have address of woredas/health facility PHEM officers? Yes/ No (if yes observe the lists and their address of woreda and H.F PHEM officers)

18. How frequently are you communicating with the woredas/health facility PHEM officers on emergencies and other daily activities?

A) Daily

B) Weekly

C) Every 2 week

D) Monthly

E) Quarterly

F) Every 6 month

G) Yearly

H) Others _____

19. When are you expected to send weekly report to the Regional PHEM unit? Every

Monday

Tuesday

Wednesday

- Thursday
- Friday
- Saturday
- Sunday

I don't know

20. When are you expected to receive weekly report from woredas /health facilities?

- Monday
- Tuesday
- Wednesday
- Thursday

Friday

Saturday

Sunday

I don't know

21. How is the Zone communicating the woredas/health facility PHEM officers in case of immediately reportable diseases?

- By e-mail
- By phone
- By fax
- Regular weekly report
- Others-----

22. Did you send summary or short report to the administrative /program leaders or other responsible organs on planning, prevention and control activities addressing important issues at community level that have arisen through the surveillance system? Yes/No

23. If answer for Q 22 is yes to whom did you send? _____

24. If you faced any problems on communicating and reporting, list them _____

IV. How do you manage the problem you faced?

Data analysis

1. Have you trained on surveillance system? Yes/ No

2. If answer for Q1 is yes a) when _____ b) Topic _____
c) For how long _____
3. Did you give any onsite training / orientation about surveillance system for the woredas or health facility PHEM focal persons? Yes/No (if yes observe any documents)
4. How many woredas have permanently assigned surveillance officer or focal person? ____
5. How many of them trained on surveillance and epidemic management? _____
6. If Q #4 is no, how surveillance activates were done at woreda level? _____
7. Was data compiled and registered? Yes/ No (if yes observe documents)
8. Did you have computer on your department (PHEM unit)? Yes/ No
9. What is the data entry and compilation instrument?
A) Manual
B) Computer
C) Other _____
10. Did you have computer skill on A) Ms word B) Ms excel C) MS power point D) Epi-info
11. Did you analyze data of the surveillance system (cased based, routine, outbreak)? Yes/ No
12. If answer for Q 11 is yes, observe whether or not data is analyzed by time, place and person
13. If you analyze surveillance data how frequently? A) weekly B) every two week C) Monthly D) quarterly E) every 6 month F) annually G) No regular time
14. Did you perform trend analysis for priority diseases? Yes/ No
15. If yes for Q #10, observe and list the diseases which has line graph _____
16. Did you have denominators for data analysis? A) T. population B) male C) female D) U5 E) pop. By woreda E) hard to reach area pop.
17. Did you notify the results of your analysis to the higher level PHEM? Yes/ No
18. Did you notify the results of your analysis to the lower level PHEM? Yes/ No
19. If answer for Q #18 is No, what is the reason?
 Lack of knowledge
 Shortage of time
 Less attention to data analysis

- Shortage of materials
- Analysis is not familiar
- Negligence
- Other-----

V. Outbreak Investigation

1. How many outbreaks were occurred in 2008 EFY? _____
2. How many of them were investigated _____ list the diseases _____
3. Did you have outbreak investigation check list? Yes/No
4. If the answer no for Q #3, how did you know possible factors for the outbreak?

5. Where was laboratory confirmation of cases done?
 - Regional laboratory
 - Hospital
 - EHNRI
 - Health center
 - Contracted private laboratory
 - Other-----
6. Who was responsible to investigate an outbreak? rapid response team HEW staffs of woredas health office experts organized randomly health facility staffs
 other _____
7. Fill the table below for question #2

| S.N ^o | Name of outbreak | Place(Kebele /woreda | N ^o of cases | | | N ^o of deaths | | | Start date of the outbreak | Investigation date | Remark |
|------------------|------------------|----------------------|-------------------------|---|----|--------------------------|---|----|----------------------------|--------------------|--------|
| | | | M | F | U5 | M | F | U5 | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |

8. Had you faced any challenge in outbreak investigation in 2008 EFY? Yes/No
9. If answer for Q 8 is yes, a) list the challenges _____
 b) List the alternatives that you take to tackle the challenges. _____

VI. Epidemic preparedness(relevant for epidemic prone diseases)

1. Did you have plan for epidemic response and preparedness? Yes/No (if yes observe)
2. Was there an emergency stock of drugs and supplies at all times in the past 1 year (2008)?
 Yes/ No (if yes observe any document for evidence)
3. If answer for Q2 is No, how did you control epidemics? -----
4. Had you experienced shortage of drugs, vaccines and supplies in 2008 EFY? Yes/No
5. Was an epidemic management committee established at zonal level? Yes/No
6. Did the epidemic management committee have regularly scheduled meeting time?
 Yes/No(if yes observe minute book)
7. How many woredas are established epidemic management committee and meet regularly? ____
8. Was Rapid response team established at zonal level? Yes/No
9. Did the Rapid response team have regularly scheduled meeting time during epidemics?
 Yes/No (observe minute book or other document)
10. How many woredas have established Rapid Response Team? _____
11. Did you have case management protocol for epidemic prone diseases? Yes/No/Not
 applicable (check)
12. Do have multi sectorial emergency preparedness and response task force committee? Yes/
 No/ Not applicable
13. In what frequency did the task force meet during outbreaks? _____
14. Were partners working together with your office on emergencies ?Yes/No
15. If answer for Q 14 is yes, what type of supports did they give to your office? _____
16. Was there a budget for epidemic response in the last year (2008)? Yes/No
17. Had you a car assigned for emergencies (PHEM)?Yes /No/Not functional
18. If answer for Q 17 is NO, how did you address emergencies? _____
19. Had you faced any Challenges on epidemic response and preparedness in 2008 EFY
 ?Yes/No
20. If answer for Q 19 is yes, a) List the challenges _____

b) What measures did you take to tackle the challenges? _____

VII. Response to epidemics

- 1) Did the zonal health office respond for epidemics within 48 hours of notification of most recently reported outbreaks? Yes /No (observe any documents)
- 2) Are epidemic management committees evaluating their epidemic preparedness and response activities during the past year (2008)? Yes/No (check written document)

VIII. Supervision and Feedback

1. Did you have supervision plan in 2008 EFY? Yes/No(check documents)
2. If answer for Q1 is No, how did you supervise? _____
3. If Q #1 is yes, did you supervise the woredas and health facilities? Yes/No
4. If Q #3 is No, what is the reason? _____
5. If Q #3 is yes, how many times did you supervise each woredas and health facilities in 2008 EFY? Woreda----- Health facility-----
6. Had you received supervision from regional PHEM unit or FMOH in the last 11 months or 2008EFY? Yes /No
7. If Q #6 is yes, how many times in 2008 EFY? -----
8. Did you have regular supervision checklist? Yes/No
9. If Q #8 is No, how did you supervise the woredas and health facilities? _____
10. Did you send feedback of your supervision findings to the woredas and health facilities which commenting/indicating their strong and weak sides? Yes /No(check)
11. If Q #10 is No, why? _____
12. If answer for Q #10 is yes, for how many woredas and health facilities and sessions did you send a feedback in 2008 EFY? Woreda _____ health facilities _____
13. Had you received feedback from higher level supervisors in the last 11 months or 2008EFY? Yes/No
14. If Q #13 is yes, how many feedbacks did you received in last 11 months or 2008 EFY? _____
15. Did you conduct active case search for health facilities in last 11 months or 2008EFY? Yes/No, if yes, how many times and for how many woredas and health facilities? _____ did woreda PHEM officers also conducted? Yes/ No (observe the document)
16. What did you get from active case search _____

17. Had you faced any challenge on supervision and feedback in the last 11 months? Yes / No

If answer for Q #15 is yes, a) list the challenges _____ b) List the measures that you take to tackle the challenges _____

IX. Resources

Percent of sites that have:

26. Data management

Computer

Printer

Photocopier

Data manager

Statistical package

27. Communications

Telephone service Fax Radio call Satellite phone

Budget line _____

28. Logistics _____

IX. Surveillance

29. Do you have a computerized surveillance network at this level? Yes/No/Not applicable

Budget for surveillance

30. Is there a budget line for surveillance in the zonal Health office budget? Yes/No Not applicable

31. *If yes*, what is the proportion: %

32. How could surveillance be improved? _____

Questionnaire for Attributes and level of Usefulness:

1. Total population under surveillance _____ 2016/2008

2. What is the incidence / Prevalence of 2016/2008 -----in your area/region

- Malaria _____ laboratory done _____ cases P.F _____ P.V _____ Deaths _____
- measles _____ cases _____ Deaths _____
- Pandemic influenza _____ cases _____ Deaths _____

I. Level of Usefulness of the Surveillance System for these selected priority diseases

Does the surveillance system help?

1. To detect outbreaks of priority diseases early on time to permit accurate diagnosis?
Yes/ No
2. To estimate the magnitude of morbidity and mortality related to these diseases, including identification of factors associated with these diseases? Yes/ No
3. Permit assessment of the effect of prevention and control programs? Yes/ No

Observe (confirmation):

1. interventions and diseases trends analyzed ---Available //Not available

II. Describe Each System Attributes:

1. **Simplicity:**
2. Is the case definition of the priority diseases (malaria, measles, pandemic influenza) easy for case detection by all level health professionals? Yes/ No
3. The surveillance system allows all levels of professionals to fill data? Yes/No
4. Does the surveillance system help to record and report data on time?
5. Does the surveillance system (Reporting format) have necessary information for investigation? Yes/No
6. How long it takes to fill the format? a, <5 minute b, 10-15 minutes c, >15 minutes
7. How long does it take to have laboratory confirmation of selected diseases----

Flexibility:

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? Yes/ No
2. Do you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? Yes /No

Comment: _____

3. Is the system easy to add new variables? Yes /No
4. Is the surveillance system easy to integrate with other systems? Yes /No
5. Is the surveillance system easy to add new disease on report? Yes /No
6. Is the system easy to add new information technology? Yes /No

Acceptability:

- 1) Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes/No
- 2) If yes, how many are active participants (of the expected including all private clinics)?
 ___/___
- 3) If No for Q #1, what is the reason for their poor participation in the surveillance activity?
 - A. Lack of understanding of the relevance of the data to be collected
 - B. No feedback / or recognition given by the higher bodies for their contribution;
 I.e. no dissemination of the analysis data back to reporting facilities
 - C. Reporting formats are difficult to understand
 - D. Report formats are time consuming
 - E. Other: _____
 - F. Were all participants using the standard case definition to identify cases? Yes/ No
 - G. If yes, What is your evidence _____
 - H. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? Yes/ No (if yes observe the documents)
 - I. Were all the health professionals aware about the surveillance system? Yes/No (if yes how they awared)

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

1. Are the reporting site / data collectors trained/ supervised regularly? Yes/No
2. **Observe:** Review the last months report of these diseases
 - a) Average number of *unknown or blank responses* to variables in each of the reported forms _____
 - b) Percent of reports which are complete(that is with no blank or unknown responses) from the total reports _____
3. Are all woredas reporting (including late report)? Yes No
4. Percent of woredas that send report of each week the last 11 months in 2008 EFY. -----
5. Are all hospitals reporting? Yes No
6. Percent of hospitals that send report of each week the last 11months in 2008 EFY. -----

Total weekly reports received from woredas/Hospitals (including late reports, from July 2015-may, 2016)

| WHO epid. wk | N ^o of woredas expected to report | N ^o of woredas that report (including late report) | N ^o of Hospitals expected to report | N ^o of hospitals that report (including late reports) | WHO epid. wk | N ^o of woredas expected to report | N ^o of woredas that report (including late report) | N ^o of Hospitals expected to report | N ^o of hospitals that report (including late reports) |
|--------------|--|---|--|--|--------------|--|---|--|--|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Representativeness:

7. What is the health service coverage of the district/ zone/ region? _____%
8. What is the health service utilization of zone? _____%
9. Do you think, the populations under surveillance have good health seeking behavior for these diseases? Yes / No
10. Was the surveillance system enabled to follow the health and health related events in the whole community? Yes /No
11. If answer for Q 12 is no,who do you think is well benefited by the surveillance system?
 The urban the rural both
12. If yes for Q 12, do you think that rural and urban communities are equally benefited in surveillance system? Yes/ No , if no why _____
13. Are all the Socio demographic variables included in the surveillance reporting format?
Yes /No
14. If the answer for Q 7 is No, which a) Sex----- b) age group-----
C) ethnic group----- d) religion----- is less represented?

