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

Ethiopia Field Epidemiology Training Program (EFELP)

Compiled Body of Works in Field Epidemiology

By:
Mukemil Hussen (Bsc. in Public health officer)

Thesis 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

June, 2019

Addis Ababa, Ethiopia

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Advisors:

Dr. Abiy Girmay (MD, PhD)
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Acknowledgements

My deepest gratitude goes to my mentors; Dr. Abiy Girmay and Mr. Sefonias Getachew; Academic mentor. And also for Mr. Getaneh Abraha; field base mentor in EPHI for the constructive and valuable suggestions and comments given to me.

Next I will give my heartfelt thanks to Centers for Disease Control and Prevention (CDC), EFETP and Ethiopian Public Health Institute (EPHI) for providing technical and financial support. My appreciation also goes to dedicated Residents Advisor Mr. Abdunnasir Abagero and Abigiya Wondimagegnehu; Academic Coordinators of Field Epidemiology Training Program for their unreserved mentoring, advice and guidance for the completion of this document.

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

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List of Abbreviations

AAU	Addis Ababa University
AARHB	Addis Ababa Regional Health Bureau
AFI	Acute Febrile Illness
AFRO	Africa Regional Office
AIDS	Acquired Immune Deficiency Syndrome
ANC	Anti-natal care
AR	Attack rate
ART	Anti-Retroviral Therapy
AWD	Acute Watery Diarrhea
BCC	Behavioral Change Communication
BCG	Bacillus Calmette Guerin
BD	Bloody Diarrhea
BPR	Business Process Reengineering
CDC	Center for Disease Control
CFR	Case Fatality Rate
COC	Combined Oral Contraceptive
CSA	Central Statistics Agency
CTC	Cholera Treatment Center
CTU	Cholera Treatment Unit
EFETP	Ethiopian Field Epidemiology Program
EFY	Ethiopian Fiscal Year
EOC	Emergency Operation Center
EPHI	Ethiopian Public Health Institute
FMoH	Federal Ministry of Health
GP	General Practitioner
HH	House Hold
HIV	Human Immuno-deficiency Virus
HMIS	Health Management Information System
HPDP	Health Promotion and Disease Prevention
IDP	Internally Displaced Population
IDSR	Integrated Disease Surveillance and response
IEC	Information Education and Communication
IGM	Immuno-globulin M
IMS	Information Management System
IP	Intestinal Parasite
IUCD	Intra Uterine Contraceptive Device
MAM	Moderate Acute Malnutrition
MCH	Maternal and Child Health

MHNT	Mobile Health and Nutrition Team
MOR	Matched Odds Ratio
MPH	Master Of Public Health
MSF	Medicines' Sans Frontiers
MUAC	Middle Upper Arm Circumference
NDRMC	National Disaster Risk Management Commission
NFI	Non-Food Items
NGO	Non-Governmental Organization
NSL	Nifas Silk Lafto
OPV	Oral Polio Vaccine
OR	Odds Ratio
ORS	Oral Rehydration Salt
PAB	Protected At Birth
PHEM	Public Health Emergency Management
PLW	Pregnant and Lactating Women
PLWHIV	People living with HIV
PMTCT	Prevention of Mother to child Transmission
PNC	Post-natal care
PTB	Pulmonary Tuberculosis
PVP	Predictive value positive
RDT	Rapid Diagnostic Test
RHB	Regional Health Bureau
SAM	Severe Acute Malnutrition
SPH	School of Public Health
TSFP	Targeted Supplementary Feeding Program
TVT	Technical and Vocational Training
UNICEF	United Nations International Children's Emergency Fund
URTI	Upper Respiratory Tract Infection
WaSH	Water Sanitation and Hygiene
WFP	World Food Program
WHO	World Health Organization
WoHo	Woreda Health Office

Executive Summary

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

From the beginning of first week of November 2017 up to the end of June 2019, I stayed in Field Epidemiology Training Program, School of Public Health-Addis Ababa University and Ethiopia Public HealthInstitute (EPHI) field base.

This body of work has nine chapters, including reports of three outbreak investigations, one surveillance data analysis, one evaluation of surveillance system, and one Woreda health profile description, four abstracts for scientific conference, onedisaster assessment report, one research proposal, as an additional output Weekly Bulletin andFeedback.

Chapter one: Threeoutbreak investigations were conducted. Descriptive and AnalyticEpidemiology was used during investigations. These are: measles outbreak investigation in two neighboring Adaarand Telalak districts of Afar region, November 2018; Cholera outbreak investigation in Amibara District, Zone 3, Afar, January 2019; Chikungunya outbreak investigation in Adaar district Afar, April 2019. We identified several factors that contributed to measles,cholera andChikungunya outbreaks occurred in different districts. ***Chapter two:*** Five years (2013 to 2017) Afar region Dysentery surveillance data was analyzed inMarch, 2018. In ***Chapter three:*** Evaluation of surveillance system was conducted in Addis Ababa city

administration in March, 2018. ***Chapter four:*** Health profile description of Woreda 06 District of Nifas silk lafto sub city, Addis Ababa March, 2018. ***Chapter five:***Two scientific manuscripts for Peer Reviewed Journals was done on Re-emergency of Chikungunya fever in Ethiopia after 3 years 2019 and Surveillance data analysis of dysentery, Afar, Ethiopia-March, 2018. ***Chapter six:*** Four abstracts were prepared for scientific conference.(1) Measles Outbreak Investigation and response in Adaar and Telalak District, Afar region, Ethiopia, November 2018. (2) Cholera outbreak investigation and response in Amibara woreda, Afar region, Ethiopia-January, 2019. (3) Chikungunya outbreak investigation and response in Adaar woreda, Afar region, Ethiopia, April 2019. And (4) Dysentery surveillance data analysis in Afar region, Ethiopia, March 2018

Chapter seven: Narrative summary of disaster situation was conducted inFafan zone of Somali region in August, 2018. ***Chapter eight:*** Protocol/proposal for Epidemiologic Research Project was prepared on the title "Assessment of magnitude of immunization coverage and Associated Factors among children Age 12–23 Months in Adaar district, Afar June to August, 2019. Finally, in ***chapternine:*** additional outputs; Coordinating Ebola Preparedness activity in Ethiopia, RHB Public health emergency operation center establishment;Short term training and workshops conducted; Weekly bulletin and Weekly Feedbackwere included.

CHAPTER-I

1. Outbreak Investigations

1.1. Measles Outbreak Investigation in two neighboringhard to reach woredaof Afar Region, Ethiopia, November 2018: Case control study.

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Abstract

Introduction: Suspected measles outbreak was notified from Afar region to national public health emergency management/PHEM/ in 10th November 2018. We investigated the outbreaks occurred in hard to reach Woredas of Afar region, to identify the contributing factors for measles outbreak.

Methods: 1:2 unmatched case control study design was conducted with 60 cases and 120 controls. We collected 5 blood samples from each woreda patients for Lab confirmation. Data entry and analysis was performed using EPI-Info version 7.2 and SPSS Version 20.

Results: a total of 66 cases and two deaths were reported from 2 two neighboring woredas affected by a measles outbreak in Afar region. All samples (10/10) became reactive for Measles IgM at national Laboratory. The cumulative attack rate of 6/10,000 population and case fatality ratio of 3.03% was recorded. High AR (29.2/10000population) was reported from age 1-4 years and 62 (93.9%) cases were unvaccinated for measles vaccine. The mean age for cases was 6.6(SD +/- 6.1) years while for controls were 5.2(+/- 6.3) years old. Being vaccinated (OR=0.51; CI: 0.002-0.12), Absence of measles cases in the family (OR=0.081; CI: 0.039-0.169) and mothers literacy (OR=0.32; CI: 0.012-0.85) was associated with protecting from measles. Intervention, immunization campaign was conducted from 4th week of the epidemic, for 6 months to 15 years old and the immunization coverage was 98 %. active case search, and health education was some of the activities carried out to curb the outbreak.