Stability:

1. Was any new restructuring affected the procedures and activities of the surveillance of these diseases? Yes/ No
2. Was there lack of resources that interrupt the surveillance system? Yes / No if yes what was it and how do you solve it _____
3. Was there any time /condition in which the surveillance is not fully operating? Yes/ No
4. If the answer yes for Q #3 When/what is the condition that talks the system not to function properly? -----
5. Is there a surveillance officer or focal person (PHEM unit)? Yes/No Number _____

Timeliness:

1. Are all woredas /health facilities reporting on time? Yes No
2. Percent of woredas that report on time. -----
3. Are all Hospitals reporting on time? Yes No
4. Percent of hospitals that report on time. -----

Weekly Zonal reports received on time in the last 11 months in 2008 EFY report (July 2015- May, 2016)

| WHO epid wk | N ^o of woredas expected to report | N ^o of woredas that report on time | N ^o of Hospitals expected to report | N ^o of Hospitals that report on time | WHO epid wk | N ^o of woredas expected to report | N ^o of woredas that report on time | N ^o of Hospitals expected to report | N ^o of Hospitals that report on time |
|-------------|--|---|--|---|-------------|--|---|--|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

How do you work with other departments and other sectors? _____

II. DISTRICT (INTERMEDIATE LEVEL) QUESTIONNAIRE

Region _____ **Zone** _____

Woreda _____ **Name of respondent** _____

Tele _____ Date _____

General

X. Availability of a National Surveillance Manual

1. Is there a national PHEM manual/ guideline for surveillance system?
Yes /No/ Not applicable / Unknown
2. *If yes*, describe (last update, diseases included, case definitions, surveillance and control, integrated or different for each disease): _____
3. What are the objectives of surveillance? _____
4. What are the strengths of your surveillance system? _____
5. What are the weaknesses of your surveillance system? _____

XI. Case Detection and Registration

1. Do you have standard case definitions for the Country's priority diseases like SAM, pandemic influenza, malaria, and measles.....?
Yes / No / Unknown / Not applicable
2. If the answer is yes for Q #1, observe the presence of the standard case definition for each priority disease. Yes No
3. If answer for Q1 is No, for which disease(s) did you lack the case definition? _____

XII. Data reporting::

4. Are the Federal/ Regional health bureau responsible for providing surveillance forms to the health facilities? Yes No Unknown Not applicable
5. *If yes*, have you lacked appropriate surveillance forms at any time during the last 11 months? Yes No Unknown Not applicable
6. What are the reporting entities for the surveillance system?
 - a. Public health facilities
 - b. NGO health facilities
 - c. Military health facilities
 - d. Private health facilities
 - e. Others _____
7. Was there any report of the immediately reportable diseases in the past 1 month? Yes/ No
8. If yes, for Q 7, with in what time is the report received after detection of the diseases?

- a. Less than 1 hour
 - b. 2-24 hour
 - c. 1- 2 days
 - d. 3-7days After 1 week
9. Percent of health facilities that have means for reporting to next level by e-mail, telephone, fax or radio _____
10. How do you report weekly, monthly and other formations to higher level?
- a. Mail
 - b. Fax
 - c. Telephone
 - d. Radio
 - e. Electronic
 - f. Other
11. Did you have address of Zonal PHEM officers? Yes /No
12. How frequently are you communicating with the Zonal PHEM officers on emergencies and other daily activities?
- Daily
 - Weekly
 - Every 2 week
 - Monthly
 - Quarterly
 - Every 6 month
 - Yearly
13. Others-----Did you have address of HC/HP PHEM focal persons?
Yes /No
14. How frequently are you communicating with the HC/HP PHEM focal persons on emergencies and other daily activities?
- Daily
 - Weekly

- Every 2 week
- Monthly
- Quarterly
- Every 6 month
- Yearly
- Others-----

15. Did you have case based reporting formats for outbreaks ?Yes /No Not Applicable

16. Was there guide line for specimen collection, handling and transportation to the next level? Yes/No Not Applicable

17. Did you have line list for reporting outbreaks? Yes/No Not Applicable

18. Did you face shortage of surveillance reporting and recording formats? Yes/ No
If yes, which form _____

19. When are you expected to send weekly report to the Zonal PHEM unit?

- Monday Tuesday Wednesday Thursday Friday Saturday Sunday

I don't know

20. When are you expected to receive weekly report from HCs/HPs?

- Monday Tuesday Wednesday Thursday Friday Saturday Sunday

I don't know

21. How is the woreda communicating the HCs/HPs PHEM officers in case of immediately reportable diseases? by e-mail by phone by fax regular weekly report others

22. Did you send summary or short report to the administrative /program leaders or other responsible organs on planning, prevention and control activities addressing Important issues at community level that have arisen through the surveillance system? Yes /No

23. If answer for Q9 is yes to whom did you send? _____ If you faced any problems on communicating and reporting, list them_____

24. Mention the alternative solutions that you take to tackle the problems you listed on the above? _____

25. Do you have assigned surveillance officer for PHEM activities and working on? Yes /No

- If no, who is responsible for PHEM activities? _____
26. If yes for Q 27, did he train on surveillance system? Yes No
27. If answer for Q 27 is yes a) when----- b) Topic-----c) For how long? -----
28. Did you conduct any onsite training / orientation about surveillance system for the HC and HP PHEM focal persons? yes/No
29. Was data compiled? Yes /No
30. Did you have computer on your office? Yes/No
31. Did you have computer on your department (PHEM unit)? Yes /No
32. What is the data entry and compilation instrument? Manual Computer other-----
33. Did you have computer skill on MS word MS excel MS power point Epi-info
34. Did you analyze the data collected from surveillance system? Yes /No
35. If answer for Q 35 is yes, did you described data by, time place person
36. If yes for Q 36, for which disease _____
37. Did you have denominators for data analysis? total population male female under five
38. Please indicate the frequency of your data analysis.
- Weekly
 - Every two week
 - Monthly
 - Quarterly
 - Every 6 month
 - Annually
 - No regular time
39. Did you notify the results of your analysis to the higher level PHEM? Yes/No
40. Did you notify the results of your analysis to the lower level PHEM? Yes/No
41. If answer for Q 38 is No, what is the reason?
- Lack of knowledge
 - Shortage of time
 - Less attention

- Shortage of materials
- Analysis is not familiar
- Negligence

42. Other-----How can report system be improved?

43. Do you have an action threshold for any of the country priority diseases?

Yes No I don't know

44. *If yes*, what is it? _____ cases _____% increase _____ rate

(Ask for 2 priority diseases)_ _____

I. Epidemic preparedness

45. Did you have plan for epidemic response and preparedness? Yes/No

46. Did you have emergency stocks of drugs and supplies? Yes/No

47. If answer for Q 47 is No, how did you control epidemics? _____

48. Had you experienced shortage of drugs, vaccines and supplies in last 11 months in 2008 EFY? Yes/ No

49. Was woreda epidemic management committee established? Yes /No

50. Did the epidemic management committee have regularly scheduled meeting time?
Yes/No

51. Was Woreda Rapid response team established? Yes /No

52. Did the Rapid response team have regularly scheduled meeting time during epidemics?
Yes /No

53. Did you have case management protocol for epidemic prone diseases? Yes /No

54. Did your PHEM have multi sectorial emergency preparedness and response task force committee? Yes /No

55. In what frequency did the task force meet during outbreaks? _____

56. Were partners working together with your office on emergencies? Yes /No

57. If answer for Q 57 is yes, what type of supports did they give to your office? _____

58. Was there a budget for epidemic response? Yes /No

59. Had you a car assigned for emergencies (PHEM)? Yes /No Not functional
60. If answer for Q 60 is NO, how did you address emergencies? _____
61. Had you faced any Challenges on epidemic response and preparedness in the last 12 months in 2008 EFY? Yes No
62. If answer for Q62 is yes, a) list the challenges _____
 b) What measures did you take to tackle the challenges? _____

II. Outbreak investigation

63. Had you investigated any outbreak in the last 12 months in 2008 EFY? Yes/No
64. Did you have outbreak investigation check list? Yes / No
65. If answer for Q64 is No, how did you know possible factors for the outbreak? -----
66. Where was laboratory confirmation of cases done?
 Regional laboratory
 Hospital
 EPHI
 Health center
 Contracted private laboratory
 Other-----
67. Who was responsible to investigate an outbreak?
 Rapid response team
 HEWs
 Staffs of woreda H.O
 Experts organized randomly
 Health facility staffs
 Other-----
68. If answer for Q 64 is yes how many out breaks did you investigated in 2008 EFY? _____

| S.No | Name of outbreak | Place(Kebele/woreda) | No of cases | | | No of deaths | | | Start date of the outbreak | Investigation date | Remark |
|------|------------------|----------------------|-------------|---|----|--------------|---|----|----------------------------|--------------------|--------|
| | | | M | F | U5 | M | F | U5 | | | |
| 1 | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|--|--|
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |

69. Had you faced any challenge in outbreak investigation in the last 12 months in 2008 EFY? Yes/ No

70. If answer for Q70 is yes, a) list the challenges _____
 b) List the alternatives that you take to tackle the challenges. _____

III. Responses

71. Has the district implemented prevention and control measures based on local data for at least one reportable disease or syndrome?
 Yes No Unknown Not applicable

72. Does the district responded within 48 hours of notification of most recently reported outbreak (from written reports)
 Yes No unknown Not applicable

73. Does the district achieved an acceptable case fatality rate for most recent outbreak (Observe from outbreak report)
 Yes No Unknown Not applicable

74. Has epidemic management committee evaluated their preparedness and response activities during the past year? (observe written report to confirm)
 Yes No Unknown Not applicable

IV. Supervision and Feedback

75. Did you have supervision plan in 2008 EFY? Yes/ No

76. If answer for Q 76 is No, how did you supervise? If answer for Q 76 is yes, did you supervise the health centers (HCS) and health posts (HPs) according to your plan in 2008 EFY? Yes/ No

77. If answer for Q 78 is No, what is the reason? _____

78. If answer for Q 78 is yes, how many times did you supervise each health center (HC) and health post (HP) in 2008 EFY? Health center _____ health post _____

79. Had you reviewed about surveillance practice by higher level supervision? Yes /No

80. Did you have regular supervision checklist? Yes/ No

81. If answer for Q 82 is No, how did you supervise the health centers and health posts?

82. Were you supervised by higher level officers the last 11 months in 2008 EFY? Yes/ No

83. If answer for Q 84 is yes how many times in 2008 EFY? _____

84. Did you send feedback of your supervision to the health centers (HCS) and health posts (HPs) commenting/indicating their strong and weak sides? Yes /No (observe)

85. If answer for Q 86 is No, why _____

86. If answer for Q 86 is yes, for how many HCs and HPs did you send a feedback in 2008 EFY? HC-----

87. Had you received feedback from higher level supervisors in 2008 EFY? Yes/ No

88. If answer for Q 89 is yes how many feedbacks did you received in 2008 EFY? _

89. Did you conduct active case search for health facilities? Yes/No if yes, how many times and for how many health facilities? _____

90. Had you faced any challenge on supervision and feedback in 2008 EFY? Yes/No

91. If answer for Q 92 is yes a) list the challenges _____

b) List the measures that you take to tackle the challenges _____

V. **Training**

92. Have you been trained in disease surveillance?

Yes No Unknown Not applicable

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

94. What percent of your personnel in the district have been trained in surveillance and epidemic management? _____

VI. **Resource**

95. **I. Percent of sites that have:**

Logistics

- a. Electricity
- b. Bicycles
- c. Motor cycles
- d. Vehicles

96. **Data management**

- a. Stationery b. Calculator c. Computer d. Printer
- b. Statistical package

97. Communication

98. Information education and communication materials

- a. Posters
- b. Megaphone
- c. Flipcharts or Image box
- d. VCR and TV set
- e. Generator
- f. Screen
- g. Projector (Movie)
- h. Other:

VII. Satisfaction with surveillance system

99. Are you satisfied with the surveillance system?

Yes/ No Unknown Not applicable

100. *If no*, how can the surveillance system be improved? _____

101. Opportunities for integration

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

Questionnaire for Attributes and level of Usefulness:

1. Total population under surveillance in 2008 EFY _____
2. What is the incidence / Prevalence of 2008 -in your area/region
 - Malaria _____ Laboratory done _____ cases P.F _____ P.v _____ Deaths _
 - measles _____ cases _____ Deaths _____
 - Pandemic influenza _____ cases _____ Deaths _____

III. Level of Usefulness of the Surveillance System for these selected priority diseases

Does the surveillance system help?

4. To detect outbreaks of priority diseases early on time to permit accurate diagnosis? Yes/ No

5. To estimate the magnitude of morbidity and mortality related to these diseases, including identification of factors associated with these diseases? Yes/ No
6. Permit assessment of the effect of prevention and control programs? Yes/ No

Observe (confirmation):

1. interventions and diseases trends analyzed ---Available //Not available

IV. Describe Each System Attributes:

Simplicity:

- A. Is the case definition of the priority diseases (malaria, measles, pandemic influenza....) easy for case detection by all level health professionals? Yes/ No
- B. The surveillance system allows all levels of professionals to fill data? Yes/No
- C. Does the surveillance system help to record and report data on time?
- D. Does the surveillance system (Reporting format) have necessary information for investigation? Yes/No
- E. How long it takes to fill the format? a, <5 minute b-10-15 minutes c- >15 minutes
- F. How long does it take to have laboratory confirmation of
 - A. measles
 - B. Pandemic influenza
 - C. Malaria
 1. Others
 2. Percent of reports which are complete(that is with no blank or unknown responses) from the total reports _____
 3. Are all health facilities reporting (including late report)? Yes No

Percent of health facilities that send report of each week in the last 11 months 2008 EFY

| WHO epid. Wk | N° of HCs expected to report | N° of HCs reported | N° of HPs expected to report | N° of HPs reported | WHO epid. wk | N° of HCs expected to report | N° of HCs reported | N° of HPs expected to report | N° of HPs reported |
|--------------|------------------------------|--------------------|------------------------------|--------------------|--------------|------------------------------|--------------------|------------------------------|--------------------|
| | | | | | | | | | |
| | | | | | | | | | |

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

A. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? Yes/ No (if yes observe the documents)

B. Were all the health professionals aware about the surveillance system? Yes/No (if yes how they awared)

Representativeness:

- 1) What is the health service coverage of the district? _____%
- 2) What is the health service utilization of the district? _____%
- 3) Do you think, the populations under surveillance have good health seeking behavior for these diseases? Yes / No
- 4) Was the surveillance system enabled to follow the health and health related events in the whole community? Yes /No
- 5) If answer for Q 13 is no, who do you think is well benefited by the surveillance system? The urban the rural both
- 6) If yes for Q 13, do you think that rural and urban communities are equally benefited in surveillance system? Yes/ No , if no why _____
- 7) Are all the Socio demographic variables included in the surveillance reporting format? Yes /No
- 8) If the answer for Q 6 is No, which a) Sex----- b) age group----- C) ethnic group----- d) religion----- is less represented?

Timeliness:

1. Are all health facilities reporting on time? Yes No
2. Percent of health facilities that report on time. -----

Weekly health facilities reports received on time in the last 12 months in 2008 EFY

| WHO epid wk | N ^o of HCS expected to report | N ^o of HCs that report on time | N ^o of HPs expected to report | N ^o of HPs that report on time | WHO epid wk | N ^o of HCS expected to report | N ^o of HCs that report on time | N ^o of HPs expected to report | N ^o of HPs that report on time |
|-------------|--|---|--|---|-------------|--|---|--|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Stability:

3. Was any new restructuring affected the procedures and activities of the surveillance of these diseases? Yes/ No
4. Was there lack of resources that interrupt the surveillance system? Yes / No if yes what was it and how do you solve it _____
5. Was there any time /condition in which the surveillance is not fully operating? Yes/ No
6. If the answer yes for Q #5 When/what is the condition that talks the system not to function properly? -----
7. How did you work with other departments and other sectors? _____

III. HEALTH CENTER QUESTIONER

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

Name of H.C _____ **Name of respondent** _____

Tele _____ **Date** _____

General

Catchment population _____ u5 _____ # of Kebeles/H.Ps _____ / _____

1. Is there a national PHEM manual for surveillance at this site?

Observe national surveillance manual:

Yes No Unknown Not applicable

2. What are the objectives of surveillance? _____
3. What are the strengths of your surveillance system? _____
4. What are the weaknesses of your surveillance system? _____

I. Case detection and registration

5. Observe the existence of a clinical register
Yes / No Unknown Not applicable
6. Observe the correct filling of the clinical register during the previous 30 days
Yes No Unknown Not applicable
7. Do you have a standard case definition for: (each priority disease) like avian influenza, measles, malaria, dysentery...?
Yes/No Unknown Not applicable
8. Observe the standard case definition for:(each priority disease)
Yes / No Unknown Not applicable
9. Observe the respondent correctly diagnosing one of the country's priority diseases using a standard case definition
Yes/ No Unknown Not applicable
(Select one of the priority diseases in the facility's clinical registers and ask how they diagnosed it — interviewer should have the standard case definition from MOH)

II. Case confirmation

10. Are you able to collect sputum Y N U N/A
Stool Y N U N/A
Blood Y N U N/A
CSF at this facility? Y N U N/A
11. Observe the presence of materials required to collect
Stool Y N U N/A
Blood/serum Y N U N/A
CSF Y N U N/A

12. Do you have the capacity to handle sputum, stool, blood/serum and CSF until shipment at this facility ?Yes No Unknown Not applicable
13. Observe presence of functional cold chain at health facility
Yes No Unknown Not applicable
14. Observe presence of transport media for stool at health facility
Yes No Unknown Not applicable
15. Observe presence of packing materials for shipment of specimens at health facility
Yes No Unknown Not applicable

III. Data reporting

16. Which communication material did you have?
- E-mail
 - Wired phone
 - Mobile
 - Radio
 - Fax
17. Other-----Did you have address of Zonal/woreda PHEM officers? Yes No
18. How frequently are you communicating with the Zonal/woreda PHEM officers on emergencies and other daily activities?
- Daily
 - Weekly
 - Every 2 week
 - Monthly
 - Quarterly
 - Every 6 month
 - Yearly
19. Others-----When are you expected to send weekly report to the Zonal/woreda PHEM unit?
- Monday
 - Tuesday

- Wednesday
- Thursday
- Friday
- Saturday
- Sunday
- I don't know exactly

20. How is your facility communicating the Zonal/woreda PHEM officers in case of immediately reportable diseases?

- By e-mail
- By phone
- By fax
- Regular weekly report

21. Others----- Did you send summary or short report to the administrative /program leaders or other responsible organs on planning, prevention and control activities addressing Important issues at community level that have arisen through the surveillance system? Yes No

22. If answer for Q 18 is yes, to whom did you send? -----

23. If you faced any problems on communicating and reporting, list them-----

24. Mention the alternative solutions that you take to tackle the problems you above? -----

25. Have you lacked appropriate surveillance forms and records at any time during the last 11 months (rumor log book, epidemic reporting, weekly, case based, investigation...)

Yes No Unknown Not applicable

26. Observe 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 Y N U N/A
- b. **Obs** Malaria Y N U N/A
- c. **Obs** AFP (polio) Y N U N/A
- d. **Obs** Pandemic influenza Y N U N/A

27. **Percent of sites that reported each reporting period to the next higher level during the past 3 months**

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

Obs Weekly: /12 times the number of sites

Obs immediately: /-- times the number of sites

28. 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

29. How do you report to higher level?

- a. Mail
- b. Fax
- c. Telephone
- d. Radio
- e. Electronic
- f. Other

30. Strengthening reporting

How can reporting be improved? _____

IV. Data analysis

31. Is there assigned focal person for surveillance activities? Yes/ No

32. If no for Q 31 how do you do surveillance activities? _____

33. If yes for Q 31, did he trained on surveillance system? Yes/ No

34. If answer for Q33 is yes a) when-----? b) Topic-----?
c) For how long? -----

35. Was data compiled? Yes /No

36. Did you have computer on your office? Yes / No

37. Did you have computer on your department (PHEM unit)? Yes /No

38. What is the data entry and compilation instrument? Manual Computer
 other _____

39. Did you have computer skill on Ms word Ms excel MS power point Epi-info

40. Did you analyze data of the surveillance system? Yes /No

41. If answer for Q 40 is yes, did you describe data by time place person

42. Did you have denominators for data analysis? total population male female
U5

43. Please indicate the frequency of your data analysis.

- Weekly
- Every two week
- Monthly
- Quarterly
- Every 6 month
- Annually
- No regular time

44. Did you notify the results of your analysis to the higher level PHEM? Yes /No

45. If answer for Q 44 is No, what is the reason?

- Lack of knowledge
- Shortage of time
- Less attention given
- Shortage of materials
- Analysis is not familiar
- Negligence

Other-----

46. Did you perform trend analysis (Observe the presence of line graph of cases by time)
Yes No Unknown Not applicable

47. Do you have an action threshold for any of the Country priority diseases?
Yes No Unknown Not applicable

48. **If yes for Q 47**, what is it (Ask for at least 2 priority diseases)? _____cases ____ %
increase _____rate

V. **Epidemic preparedness**

49. Did you have plan for epidemic response and preparedness? Yes/ No

50. Did you have emergency stocks of drugs and supplies? Yes/ No

51. If answer for Q 50 is No, how did you control epidemics? _____

52. Had you experienced shortage of drugs, vaccines and supplies 2008 EFY? Yes No
I don't know

53. Did you establish epidemic management committee? Yes No Not Applicable
54. Did the epidemic management committee have regularly scheduled meeting time? Yes/ No
55. Did you establish Rapid response team? Yes No Not Applicable
56. Did the Rapid response team have regularly scheduled meeting time during epidemics?
Yes/No
57. Did you have case management protocol for epidemic prone diseases? Yes No
58. Was there a budget for epidemic response? Yes No
59. Any Challenges on epidemic response and preparedness in 2008 EFY? Yes / No
60. If answer for Q 59 is yes, a) list the challenges_____
- b) What measures did you take to tackle the challenges?_____