Conclusion: Lack of vaccination, mother's illiteracy and presence of sick person in the family were contributing factor for Measles outbreak in neighboring hard to reach woreda of Afar region. We recommend Afar regional health bureau establishing reaching every child (REC) strategy for hard to reach areas and strengthen supplemental immunization activities and to improve mother's awareness on Vaccination.

Keywords: Measles outbreak, Adaar, Telalak, Afar region

Introduction

Measles is a highly contagious respiratory viral disease that is characterized by fever, maculo-papular rash, cough, conjunctivitis and runny nose. The incubation period range from 10 to 12 days. Measles is spread through contact with nose and throat secretions of infected people and through airborne droplets released when an infected person sneezes or coughs. A person infected with measles is contagious from four days before to four days after the rash appears (1). Even though a safe and cost-effective vaccine is available, in 2017, there were 110 000 measles deaths globally, mostly among children under the age of five (2). Accelerated immunization activities have had a major impact on reducing measles deaths. During 2000– 2017, measles vaccination prevented an estimated 21.1 million deaths. Global measles deaths have decreased by 80% from an estimated 545 000 in 2000* to 110 000 in 2017. Measles outbreaks can be particularly deadly in countries experiencing or recovering from a natural disaster or conflict. Damage to health infrastructure and health services interrupts routine immunization, and overcrowding in residential camps greatly increases the risk of infection (2).

Measles is one of the most contagious vaccines-prevent- able viral diseases and represents an important cause of child mortality in sub-Saharan Africa. In Ethiopia measles is causing preventable morbidity and mortality in children. It accounts four percent of childhood mortality in Ethiopia. Ethiopia is adopting strategies to control and ultimately to eliminate measles by 2020. The country is implementing routine immunization of children aged 9 to 11 months, case based measles surveillance and improving case management through the provision of vitamin A (3).

Measles is endemic in Ethiopia with outbreaks reported annually. However, since October 2018, a worrying number of cases (almost 4,000) have been reported in Oromia (70%), Somali (20%) and Amhara (10%) regions. The vast majority of the cases affect young children (54% of cases are under 5). More than two-third of the cases had never been vaccinated.

In Ethiopia, 348 cases had been confirmed and 40 outbreaks reported in Addis Ababa, Afar, Amhara, Oromia, Southern Nations Nationalities and Peoples, Somali and Tigray regions, as of 31 March 2017. The majority of the cases (39 per cent) have occurred among children under five years. (3)

Outbreaks of measles were reported in Telalak woreda in Afar region September 10, 2018 and transmitted to neighboring Adaar Woreda. A team from EPHI and Afar RHB was organized and deployed to districts to investigate the outbreak and to identify possible risk factors responsible for the occurrence of the outbreak and to institute preventive and control measures

Objective

General objective

To describe the distribution of measles cases and identify risk factor associated with the Measles Outbreak in Telalak and Adaar Woreda Afar region, November, 2018.