VI. Epidemic response

61. Is there any outbreak occurred in your area in 2008 EFY? Yes/ No how money _____
62. If yes for Q 61, how many of them were investigated in 2008 EFY? _____
63. Did you have outbreak investigation check list? Yes/ No
64. If answer for Q 63 is No, how did you know possible factors for the outbreak? -----
65. Where was laboratory confirmation of cases done?
- Regional laboratory
- Hospital
- EPHI
- Health center
- Contracted private laboratory
- Other-----
66. Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease?
- Yes No Unknown Not applicable
67. Did they achieved acceptable case fatality rates (e.g. 10% for Meningococcal, 1% for Cholera) during the most recent outbreak
- Observe that the health facility achieved an acceptable case fatality rate for most recent outbreak Yes No Unknown Not applicable

VII. Supervision and Feedback

68. Were you supervised by higher level (regional, zonal or woreda) officers in 2008 EFY?
Yes /No(observe at least one feedback report)
69. If answer for Q 68 is yes, how many times in 2008 EFY? -----
70. Had you received feedback from higher level supervisors in 2008 EFY? Yes /No
71. If answer for Q 70 is yes, how many feedbacks did you received in 2008 EFY? -----
72. Had you faced any challenge on supervision and feedback in 2008 EFY? Yes /No
73. If answer for Q 72 is yes a) list the challenges. -----
b) list the measures that you take to tackle the challenges.-----
- How many meetings has this health facility conducted with the community members in the past 11 months? _____
- Observe the minutes or report of at least 1 meeting between the health facility team and the community members within the 11 months
- Yes No Unknown Not applicable

VIII. Resources

74. Logistics

- a) Electricity
- a) Bicycles
- b) Motor cycles
- c) Vehicles

75. Data management

- a) Stationery
- b) Calculator
- c) Computer
- d) Software
- e) Printer

76. Communication

- A. Tel. service
- B. Fax
- C. Computer with modem
- D. Radio call

77. Information education and communication materials

- A. Posters
- B. Megaphone
- C. Flipcharts or Image box
- D. VCR and TV set
- E. Generator
- F. Screen
- G. Projector (Movie)
- H. Other:

Protection materials (list) _____

Questionnaire for Attributes and level of Usefulness:

78. Total population under surveillance _____ 2008

79. What is the incidence / Prevalence of 2008 -in your area/region

- Malaria _____ Total laboratory done ___cases P.F _____P.V____ Deaths _____
- measles _____cases _____Deaths _____
- pandemic influenza _____cases _____Deaths _____

Level of Usefulness of the Surveillance System for these selected priority diseases

Does the surveillance system help?

80. To detect outbreaks of priority diseases early on time to permit accurate diagnosis? Yes/ No

81. To estimate the magnitude of morbidity and mortality related to these diseases, including identification of factors associated with these diseases? Yes/ No

82. Permit assessment of the effect of prevention and control programs? Yes/ No

Describe Each System Attributes:

Simplicity:

- 1) Is the case definition of the priority diseases (malaria, Dysentery, Pandemic influenza....) easy for case detection by all level health professionals? Yes/ No
- 2) The surveillance system allows all levels of professionals to fill data? Yes/No
- 3) Does the surveillance system help to record and report data on time?

- 4) Does the surveillance system (Reporting format) have necessary information for investigation? Yes/No
- 5) How long it takes to fill the format? a, <5 minute b-10-15 minutes c- >15 minutes
- 6) How long does it take to have laboratory confirmation of selected diseases ?

Flexibility:

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? Yes/ No
2. Do you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? Yes /No

Comment: _____

Is the system easy to add new variables? Yes /No

3. Is the surveillance system easy to integrate with other systems? Yes /No
4. Is the surveillance system easy to add new disease on report? Yes /No
5. Is the system easy to add new information technology? Yes /No

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

- 1) Are the reporting site / data collectors trained/ supervised regularly? Yes/No
- 2) **Observe:** Review the last months report of these diseases
- 3) Average number of *unknown or blank responses* to variables in each of the reported forms

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

Acceptability:

1. Were all health workers using the standard case definition to identify cases? Yes/ No
2. If yes, What is your evidence _____
3. Were your health facilities sending your report using the current and appropriate surveillance reporting format? Yes/ No (if yes observe the documents)
4. Were all the health professionals aware about the surveillance system? Yes/No (if yes how they awared)

Representativeness:

- 1) What is the health service coverage of the catchment area? _____%
- 2) What is the health service utilization of the catchment area? _____%
- 3) Do you think, the populations under surveillance have good health seeking behavior for these diseases? Yes / No
- 4) Was the surveillance system enabled to follow the health and health related events in the whole community? Yes /No
- 5) If answer for Q 4 is no, who do you think is well benefited by the surveillance system?
 The urban the rural both
- 6) If yes for Q 4, do you think that rural and urban communities are equally benefited in surveillance system? Yes/ No , if no why _____
- 7) Are all the Socio demographic variables included in the surveillance reporting format? Yes /No
- 8) If the answer for Q 7 is No, which a) Sex----- b) age group-----
 C) ethnic group----- d) religion-----

Timeliness:

1. Are you sending report timely? Yes No (observe copy of reports)

Stability:

1. Was any new restructuring affected the procedures and activities of the surveillance of these diseases? Yes/ No
2. Was there lack of resources that interrupt the surveillance system? Yes / No if yes what was it and how do you solve it _____
3. Was there any time /condition in which the surveillance is not fully operating? Yes/ No
4. If the answer yes for Q #3 When/what is the condition that talks the system not to function properly? -----

5. Opportunities for integration

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

Health Post Level Questionnaire

Region _____

Respondent _____

Zone _____

Tele. _____

Woreda _____

Date _____

Health C. (cluster) _____

Name of health Post _____

A. General overview

1. What are the objectives of surveillance? _____
2. What are the strengths of your surveillance system? _____
3. What are the weaknesses of your surveillance system? _____

B. Communication and reporting assessment

1. Which communication material did you have?

E-mail

Wired phone

Mobile

Radio

Fax

2. Other-----Did you have address of woreda or H.C PHEM officers? Yes
/No

3. How frequently are you communicating with the woreda or H.C PHEM officers on
emergencies and other daily activities?

Daily

Weekly

Every 2 week

Quarterly

Every 6 month

Yearly

4. Others-----When are you expected to send weekly report to the woreda or H.C
PHEM unit?

Monday

Tuesday

Wednesday

Thursday

- Friday
- Saturday
- Sunday
- I don't know

5. How are you communicating the woreda or H.C PHEM officers in case of immediately reportable diseases?

By e-mail

By phone

By fax

Regular weekly

Others-----

6. If you faced any problems on communicating and reporting, list them-----

Mention the alternative solutions that you take to tackle the problems you above? -----

C. Assessment of availability of Surveillance Documentation, Registers, and Forms

1. Was there national manual for surveillance? Yes No Not Applicable

2. Did you have standard case definition for all country priority diseases? Yes/ No

3. Was the case definition posted? Yes No

4. If answer for Q2 is No, for which disease(s) did you lack the case definition? -----

Did you have case reporting formats for out breaks? Yes No Not Applicable

5. Was there guide line for specimen collection, handling and transportation to the next level?

Yes No Not Applicable

6. Had you line list format for reporting outbreaks? Yes No Not Applicable

7. Was there a clinical register/logbook in your health post? Yes No Not

Applicable

8. Did you face shortage of surveillance reporting and recording formats? Yes/ No

9. If answer for Q9 is yes, which form? -----

D. Data analysis and training assessment

1. Had you trained on surveillance system? Yes/ No

2. If answer for Q1 is yes a) when-----? b) Topic-----? c) For how long? -----

3. Did you analyze data? Yes No

E. Outbreak investigation and case confirmation assessment

1. Was there any outbreak in your Kebele in 2008 EFY? Yes/ No

2. If your answer for Q1 is yes, what did you do?

- Reported to the woreda PHEM
- Reported to administrative leaders
- We investigated

Cases referred to health center/hospital

Other-----

3. Where was laboratory confirmation of cases done? _____

4. Who was responsible to investigate an outbreak? _____

5. If answer for Q1 is yes how many out breaks were occurred in your Kebele in 2008 EFY?
Fill the table below

6. Had you faced any challenge in outbreak investigation in 2008 EFY? Yes/ No

7. If answer for Q 6 is yes, a) list the challenges b) list the alternatives that you take to tackle the challenges.-----

F. Supervision and feedback

1. Were you supervised by higher level (regional) officers in 2008 EFY? Yes No

2. If answer for Q1 is yes how many times in 2008 EFY? -----

3. Had you received feedback from higher level supervisors in 2008 EFY? Yes No

If answer for Q 3 is yes how many feedbacks did you received in 2008 EFY? -----

Annex 3 : Data Collection Tools for Health Profile of Ebinat Woreda/District 2014/2015 (2007EFY)

Historical Aspects of the area (if available)

The name how and why_____

How was the **woreda** formed_____

Any other historical aspect_____

2. Geography and Climate

- Distance from Addis Ababa and Bahir Dar respectively _____, _____
- Altitude _____ Latitude _____
- Average Annual rain fall _____ Average Annual temp _____
- surface area sq.k.m _____ (%) from the zone _____

3. Demographic information

- Total Population size _____ male _____ female _____
- Urban _____ male-----female _____
- Rural _____ male _____ female _____
- Sex ratio _____
- Population under 1yrs _____ Population under five yrs _____
- Population < 15 years _____ Population >64 years _____
- Women 15_49 years of age _____ Pregnant women _____
- Average household size ----- Annual population growth rate (%)
- Population pyramid by age and sex ----- Dependency ratio _____
- Population size by religion (Proportion)
- Orthodox _____ Protestant _____ Muslim _____ Others _____

Estimated Population size by Kebele

| Serial No | Kebele name | population size | | |
|-----------|-------------|-----------------|--------|-------|
| | | Male | Female | Total |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| total | | | | |

4. Administrative setup

Total no. of kebeles: _____ rural _____ Urban _____

Boundaries _____

5. Health status

5.1. Number of health facilities

| Type of Health facility | Number | Ratio | # of facilities Under construction |
|-------------------------|--------|-------|---------------------------------------|
| Hospital | | | |
| Health Center | | | |
| Health post | | | |
| Pharmacy | | | |
| Drug store | | | |
| Diagnostic laboratories | | | |
| Private clinic | | | |

5.2. Man power of Woreda health office and health facility in 2014/15

| Type | Number | Ratio |
|------------------------------------|--------|-------|
| Physician | | |
| Health officers | | |
| Laboratory/Technician/Technologist | | |
| Pharmacy/technician/Pharmacist | | |
| Nurses (diploma + degree) | | |
| Mid wife (diploma + degree) | | |
| Sanitarian/environmental health/ | | |
| HEW | | |

| | | |
|-----------------------------------|--|--|
| Administrative staff | | |
| Others | | |
| Total man power at district level | | |

5.3. Top causes of morbidity and mortality

5.3.1. Top ten leading causes of OPD visit (morbidity) in Ebinat woreda, 2014/15

| Serial no. | Adult | | | Pediatics | | |
|------------|--|--------|-----|-----------|--------|-----|
| | Diagnosis | Number | (%) | Diagnosis | Number | (%) |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| | Total of Leading causes of Outpatients | | | | | |
| | Total of all outpatient cases | | | | | |

5.3.2. Top ten causes of admissions, at Ebinat woreda, 2014/2015

| Serial no. | Adult | | | Pediatics | | |
|------------|------------------------|--------|-----|-----------|--------|-----|
| | Diagnosis | Number | (%) | Diagnosis | Number | (%) |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| | Total of leading cause | | | | | |
| | Total admitted | | | | | |

5.3.3. Top ten causes of deaths (mortality), at Ebinat woreda, 2014/2015

| Serial no. | Adult | | | Pediatics | | |
|------------|------------------------|--------|-----|-----------|--------|-----|
| | Diagnosis | Number | (%) | Diagnosis | Number | (%) |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| | Total of leading cause | | | | | |
| | Total death | | | | | |

Vital statistics

CBR _____ CDR _____ NMR _____ PNMR _____

IMR _____ MMR _____ GR _____

Marital status: single _____ Married _____ Divorced _____ widow

5.3.4 Environmental sanitation and availability of safe drinking Water, at Ebiinat woreda in 2014/15

| Description | Plan | Achievement | |
|--|------|-------------|-----|
| | | Number | (%) |
| Households who have Latrine | | | |
| HH Who uses Latrine | | | |
| ODF kebeles | | | |
| Safe Water Supply coverage | | | |
| No. of kebeles accessed to Safe Water Supply | | | |

5.4. Maternal health service delivery in Ebinat woreda, 2014/2015

| Description | 2005E.C Plan and achievement | | 2006E.C Plan and achievement | | 2007E.C Plan and achievement | |
|---------------------|------------------------------|------------|------------------------------|------------|------------------------------|------------|
| | Plan | Number (%) | Plan | Number (%) | Plan | Number (%) |
| ANC 1 st | | | | | | |

| | | | | | | |
|----------------------------|--|--|--|--|--|--|
| ANC 4 th | | | | | | |
| Skilled attendant delivery | | | | | | |
| Delivery by HEW | | | | | | |
| HDF kebeles | | | | | | |
| PNC coverage | | | | | | |
| PMTCT coverage | | | | | | |
| Prophylaxis received | | | | | | |
| Long family planning | | | | | | |
| Short family planning | | | | | | |
| TT2+ pregnant | | | | | | |
| TT2+ non pregnant | | | | | | |

5.5. Child health service delivery, at Ebinat woreda, 2014/2015

| Description | 2005E.C Plan and achievement | | 2006E.C Plan and achievement | | 2007E.C Plan and achievement | |
|-----------------|------------------------------|------------|------------------------------|------------|------------------------------|------------|
| | Plan | Number (%) | Plan | Number (%) | Plan | Number (%) |
| BCG antigen | | | | | | |
| Measles antigen | | | | | | |
| Penta-2 | | | | | | |
| Penta-3 | | | | | | |
| Rota virus-1 | | | | | | |
| Rota virus-2 | | | | | | |
| Fully | | | | | | |

| | | | | | | |
|-----------------------------------|--|--|--|--|--|--|
| < 5yrs Pneumonia diseases treated | | | | | | |
| < 5yrs Diarrhea diseases treated | | | | | | |

5.6. Endemic Diseases at Ebinat woreda, 2014/2015

Malaria prevention and control program of **Town** in 2014/15

| Description | Number | Percent (%) From total popup |
|---|--------|---------------------------------|
| Number of Malarious kebeles/population/ | | |
| ITN distributed with in the last years | | |
| IRS in the last years | | |
| Total laboratory done | | |
| Slide positivity rate | | |
| Total no. of cases/yr. | | |
| Case fatality rate | | |
| Cases treated clinically | | |
| Confirmed malaria Cases Treated | | |

Was there problems of RDT or antimalarial drug Supplies during the last year: _____

5.7. Prevalence of TB/Leprosy in Ebinat woreda, 2014/2015

| Description | Plan | Number | Coverage (%) |
|-------------------|----------------|--------|--------------|
| Prevalence of TB | | | |
| Pulmonary TB | Smear positive | | |
| | Smear negative | | |
| Extra PTB | | | |
| TB detection rate | | | |
| TB cure rate | | | |

| | | | |
|--|--|--|--|
| TB Rx success rate | | | |
| TB defaulter rate | | | |
| Death on TB Rx | | | |
| Total TB patients screened for HIV HIV prevalence rate among TB cases | | | |
| MDR TB detection | | | |
| Prevalence of Leprosy | | | |

5.8. **HIV/AIDS control and prevention in Ebinat woreda, 2014/2015**

| Activities | Plan | | | Achievement | | | |
|-------------------------------|------|--------|-------|-------------|--------|-------|--------|
| | Male | Female | Total | Male | Female | Total | Remark |
| Total people screened for HIV | | | | | | | |
| VCT | | | | | | | |
| PICT | | | | | | | |
| PMTCT | | | | | | | |
| HIV prevalence | | | | | | | |
| Total PLWHIV | | | | | | | |
| Currently on ART | | | | | | | |
| Currently on Pre-ART | | | | | | | |
| Condom distribution | | | | | | | |
| STI cases screened for HIV | | | | | | | |
| STI cases positive for HIV | | | | | | | |

| | | | | | | | |
|------------------------|--|--|--|--|--|--|--|
| Community conversation | | | | | | | |
|------------------------|--|--|--|--|--|--|--|

Other public health emergency diseases

Measles cases _____AFP _____NNT _____ any Anthrax _____ dysentery _____

Typhoid _____ Rabies _____relapsing fever _____typhus _____ Others specify -----

5.9. Trachoma diseases in Ebinat woreda, in 2014/2015

| Activities | Plan | Achievement number | Achievement percent |
|-------------------------|------|--------------------|---------------------|
| Active trachoma treated | | | |
| TT surgery | | | |

6. Socio economic conditions at Ebinat woreda, 2014/2015

Education and school Health

| Type of School | Number of School (coverage) | Number of Teachers | School age | | Enrollment | | Gross Enrollment Ratio | |
|----------------|-----------------------------|--------------------|------------|---------|------------|---------|------------------------|---------|
| | | | Both sexes | Females | Both sexes | Females | Both sexes | Females |
| Pre-school | | | | | | | | |
| Primary | | | | | | | | |
| Secondary | | | | | | | | |
| Total | | | | | | | | |

School health activities:

schools with water supply _____ Schools with functional latrines _____

Schools with HIV/other Health clubs _____ Literacy ratio _____

Employment

Number of people employed _____ Number of people un employed _____

- Ratio of Employed to unemployed _____
- Income
- Yearly income per house hold _____ Average income per capita
- Total Land mass area by hectare _____ Fertile farm land by hectare _____
- Main source of income: Agriculture ____ Civil servant ____ others (specify) _____

Main crop/cereal production: _____, _____, _____

7. Communication and Utilities at Ebinat woreda, 2014/2015

- How many of the health facilities have access to transportation _____ (%)
- Telecommunication _____ (%)
- Electric power _____ (%)
- Water _____ %

8. Health sector expenditure and financing at Ebinat woreda, 2014/2015

| | |
|--------------------------------------|--|
| Source | |
| Total district budget | |
| Allocated to Health sector | |
| Total per capital Health Expenditure | |

9. Disaster situation at Ebinat woreda, 2014/2015

- was there any disaster (natural or manmade) in the **Woerda** in the last one year? YES (specify) _____ No _____
- Any recent disease outbreak/other public health emergency? Yes (specify) _____ No _____
- If yes cases _____ and deaths _____

10, Nutrition intervention at Ebinat woreda in 2014/15

10.1. CBN

| | | | |
|--------------|--|--|------------|
| Type of Food | | | Discharges |
|--------------|--|--|------------|

| intervention program | Site number | Total admitted | Cured (%) | Death (%) | Others (unknown, defaulter, nonresponse, Medical transfer) | Total |
|----------------------|-------------|----------------|-----------|-----------|--|-------|
| OTP sites | | | | | | |
| TFU (SC) | | | | | | |
| SFP | | | | | | |

10.2. CHD

| Activities | plan | Achievement In number | Achievement percent | Remark |
|------------|------|--------------------------|------------------------|--------|
| Vitamin A | | | | |
| Deworming | | | | |

11. What do you think the major Health problem/s of the **District**?

11.1. What do you think solutions of the addressed problems? _____

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

13. Problem identification and Priority Setting –set priority health problems based on the public health importance, magnitude, severity, community concern, feasibility etc.

14. What are the main zoonotic diseases in the district?

a. _____ b. _____ c. _____

Annex 4: Rapid Meher assessment 2016 - Health and Nutrition Sector: Region/Zone level Questionnaire

ACRONYMS

| | |
|-----|-----------------------|
| AWD | Acute watery Diarrhea |
| CHD | Community health day |

| | |
|---------|---------------------------------|
| Cm | Cent meter |
| CTC kit | Cholera treatment center kit |
| Dd | Due date |
| EC | Ethiopian calendar |
| EFY | Ethiopian fiscal year |
| GAM | Global acute malnutrition |
| GC | Gregorian calendar |
| HC | Health center |
| HEW | Health Extension worker |
| MAM | Moderate acute malnutrition |
| Mm | Month |
| MUAC | Mid upper arm circumference |
| NGO | Non-Governmental organization |
| OTP | Outpatient therapeutic program |
| PLW | Pregnant and lactating women |
| RDT | Rapid diagnostic test |
| RUSF, | Ready to use supplementary food |
| RUTF | Ready to Use therapeutic Food |
| SAM | Sever acute malnutrition |
| SC | Stabilization center |
| TSFP | Target supplementary program |
| Vit A | Vitamin A |

Rapid Meher assessment 2016, Health and Nutrition Sector: Region/Zone level

Questionnaire

Interviewer name _____

Institution: _____

Interview Date: (dd) ____/(mm)_____/2016_____

Region: _____

Zone: _____

Main contact at this location: Name: _____

Position: _____

Tel: _____

| SECTION I: SOCIO- DEMOGRAPHIC PROFILE | | | | |
|--|---|-----------------------------------|--------------------------------------|---|
| Population: Woreda total population | M:_____ F:_____ | Total:_____ | Under 5_____ | |
| | No. of women of reproductive age (age 15-49 yrs.) _____ | | | |
| | No. of pregnant women : _____ | | | |
| Special Population (if any) | Pastorals_____ | Refugees_____ | IDPs_____ | Migrant Workers_____ |
| Number of HCs_____ Number of HPs _____ Number of Mobile health and Nutrition teams _____ | | | | |
| Number of HEWs _____ | | | | |
| Water availability at health centers (HC) | No. of health centers _____ | No. of HC with water access _____ | No. of HC without water access _____ | |
| SECTION II: HEALTH PROFILE | | | | |
| 2.1. Coordination and management systems | | | | |
| Is there a PHEM Officer at Regional level? If yes how money _____ | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Does the RHB/Zone Health Office regularly report PHEM report as scheduled dates? Observe copies and comment _____ | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| 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 woreda level _____ | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Do the Woredas, health facilities and HEWs regularly report PHEM report as scheduled dates? Observe copies and comment _____ | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Are all relevant government, NGOs and UN agencies represented at Regional PHEM? | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there a multi sector health coordination forum? If yes how frequently meet? ----- | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there a Public Health Emergency preparedness and response plan? Does it include reproductive health? Yes <input type="checkbox"/> No <input type="checkbox"/> | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there accessible emergency response fund for PHEM at regional level? If yes how much allocated----- | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| 2.2. Mention anticipated epidemics (If yes please indicate Zone/Woreda at risk and risk population per anticipated risk: (Use the back side) _____, _____) | | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| 2.3. Public Health emergency Management | | | | |

| | |
|--|---|
| Is there a Public Health and Nutrition Emergency Preparedness and Response plan? | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| If yes, is the plan budgeted/ funded? | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there a trained staff on PHEM basic level (Regional/Zonal/Woreda/HFs) | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| If yes specify number of trained personnel per level: Region/Total: Female _____ Male _____, Zone: Female _____ Male _____, Woreda: Female _____ Male _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there a Regional/zonal trained Rapid Response team (RRT)? | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there a trained staff on Emergency nutrition management at all level? If yes specify the no. : Total ___ Male : ___ Female :- ___ | Yes <input type="checkbox"/> No <input type="checkbox"/> |