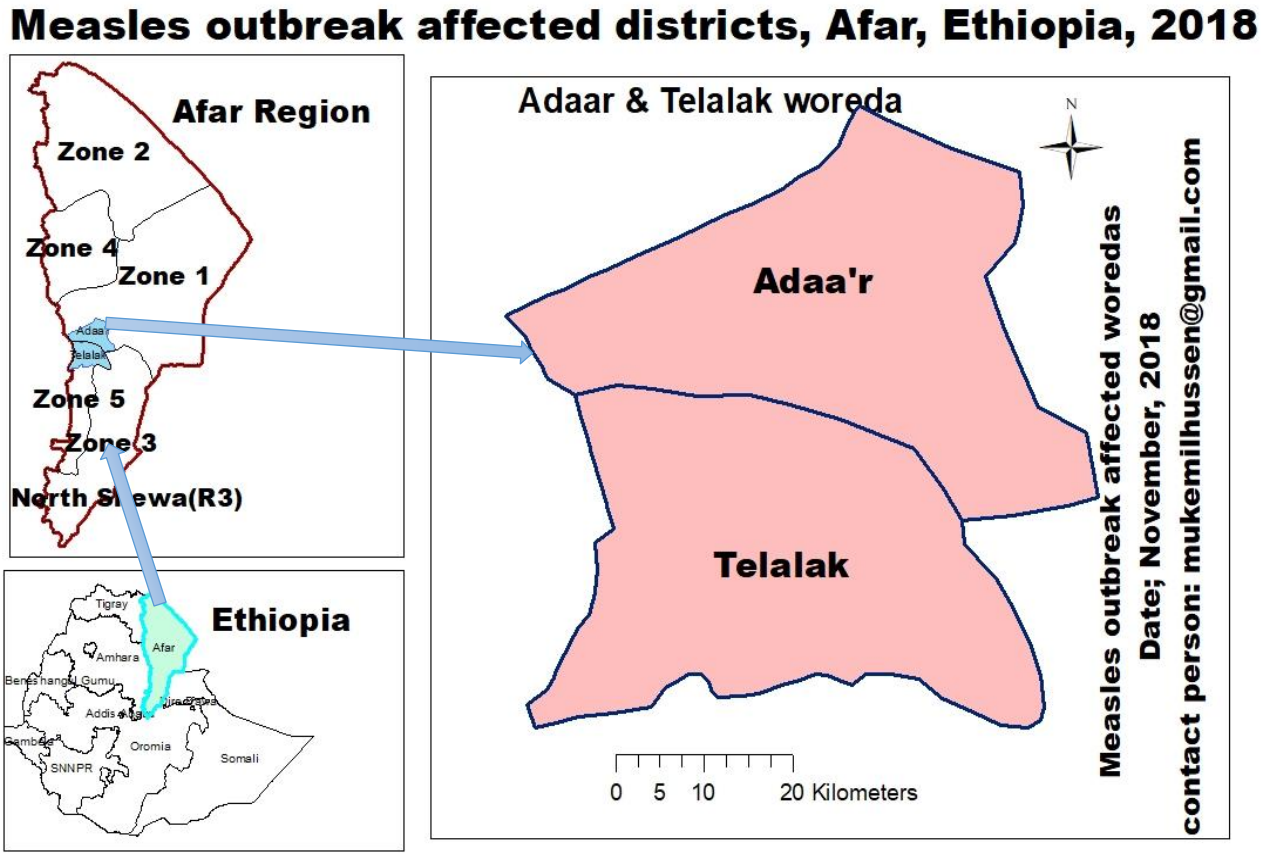
Specific Objectives

- To verify existence of outbreak
- To describe distribution of the outbreak by person, place and time
- To identify the risk factors
- To implement prevention and control measures.

Method and Materials

Study area and period

The investigation was conducted in two neighboring woredas (Adaar and Telalak Woreda, zone 1 and zone 5, respectively) of Afar regional state. Adaar woreda is located 122 km far from Samara, which is a capital city of Afar region. And it was neighboring for Telalak woreda to south. The Adaar and Telalak Woreda have 12 and 11 kebeles; total population of 64556 and 45550, from 2011 E C population projection respectively(Map 1). They have 3 health centers and 8health posts for each. The study was conducted from 10 September - 24 October, 2018 in Telalak and Adaar Woreda of Afar region.



Map 1: Map of Measles outbreak affected districts, Afar region, Ethiopia, November, 2018

Study Design

We conducted a descriptive study followed by unmatched 1:2 case control study design was used. A total of 60 cases and 120 controls were selected.

Sampling: All cases that meet standard PHEM measles case definitions were included.

Cases Definition: national Guideline on measles surveillance and outbreak management case definition of Measles was used

Suspected measles case was defined as any person with fever, maculo-papular generalized rash and cough, coryza (runny nose) or conjunctivitis.

A confirmed case was defined as: suspected case with laboratory confirmation (positive IgM antibody) and epidemiological link to confirmed cases in an epidemic.

All cases that fulfilled this case definition were included in the study as a case. Controls were a person without the history of measles and from the same area were enrolled.

Data collection Methods:

A structured questionnaire was used to interview the patients and controls. Information was collected regarding age, gender, previous history of measles infection, having contact with suspected or confirmed measles case, immunization status against measles before the illness.Data was collected by two BSC Nurses, who were trained for half days on data collection tool. Data collectors speak Afarigna and they were translating English in to Afarigna for study participant. Interview of key informants (HCs medical directors, health care givers and Woreda and Regional health authorities) were also conducted and availability of refrigerator, vaccine carrier, ice pack and cold chain management were observed.

Inclusion and Exclusion criteria

Inclusion Criteria

Cases: Any resident of Telalak and Adaar woreda who had symptoms of measles (generalized Maculo-papular rash and fever plus one of the following: cough or coryza (runny nose) or conjunctivitis (red eyes) from September 10- 0ctober 24, 2018 and who agreed to participate in the study was included.

Controls: Any resident of Telalak and Adaar Woreda during the study who was a neighbor to a case and who did not develop signs and symptoms of measles the study period and agreed to participate was included.

Exclusion criteria

Cases: Those who refused to participate or were unconscious were excluded.

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

Laboratory investigation

Five blood samples were taken from each woreda patients and sent to Ethiopian Public Health Institute (EPHI) on 12 September, 2018.

Data analyses and clearance

The data collected were entered into Excel software and imported to EPI-info 7. The entered data were analyzed by Epi-info (version7) and SPSS version 20.0 software were employed. Descriptive statistics were used to determine the frequency of different variables. Both multi variate and bivariate analysis was applied and Results were displayed using tables and graphs. 95% confidence interval (CI) for OR (odds ratio) were used in judging the significance of the associations.

Ethical Issues:-

Ethical clearance was obtained from Ethiopian Public Health Institute (EPHI). A letter was written for woreda health offices in order to obtain approval on data collection. Informed verbal consent was obtained from all study participants before conducting interview by explaining the purpose of the study. Privacy and confidentiality was ensured. The name of respondents was not written on the questionnaire, therefore, the information study participants provide was not known to others. The participation of individuals in this study was purely voluntary.

Dissemination of the result:-

There were meeting to debrief the finding of the investigation to the Woreda and Region. Written report of the investigation was submitted to the Region, resident advisor and to the EFELTP Program Coordinator of Addis Ababa University.

Result

Descriptive Analysis

A total of 66 cases (AR=6/10000) and two deaths with CFR 3.03% were registered from two neighboring woreda Adaar and Telalak September 06 – October 24/2018. The overall attack rate for the two woreda was 6 per 10,000 populations (8 and 4 per 10000 populations in Adaar and Telalak respectively). But the highest cases fatality rate (11.8%) was reported in Telalak woreda whereas zero case fatality rate was reported in Adaar woreda.

Distribution of Cases by Sex: The higher number of cases recorded in Male. But attack rate and cases fatality rate was higher on female compared with male by the outbreak due lower number female population in the study area.

Table 1: Distribution of measles cases by sex, AR, CFR two neighboring woreda Telalak and Adaar, Afar region, Ethiopia, 2018

Sex	# of cases	%	Death	Total population	AR /10000	CFR (%)
Male	34	51.5%	1	60756	5.6	2.9
Female	32	48.5%	1	49350	6.5	3.1

Distribution of Cases by Age group: The attack rate is higher (29.2/10000) among 1-4 years of age groups followed by less than 1 year age group (10.1/10000).