2.4. 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 | | | |
| | Doxycycline | | | |
| | 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 <input type="checkbox"/> | No <input type="checkbox"/> |
| | Presence of malaria breeding site | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | Interrupted or potentially interrupting rivers | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | Unprotected irrigation in the area | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | LLINs coverage <80 | No _____ % _____ | |
| | Indicate the coverage of IRS 2008 | No _____ % _____ | |
| | Was there any prevention and control activities | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | 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 <input type="checkbox"/> | No <input type="checkbox"/> |
| | Has vaccination been conducted in the past 3 years | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | 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 <input type="checkbox"/> No <input type="checkbox"/> |
| | What is the measles vaccination No and % coverage of 2008, less than one year No _____ Percentage of coverage _____ | |
| | Has SIA been conducted in 2008 EFY | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | 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 – May to October 2016

SAM Management

4.1 Facilities with SAM management in Region/Zone

| Month | Total Number of Hospitals | Total Number of Health centers | Total Number of Health posts | Number of SC. | Number of OTP. | Total Number of OTP/SC reported |
|-------|---------------------------|--------------------------------|------------------------------|---------------|----------------|---------------------------------|
| May | | | | | | |
| Jun | | | | | | |
| Jul | | | | | | |
| Aug | | | | | | |
| Sep | | | | | | |
| Oct | | | | | | |

4.2 Admission and performance of the therapeutic feeding programme for SAM management

| Month | Total SAM Cases | | % of SAM children cured | | % of SAM children defaulted | | % of SAM children died | | % of SAM children non-respondent | | % of SAM children other | |
|-------|-----------------|--------------|-------------------------|--------------|-----------------------------|--------------|------------------------|--------------|----------------------------------|--------------|-------------------------|--------------|
| | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. |
| May | | | | | | | | | | | | |
| Jun | | | | | | | | | | | | |
| Jul | | | | | | | | | | | | |
| Aug | | | | | | | | | | | | |
| | 2008 E.C. | 2009 E.C. | 2008 E.C. | 2009 E.C. | 2008 E.C. | 2009 E.C. | 2008 E.C. | 2009 E.C. | 2008 E.C. | 2009 E.C. | 2008 E.C. | 2009 E.C. |
| Sep | | | | | | | | | | | | |
| Oct | | | | | | | | | | | | |

4.3. Availability of therapeutic supplies

| | Yes | No |
|---|-----|----|
| Is there sufficient supplies for 3 months of : | | |
| RUTF | | |
| F100 | | |
| F75 | | |
| 2 nd 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 (2 nd generation) TSFP woreda? | | |
| Has the Woreda been supported by an NGO in the last 3 months? | | |

4.7. MAM admission

| Month | Priority 1 woreda | | Total MAM Cases | | Total Number of Food Distribution points in the woreda |
|-------|-------------------|-----------|-----------------|-----------|--|
| | Y/N | | | | |
| | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | |
| May | | | | | |
| Jun | | | | | |
| Jul | | | | | |
| Aug | | | | | |

| | | | | | |
|-----|-----------|-----------|-----------|-----------|--|
| | 2008 E.C. | 2009 E.C. | 2008 E.C. | 2009 E.C. | |
| Sep | | | | | |
| Oct | | | | | |

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 odema and MUAC <11 cm | | | # of children with no | % Proxy GAM for children | % Proxy SAM for children | |
|----------|-----------------------------|------------------------|------------------------|---|-------|-------|-----------------------|--------------------------|--------------------------|------|
| | | | | #SAM | | | | | | #MAM |
| | | | | MUAC <11 cm | odema | Total | | | | |
| May 2008 | | | | | | | | | | |
| Jun 2008 | | | | | | | | | | |
| Jul 2008 | | | | | | | | | | |
| Aug 2008 | | | | | | | | | | |
| Sep 2009 | | | | | | | | | | |
| Oct 2009 | | | | | | | | | | |

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 |
|----------|------------|-------------------|------------------------|------------------------------|---------------------|
| May 2008 | | | | | |
| Jun 2008 | | | | | |
| Jul 2008 | | | | | |
| Aug 2008 | | | | | |
| Sep 2009 | | | | | |
| Oct 2009 | | | | | |

* Below 21.0 cm in Tigray up to Aug

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

5.1. Was there flood disaster in the last 6 months in the **Region /Zone**? Yes No

5.2. If yes, How many woredas affected _____,

5.3. Mention the names of woredas affected with flood _____, _____,

5.4. If yes, No of population affected _____

5.5. Human Death due to flooding _____ Yes No ,

5.6. If yes how many in number _____

5.7. Are there displaced people due to flooding? Yes No

5.8. If Yes, how many _____ PLW

5.9. Children <5 yrs _____ <2 yrs) _____ <6months _____ 6-23 months _____

5.10. 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) _____ |
| Type of outbreak _____ Number of cases _____ Deaths _____ (specify the time period) _____ |
| Type of outbreak _____ Number of cases _____ Deaths _____ (specify the time period) _____ |

Any comment _____

Summary: Requirements/Meher assessment needs 2016

| Region/Zone | Type of Health and nutrition Emergency | Total estimated Beneficiaries ¹ | Required finance |
|-------------|--|--|------------------|
| | | | |
| | | | |
| | | | |

| Region | Zone | Woreda at Risk | Type of Risk | At risk Population |
|--------|------|----------------|--------------|--------------------|
| | | | | |
| | | | | |
| | | | | |

Rapid Meher assessment 2016 - Health and Nutrition Sector: Woreda level Questionnaire

Interviewer name _____

Institution: _____

Interview Date: (dd) ____/(mm) ____/2016 _____

Region: _____

Zone: _____ Woreda _____

Main contact at this location: Name: _____

Position: _____ Tel: _____

| SECTION I: SOCIO- DEMOGRAPHIC PROFILE | | | | |
|---|---|----------------|---------------|-----------------------|
| Population: Woreda total population | M: _____ F: _____ | Total: _____ | Under 5 _____ | |
| | No. of women of reproductive age (age 15-49 yrs.) _____ | | | |
| | No. of pregnant women : _____ | | | |
| Special Population (if any) | Pastorals _____ | Refugees _____ | IDPs _____ | Migrant Workers _____ |
| Number of HCs _____ Number of HPs _____ Number of Mobile health teams _____ Number of _____ | | | | |

| | | | |
|---|-----------------------------|-----------------------------------|--------------------------------------|
| HEWs _____ | | | |
| Water availability at health centers (HC) | No. of health centers _____ | No. of HC with water access _____ | No. of HC without water access _____ |

SECTION II: HEALTH PROFILE

2.1. Coordination and management systems

| | |
|---|--|
| Is there a PHEM Officer at Woreda Health Office level? How many PHEM officers are there _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there RRT in Woreda health office | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Are there RRTs at HCs? If yes no. _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Are there PHEM Officers/focal persons at HCs? If yes No. _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Does the Woreda Health Office regularly report PHEM report as scheduled dates? If yes, Observe copies and comment _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Do the health facilities and HEWs regularly report PHEM report as scheduled dates? If yes, Observe copies and comment _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there a multi sector Health Emergency/PHEM coordination forum? If yes how frequently meet? _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there a Public Health Emergency preparedness and response plan? Does it include reproductive health? Observe and comment (Observe and comment) _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there accessible emergency response fund? If yes, How much is that _____ If yes, how much allocated and/or by whom allocated _____, _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |

2.2. Morbidity (List top 5 causes of Morbidity) in the year 2008 EC (2015-2016 GC)

| a. Morbidity below 5 | b. Morbidity above 5 | |
|----------------------|----------------------|--|
| 1. | 1. | |
| 2. | 2. | |
| 3. | 3. | |
| 4. | 4. | |
| 5. | 5. | |

2.3. List number of cases/deaths from Ginbot 2008 to Tikimt 2008 (May 2016 –October 2016)

| Month | AWD | | | | Malaria | | | | Measles | | | | Meningitis | | | | Other(specif) |
|-------|-------|------|--------|------|---------|------|--------|------|---------|------|-------|------|------------|------|-------|------|---------------|
| | Cases | | Deaths | | Cases | | Deaths | | Cases | | Death | | Cases | | Death | | |
| | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | |
| May | | | | | | | | | | | | | | | | | |
| Jun | | | | | | | | | | | | | | | | | |
| Jul | | | | | | | | | | | | | | | | | |
| Aug | | | | | | | | | | | | | | | | | |
| | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | |
| Sep | | | | | | | | | | | | | | | | | |
| Oct | | | | | | | | | | | | | | | | | |

2.4. 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) _____

2.5. Preparedness: Is there emergency drugs and supplies enough for 1 month? Or easily accessible on need? Comments

| | | |
|--|--|--|
| Ringer Lactate (to treat AWD cases) | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| ORS (to treat AWD cases): | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Doxycycline (to treat AWD cases): | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Consumables : Syringes, Gloves (for AWD management): | Yes <input type="checkbox"/> No <input type="checkbox"/> | |

| | | |
|--|--|--|
| Amoxil susp (measles) | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Tetracycline ointment (measles) | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Vit A (measles) | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Coartem for Malaria | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Lab supply: RDT for Malaria | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Lab supply: RDT (pastorex) for Meningitis | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| LP set | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Number of CTC kit available: (for AWD) | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Are there emergency reproductive health kits in health facilities to provide Basic Emergency Obstetric and New Born Care? (If No, list the missing medicines and supplies) | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Are there emergency medicines and supplies to support care of rape survivors? (Main shortage (if any): Specify) _____ | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is budget allocated for emergency rapid response by the woreda? How much allocated _____ | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| SECTION III: RISK FACTORS | | |
| Diseases | Risk factors for epidemics to occur | |
| Malaria | Malaria endemic area | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Presence of malaria breeding site | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Interrupted or potentially interrupting rivers | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Unprotected irrigation in the area | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | LLINs coverage No _____ % _____ | |
| | Indicate the coverage of IRS 2008. No _____ % _____ | |
| | Was there any prevention and control activities. 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) If yes, No _____ % _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Has vaccination been conducted in the past 3 years If yes, No _____ % _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | 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) | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Latrine coverage No _____ % _____ | |
| | Latrine utilization No _____ % _____ | |
| | Safe water coverage No _____ % _____ | |
| Measles | Is there ongoing measles outbreak | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | What is the measles vaccination coverage of 2008, less than one year No _____ % _____ | |
| | Has SIA been conducted in 2008 EFY | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | If yes, Indicate the month and number of children vaccinated including the age group Month----- Number-----Age group-----, coverage (%)----- | |

Any other observations you made or any risks of epidemics?

What were the major challenges in your Epidemic response experience?