Table 2: Distribution of measles cases by age group, AR, CFR two neighboring woreda Telalak and Adaar, Afar region, Ethiopia, 2018

Age group	Number of cases	Death	Total population	AR by 10000	CFR (%)
<1	3	0	2961	10.1	33.3
1_4	28	1	9591	29.2	3.6
5_15	20	0	47284	4.2	0.0
>15	15	0	50274	3.0	0.0

Distribution of Measles Cases by Time: The first index case was reported from the Telalak woreda Waydalole kebele had travel history to measles epidemic affected area in Oromia region developed the symptom come to health center. The case fit the cases definition and reported to the district on September 06, 2018 and subsequently additional cases were being reported from the neighboring Adaar woreda on September 11, 2018 and progressive cases are increased until it dropped to zero starting from October 24, 2018.

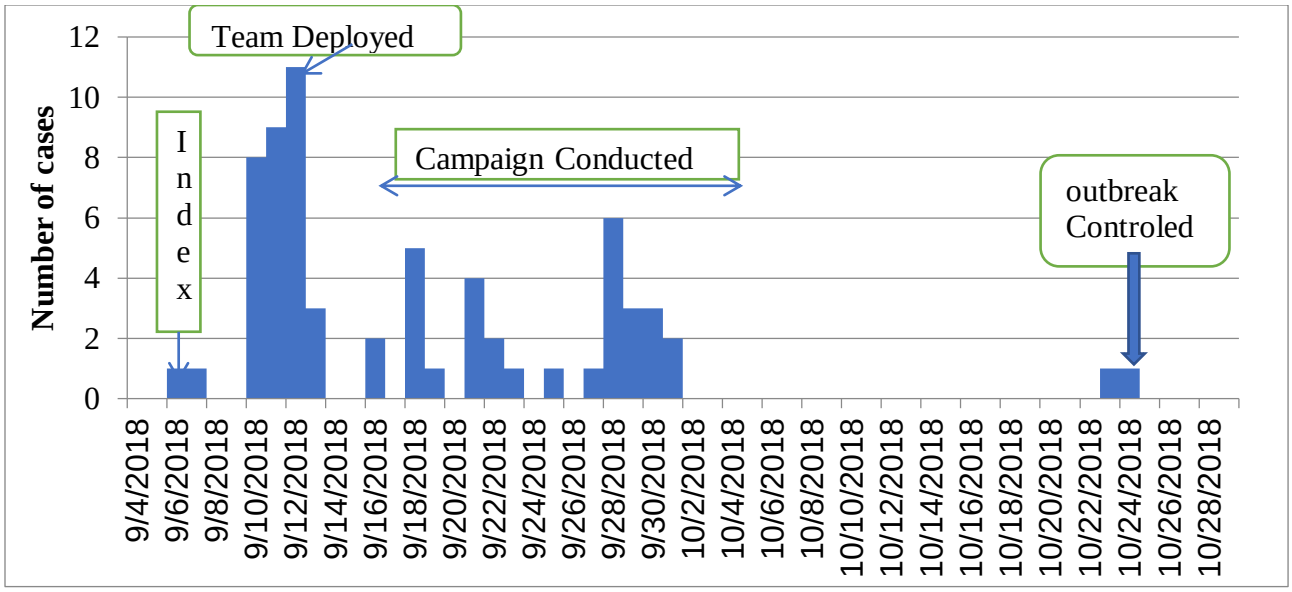


Figure 1: Epi curve of Measles case reported by date of onset two neighboring woreda Adaar and Telalak Afar region, Ethiopia, 2018

Distribution of Cases by Kebele: The two woreda have a total of 23 Kebele. Of these 12 Kebele were affected by the outbreak. The most affected Kebele were Waydalole (AR= 2.5/1000) followed by Ledi, Habalaytali and Eliwuha (AR=1.9/1000, 1.9/1000,1.6/1000 respectively).