SECTION IV: NUTRITION– SAM and MAM Management in the Woreda – May To October 2016

SAM Management

4.1. Facilities with SAM management in the woreda

| Month | Total Number of Health centers/ Hospitals | Total Number of Health posts | Number of SC. | % of health centers/ hospitals with a SC. | Number of OTP. | % of health posts with an OTP | Total Number of OTP/SC reported | % of OTP/SC who have reported |
|-------|---|------------------------------|---------------|---|----------------|-------------------------------|---------------------------------|-------------------------------|
| May | | | | | | | | |
| Jun | | | | | | | | |
| Jul | | | | | | | | |
| Aug | | | | | | | | |
| Sep | | | | | | | | |
| Oct | | | | | | | | |

4.2 Admission and performance of the therapeutic feeding program for SAM management

| Month | Total SAM Cases | | % of SAM children cured | | % of SAM children defaulted | | % of SAM children died | | % of SAM children non-respondent | | % of SAM children other | |
|-------|-----------------|-----------|-------------------------|------|-----------------------------|------|------------------------|------|----------------------------------|------|-------------------------|------|
| | 2007 E.C. | 2008 E.C. | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 |
| May | | | | | | | | | | | | |
| Jun | | | | | | | | | | | | |
| Jul | | | | | | | | | | | | |
| Aug | | | | | | | | | | | | |
| | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 | 2008 | 2009 |

| Month | Total SAM Cases | | % of SAM children cured | | % of SAM children defaulted | | % of SAM children died | | % of SAM children non-respondent | | % of SAM children other | |
|-------|-----------------|-----------|-------------------------|------|-----------------------------|------|------------------------|------|----------------------------------|------|-------------------------|------|
| | 2007 E.C. | 2008 E.C. | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 | 2007 | 2008 |
| Sep | | | | | | | | | | | | |
| Oct | | | | | | | | | | | | |

4.3. Availability of therapeutic supplies

| | Yes | No |
|---|-----|----|
| Is there sufficient supplies for 3 months of : | | |
| RUTF | | |
| F100 | | |
| F75 | | |
| 2 nd line drugs | | |
| Is there sufficient woreda level storage for SAM treatment at woreda level? | | |
| water availability at stabilization center (SC) | | |

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 the Woreda? _____

How many HEWs are there in the woreda? No _____, _____%

How many HEWs have been trained in MAM management? No _____, _____%

4.6. MAM Management

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 (2 nd generation) TSFP woreda? | | |
| Has the Woreda been supported by an NGO in the last 3 months? | | |

4.7. MAM admission

| Month | Priority 1 woreda | | Total MAM Cases | | Total Number of Food Distribution point in the woreda |
|-------|------------------------------|-----------------------------|---------------------------------------|-----------|---|
| | Yes <input type="checkbox"/> | No <input type="checkbox"/> | I don't Know <input type="checkbox"/> | | |
| | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | |
| May | | | | | |
| Jun | | | | | |
| Jul | | | | | |
| Aug | | | | | |
| | 2008 | 2009 | 2008 | 2009 | |
| Sep | | | | | |
| Oct | | | | | |

4.8. Screening

When was the last screening conducted in the woreda? _____

What screening modality is used in the woredas? EOS _____, CHD _____, Routine _____, vitamin A and Screening coverage _____ 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 odema and MUAC <11cm | | | # of children with no oedema and MUAC 11 to 11.9CM | % Proxy GAM for children | % Proxy SAM for children | |
|-------|-----------------------------|------------------------|------------------------|--|-------|-------|--|--------------------------|--------------------------|------|
| | | | | #SAM | | | | | | #MAM |
| | | | | MUAC <11 cm | odema | Total | | | | |
| May | | | | | | | | | | |
| Jun | | | | | | | | | | |
| Jul | | | | | | | | | | |
| Aug | | | | | | | | | | |
| Sep | | | | | | | | | | |
| Oct | | | | | | | | | | |

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 |
|----------|------------|-------------------|------------------------|------------------------------|---------------------|
| May 2008 | | | | | |
| Jun 2008 | | | | | |
| Jul 2008 | | | | | |
| Aug 2008 | | | | | |
| Sep 2009 | | | | | |

| | | | | | |
|----------|--|--|--|--|--|
| Oct 2009 | | | | | |
|----------|--|--|--|--|--|

* Below 21.0 cm in Tigray

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

- 5.1. Was there flood disaster in the last 6 months in the **Region /Zone**? Yes No
- 5.2. If yes, How many Kebeles affected _____,
- 5.3. Names of kebeles _____,
- 5.4. Population affected _____
- 5.5. Human death due to flooding Yes No ,
- 5.6. If yes how many in number _____
- 5.7. Are there displaced people due to flooding? Yes No
- 5.8. If Yes, how many PLW _____
- 5.9. Children <5yrs _____ <2 yrs _____ <6months _____ 6-23 months _____
- 5.10. 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) _____ |
| Type of outbreak _____ Number of cases _____ Deaths _____ (specify the time period) _____ |
| Type of outbreak _____ Number of cases _____ Deaths _____ (specify the time period) _____ |

Any comments on flooding _____

Rapid Meher Assessment 2016 - Health and Nutrition Sector: Health Facility/Health Center Level Questionnaire

Interviewer name _____ Institution: _____
 Interview Date: (dd) ___/(mm)_____/2016 _____ Region: _____

Zone: _____ Woreda _____

Name of HF/HC _____

Main contact at this location: Name: _____ Position: _____ Tel: _____

| SECTION I: SOCIO- DEMOGRAPHIC PROFILE | | | |
|--|---|----------------------|---|
| Catchment total population | M: _____ F: _____ | Under 5 _____ | Total _____ |
| | No. of women of reproductive age (age 15-49 yrs.) _____ | | |
| | No. of pregnant women : _____ | | |
| Special Population (<i>if any</i>): | Pastorals _____ | Refugees _____ | IDPs _____ Migrant Workers _____ |
| water availability at health centers (HC) | Yes _____ | No _____ | Comments _____ |
| Description: health provision status under catchment | | | Number |
| Number of HPs | | | |
| Number of Mobile health teams | | | |
| Number of HEWs | | | |
| SECTION II: HEALTH PROFILE | | | |
| 2.1. Coordination | | | |
| Is there a multi-discipline rapid response team (RRT) in HC? if yes how frequently meet----- | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there a Public Health Emergency preparedness and response plan? | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Is there accessible emergency response fund? If yes how much allocated----- | | | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| 2.2. Morbidity (List top 5 causes of Morbidity) in the year 2008 EC (2015-2016 GC) | | | |
| c. Morbidity below 5 | | d. Morbidity above 5 | |
| 1. | 1. | | |
| 2. | 2. | | |
| 3. | 3. | | |
| 4. | 4. | | |
| 5. | 5. | | |
| 2.3. Disease Outbreaks | | | |

| | |
|---|--|
| Was there any outbreak in the last 3 months in your catchment area? 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 in your catchment area? 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) _____ |
| 2.4. Emergency preparedness: Is there emergency drugs and supplies enough or easily accessible on need for immediate response? | Comments |
| Ringer Lactate (to treat AWD cases) | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| ORS (to treat AWD cases): | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Doxycycline (to treat AWD cases): | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Consumables : Syringes, Gloves (for AWD management): | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Amoxil susp (measles) | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Tetracycline ointment (measles) | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Vit A (measles) | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Coartem for Malaria | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Lab supply: RDT for Malaria | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Lab supply: RDT (pastorex) for Meningitis | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| LP set | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Number of CTC kit available: (for AWD) | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Are there emergency reproductive health kits in hospitals to provide Comprehensive Emergency Obstetric and New Born Care? | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Are there emergency medicines and supplies to support care of rape survivors? | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Main shortage (if any): Specify | |

| SECTION III: RISK FACTORS IN CATCHMENT AREA | | |
|---|--|--|
| Diseases | Risk factors for epidemics to occur | |
| Malaria | Malaria endemic area | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Presence of malaria breeding site | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Interrupted or potentially interrupting rivers | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Unprotected irrigation in the area | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | LLINs coverage <80% No _____ % _____ | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | Indicate the coverage of IRS 2008 No _____ % _____ | |
| | Was there any prevention and control activities? 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 <input type="checkbox"/> No <input type="checkbox"/> |
| | Has vaccination been conducted in the past 3 years | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | If yes : Indicate the date and number of people vaccinated Date _____ No of people _____ | |
| AWD | Was there AWD epidemic in the last three years (If yes specify date) _____ | |
| | Latrine coverage No _____ % _____ | |
| | Latrine utilization No _____ % _____ | |
| | Safe water coverage No _____ % _____ | |
| Measles | Is there ongoing measles outbreak | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | What is the measles vaccination coverage of 2008 for less than one year No _____ % _____ | |
| | Has SIA been conducted in 2008 or 2009 EFY | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | If yes, Indicate the month and number of children vaccinated including the age group. Month _____ No of children _____ | |

| | | |
|--|------------------------------------|--|
| | Age group _____ Coverage (%) _____ | |
|--|------------------------------------|--|

What were the major challenges in your Epidemic response experience? _____

Any other comments in health emergency _____

Any other observations you made or any risks of epidemics _____

SECTION IV: NUTRITION – SAM and MAM Management at HC

4.1. SAM Management

Is there SC in HC? Yes ___ No. ___

Is there OTP in HC? Yes ___ No. ___

How many of the HPs have OTP? _____/% _____

4.2 Admission and performance of the therapeutic feeding programme for SAM management

| Month | Total SAM Cases | | No of SAM children cured | | No of SAM children defaulted | | No of SAM children died | | No of SAM children non-respondent | | No of SAM children other | | No. of HPs reported | |
|-------|-----------------|-----------|--------------------------|-----------|------------------------------|-----------|-------------------------|-----------|-----------------------------------|-----------|--------------------------|-----------|---------------------|-----------|
| | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. |
| | | | | | 2007 E.C. | 2008 E.C. | | | | | | | | |
| May | | | | | | | | | | | | | | |
| Jun | | | | | | | | | | | | | | |
| Jul | | | | | | | | | | | | | | |
| Aug | | | | | | | | | | | | | | |
| | 2008 E.C. | 2009 E.C. | 2008 E.C. | 2009 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. |
| Sep | | | | | | | | | | | | | | |
| Oct | | | | | | | | | | | | | | |

4.3. Availability of therapeutic supplies

| Description | Yes | No |
|--|-----|----|
| Is there sufficient supplies for 3 months of : | | |

| | | |
|---|--|--|
| RUTF | | |
| F100 | | |
| F75 | | |
| 2 nd line drugs | | |
| Water availability at stabilization center (SC) | | |
| Specify if any shortages | | |

4.4. SAM reporting

How many HEWs are there in the catchment? _____

How many HEWs have been trained in SAM management? Number _____ % _____

Is there weekly SAM report? Yes _____ No _____ (if yes observe)

4.5. MAM Management: TSFP programme in catchment area

| Questions | Yes | No |
|--|-----|----|
| Is this a priority 1 area? | | |
| Was there a TSFP distribution last month? | | |
| Are children discharged from OTP referred to TSFP? If yes, how of them referred since last month _____ of _____ total | | |

4.6. Screening

When was the last screening conducted in the catchment area? _____

What screening modality is used in the woredas? EOS _____, CHD _____

Screening coverage Number _____ % _____

Vitamin children Number _____ % _____

Deworming Number _____ % _____

Screening PLW Number _____ % _____

4.7. Screening performance for children in catchment area

| Month | Target Children | # of screened children | Screening Coverage | # of Children with no odema and | # of children with no oedema | % Proxy GAM | % Proxy SAM |
|-------|-----------------|------------------------|--------------------|---------------------------------|------------------------------|-------------|-------------|
| | | | | | | | |

| | | | | #SAM | | | | #MAM | | |
|-----|--|--|--|------|-------|-------|-------|------|--|--|
| | | | | MUA | C <11 | odema | Total | | | |
| May | | | | | | | | | | |
| Jun | | | | | | | | | | |
| Jul | | | | | | | | | | |
| Aug | | | | | | | | | | |
| Sep | | | | | | | | | | |
| Oct | | | | | | | | | | |

4.8. 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 |
|----------|------------|-------------------|------------------------|------------------------------|---------------------|
| May 2008 | | | | | |
| Jun 2008 | | | | | |
| Jul 2008 | | | | | |
| Aug 2008 | | | | | |
| Sep 2009 | | | | | |
| Oct 2009 | | | | | |