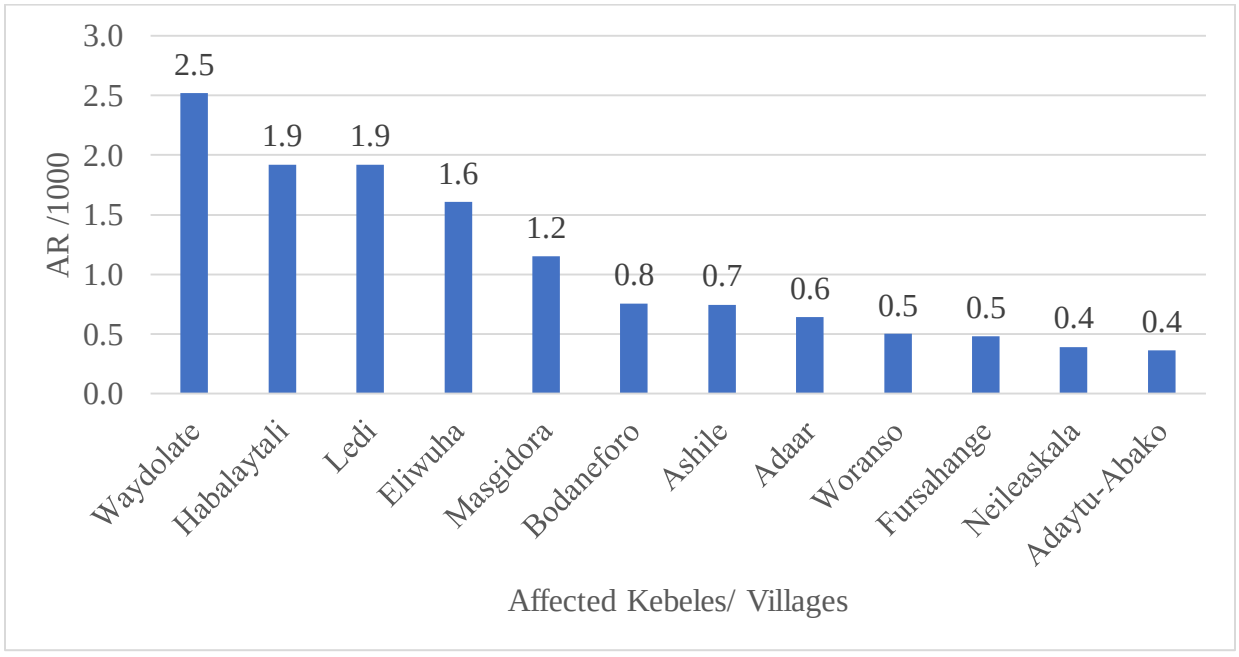


Figure 2: Measles Attack rate (AR/1000) by Kebele of two neighboring Woreda Telalak and Adaar, Afar region, Ethiopia, 2018

Distribution of Measles Cases by Vaccination Status: Majority (93.9%) of cases didn't have vaccination history, 4.5% of cases had unknown vaccination history while 1.5% cases had one dose vaccination history.