* Below 21.0 cm in Tigray

4.9. SC observation

Observe and comment (status of ward, supplies, admitted children, records, trained person availability, management)_____

4.10. What were the major challenges in your emergency nutrition response experience?

4.11. Any other comments

Rapid Meher assessment 2016 - Health and Nutrition Sector: Health Post level

Questionnaire

Interviewer name _____

Institution: _____

Region: _____

Interview Date: (dd) __/(mm)__/2016 _____

Zone: _____ Woreda _____

Name of Hp _____

Main contact at this location: Name: _____

Position: _____ Tel: _____

SECTION I: SOCIO- DEMOGRAPHIC PROFILE

| | | | |
|--|--|-------------------------|-----------------------|
| Kebele total population: | M: _____ F: _____ | Total _____ | Under 5: _____ |
| | No. of women of reproductive age (age 15-49 yrs.) _____ | | |
| | No. of pregnant women : _____ | | |
| Special Population (if any): | Pastorals _____ _____ | Refugees _____ _____ | IDPs _____ _____ |
| | | | Migrant Workers _____ |
| water availability at health centers(HP) | Yes <input type="checkbox"/> No <input type="checkbox"/> | | |

SECTION II. HEALTH EMERGENCY

2.1.Disease Outbreaks

Was there any outbreak in the last 3 months in your Kebele? 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) _____

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) _____

| 2.2.Preparedness for emergency response | | |
|--|--|---|
| Is there emergency drugs and supplies enough for 1 month? Or easily accessible on need? | | |
| ORS (to treat AWD cases): | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Coartem for Malaria | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Lab supply: RDT for Malaria | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Main shortage (if any): Specify | | |
| 2.3.RISK FACTORS | | |
| Diseases | Risk factors for epidemics to occur | |
| Malaria | Malaria endemic area | |
| | Population in malaria area | |
| | LLINs coverage <80% | |
| | Indicate the coverage of IRS 2008 | |
| | Weak environmental malaria control activities | |
| AWD | Was there AWD epidemic in the last three years? If yes specify date _____ | |
| | Latrine coverage No _____ % _____ | |
| | Latrine utilization No _____ % _____ | |
| | Safe water coverage No _____ % _____ | |
| Measles | Is there ongoing measles outbreak | |
| | What is the measles vaccination coverage of 2008, less than one year No vaccinated _____ No children < 1year _____ | |
| | Has SIA been conducted in 2008 EFY | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| | If yes, Indicate the month and number of children vaccinated including the age group Month----- Number vaccinates----- Age group----- Coverage (%) ----- | |

SECTION III: NUTRITION – SAM and MAM Management in the Kebele

3.1.Availability of SAM service/OTP

Is there OTP at HP/Kebele Yes ___ No _____

If yes fill the tables below

Admission and performance of the therapeutic feeding programme for SAM management

| Month | Total SAM Cases | | % of SAM children cured | | % of SAM children defaulted | | % of SAM children died | | % of SAM children non-respondent | | % of SAM children other | |
|-------|-----------------|-----------|-------------------------|-----------|-----------------------------|-----------|------------------------|-----------|----------------------------------|-----------|-------------------------|-----------|
| | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. | 2007 E.C. | 2008 E.C. |
| May | | | | | | | | | | | | |
| Jun | | | | | | | | | | | | |
| Jul | | | | | | | | | | | | |
| Aug | | | | | | | | | | | | |
| Sep | | | | | | | | | | | | |
| Oct | | | | | | | | | | | | |

3.2. Availability of therapeutic supplies

| Questions | Yes | No |
|---|-----|----|
| Is there sufficient supplies for 3 months of : | | |
| RUTF | | |
| F100 | | |
| F75 | | |
| 2 nd line drugs | | |
| Is there sufficient Kebele level storage for SAM treatment? | | |

3.3. Screening

When was the last screening conducted in the Kebele? _____

What screening modality is used in the Kebele? EOS _____, CHD _____,

Coverage:

Screening children: Number _____ % _____

Screening PLW: Number _____ % _____

Vitamin A children: Number _____ % _____

Vit A Lactating women: Number _____ % _____

De-worming children: Number _____ % _____

SAM children: Number _____ % _____

MAM children: Number _____ % _____

3.4.Nutrition Reporting

Is there weekly SAM report? yes _____ No _____ (if yes observe) yes _____ No _____

How many HEW are there in the HP? _____

How many have been trained in SAM management? _____

3.5.TSFP programme in the Kebele

Was there a TSFP distribution for last screening/month? Yes _____ No _____

Are children discharged from OTP referred to TSFP? Yes _____ No _____

Challenge and any other comments by HEWs

Over all observation of HP preparedness for health and nutrition emergency services

Annex 5: EPIDEMIOLOGIC RESEARCH PROJECT Consent form

Code No: _____

Hello, my name is..... I am working as a data collector for the study being conducted in this district by Fisseha Walle who has studied for his master’s degree at Addis Ababa University, College Of Health Sciences, and School Of Public Health. Thank you for taking the time to speak with us today. The purpose of the study is to identify associated factors of acute malnutrition among children aged 6-59 months in this study area. This will be critical input for policy makers and organizations involved on care and support on acute malnutrition patients. Your participation in this research must be voluntary. If you decide not to participate; there will be no negative consequences on you. If you do decide to participate there will be no benefits for you. However, your participation on this study is very important for achievement of the study objectives to identify factors and appropriate program management for prevention and control the problem. You will fill out personal questions but your name or anything that describes your identity will not be recorded so that the confidentiality of your response will be kept. You have full right to refuse and withdrawal to participate in this study if you don’t wish. The interview period will take approximately about 25-30 minutes.

Are you voluntary to participate in the interview? Yes No

Name of investigator: Fisseha Walle

Tel: 0910296695

E-mail: fwale95@gmail.com

Name of advisors

Annex 6: Epidemiologic Research Project Questionnaire

Date of the interview -----/-----/----- time start-----

Interviewer’s Name and signature: _____

Supervisor’s Name and signature: _____

Participants’ identification:

Kebele Village.....

Code of the respondent.....

Relationship of the respondent to the child.....

| Part I: Demographic Characteristics | | | |
|--|--|--|--|
| No | Questions | Response | |
| | Residence | 1. Rural 2. Urban | |
| 1 | Ethnicity | 1. Agew 2. Amhara 3. Tigre 4. Other | |
| 2 | What is the religion of child's mother | 1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. other | |
| 3 | What is educational level of child's mother? | 1=No education 2=Primary education 3=Secondary 4=Tertiary/University | |
| 4 | How many children do you have? | _____ In number | |
| 5 | How many of them are <5 year? | _____ In number | |
| 6 | How many people currently live in your house (HH size)? | _____ In number | |
| 7 | What is educational level of child's Father? | 1=No education 2=Primary education 3=Secondary 4=Tertiary/University | |
| 8 | What is the occupation for the child's mother? | 1=Housewife 2=Merchant 3=Employee 4=Peasant 5=Daily laborer 6=Other | |
| 9 | Who is the head of the HH? | 1. Husband 2. Wife 3. Other | |
| Part II: Assessment Of Children (6-59month) And Mother Nutritional Practice | | | |
| 10 | Sex of the child | 1= Male 2=Female | |
| 11 | Age of child | _____ Year _____ Month | |
| 12 | Birth order of the child (refer to the biological mother of the child) | _____ | |

| | | | |
|----|---|---|---------------------------|
| 13 | Birth interval between the child and older and younger sibling (if any) | _____years ____Years respectively | |
| 14 | Is the child has a twin? | 1=Yes 2=No | |
| 15 | Did you breast fed the child? | 1=Yes 2=No | If no skip to question 11 |
| 16 | How frequent did you breast fed the child within 24 hours | 1. < 3 times 2. 3-5 times 3. 6-8 times 4. 8 and more | |
| 17 | Give supplementary food | 1=Yes 2=No | |
| 18 | For how long did you give exclusive breast feeding? | 1. <6 months 2. For 6 months 3. 7-9 month 4. 10-12 months 5. For 12 months 6. >12 months 7. Do not remember | |
| 19 | At What age did you start to give supplementary feeding? | 1. Immediately after birth 2. Within <6 months 3. Within 6-9 months 4. Within 9-12 months 5. 12 months later | |
| 20 | Is the child's biological mother alive? | 1=Yes 2=No, 3= I do not know | |
| 21 | Is the child's biological father alive? | 1=Yes 2=No, 3= I do not know | |
| 22 | What is the marital status of the parents if both are alive? | 1=Never lived together as couple, 2=Married, 3=Separated, 4=cohabiting, 5=I do not know | |
| 23 | How old was the child's biological mother at birth? | _____ (years) | |
| 24 | Have you attended ANC during your pregnancy? | 1. Yes 2. No | If no skip to question 25 |

| | | | |
|---|--|---|-----------------------------|
| 25 | How many times did you attend ANC during your pregnancy? | 1. Less than 3 times 2. 3-4 times 3. more than 4 times | |
| 26 | Where did you birth your child? | 1. at home 2. at health facility 3. . do not remember | |
| 27 | Was the child vaccinated? | 1=Yes 2=No | If no skip to question # 29 |
| 28 | Which vaccine did the child received? | 1=Measles 2=Polio 3=BCG 4=Pentavalent 5=PCV 6=Rota | |
| 29 | Vitamin A supplement administered to the child? | 1= Yes 2= No 3= I don't know | |
| 30 | Deworming supplement administered to the child? | 1= Yes 2= No 3= I do not know | |
| 31 | Was the child sick in the last two weeks? | 1=Yes 2= No | |
| 32 | What is her/his illness | 1=Fever 2=Cough 3=diarrhea 4=Other | |
| 33 | Presence of bilateral pitting oedema | Yes 2. No | |
| Part III: Child Anthropometry | | | |
| 34 | Anthropometric measurement of a child | 1. Weight (Kg):____ 2. Height(Cm):_____ 3. W/H_____ 4. MUAC (Cm)_____ | |
| Part Iv: Assessment Of Socio-Economic Indicators | | | |
| 35 | Source of drinking water | 1. Protected well/sprig 2. Unprotected well/spring 3. River water 4. Rain water/Dam 5. Pipe (tap) | |

| | | | |
|----|--|--|--|
| 36 | What is the main source of income for the house hold? | 1. Land farming product 2. Husbandry 3. Trade 4. Daily labor 5. Monthly salary | |
| 37 | How much quintal did you get per year? If you are farmer.... | 1. < 5 quintal 2. 5- 10 Quintal 3. 11-20 quintal 4. 20 and more quintal | |
| 38 | Which one of the following do you have? And how much? (please fill only for available animals) | 1. Cattle: _____ 2. Goat: _____ 3. Sheep: _____ 4. Donkey: _____ 5. Other: _____ | |
| 39 | How much money did you earn per month? | 1. Less than 400 ETB 2. 400- 799 ETB 3. 800-1199 ETB 4. 1200-1599 ETB 5. 1600-1999 ETB 6. 2000 and more ETB | |
| | Time at the end of the interview | _____ | |

Annex 7: Declaration

I undersigned, senior field epidemiology student declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master of field epidemiology.

Name: Fisseha Walle Tsegaw

Signature: _____

Submitted to: Addis Ababa University, college of health sciences, school of public health department of field epidemiology training program

Date of Submission: _____

This thesis work has submitted for examination with my approval as university advisor(s).

Advisors

| | Name | Signature |
|----|-------|-----------|
| 1. | _____ | _____ |
| 2. | _____ | _____ |