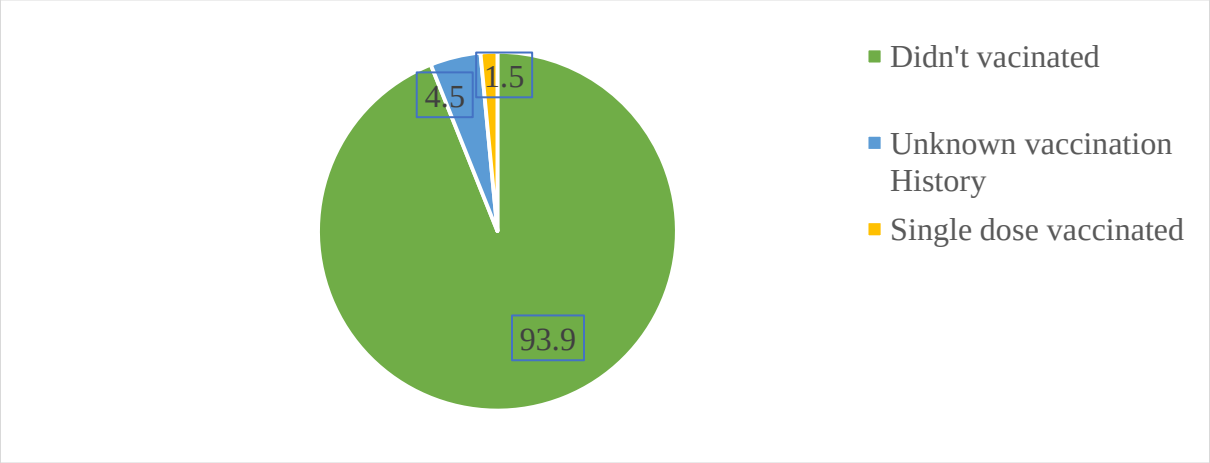


Figure 3: Vaccination status of Measles cases of two neighboring Woreda Telalak and Adaar, Afar region, Ethiopia, 2018.

Clinical Symptoms and Laboratory Investigation: Cases had history of fever 66(100%), rash 66(100%), cough 65 (98.5%) and conjunctivitis 51 (77.3%). Blood specimens were collected from 5 cases from each of the two neighboring woreda and sent to EPHI/National Polio and measles laboratory for measles antibody detection and the entire collected specimen were positive for measles specific antibody (IgM). The remaining cases were confirmed by epidemiological linkages.

We observed the cold chain management system and vaccine carrier availability. In all health centers there is available functional refrigerator. However power interruption is very common in the woreda therefore the refrigerators are supplied by kerosene and solar energy but the solar energy does not work when the weather is cold or rainy. In addition, kerosene is not consistently available in all health centers. But particularly in one health center neither solar energy nor kerosene was available to maintain the cold chain system.

Analytical investigation

We recruited 60 cases and 120 controls (1:2). The mean age for cases were 6.6(SD +/- 6.1) years while for controls were 5.2(+/- 6.3) years. On bivariate analysis seven variables: Being vaccinated (OR=0.51; CI 0.002-0.12, P-value 0.000), absence of sick person in the family (OR=0.081; CI 0.039-0.169 P-value 0.000) were statically Associated.

Table 3: Bivariate analysis for different exposure of measles disease, Adaar and Telalak woreda, Afar region, Eastern Ethiopia, 2018

Exposure		Case	Control	COR(CI)	P-value
Being vaccinated	Yes	9(15%)	93(77.5%)	0.51(0.002-0.12)	0.000
	No	51(85%)	27(22.5%)		
Absence of Sick person in the family	Yes	42(68.9%	19(31.1%)	0.081(0.039-0.169)	.0000
	No	18(15.3%)	101(84.7%)		
Contact with suspected or confirmed measles cases	Yes	36(60.0%)	34(28.3%)	3.8(1.98-7.3)	0.000
	No	24 (40.0%)	86(71.7%)		
Family occupation	Yes	33(55%)	42 (35%)	2.3(1.2-4.3)	0.016
	No	27(45%)	78(65%)		
Travel history to epidemic area	Yes	26(17.5%)	21(17.5%)	3.605(1.8-7.2)	0.000
	No	34(56.7%)	99(82.5%)		
Mother's literacy	Yes	41(68.3%)	45(37.5%)	0.32(0.012-0.85)	0.000
	No	19(31.7%)	75(62.5%		
Know measles is vaccine preventable disease	Yes	18(30%)	90(75%)	0.143(0.072-0.285)	0.000
	No	42(70%)	30(25%)		

For the multivariate logistic regression analysis, the risk factors that are statistically significantly associated with the illness were Vaccination status, presence of sick person with measles cases and Educational status.

Table 4: Multivariate analysis of risk factor for Measles, Adaar and Telalak Woreda, Afar region, Ethiopia 2018

Exposure		Case	Control	COR(CI)	AOR	P-value
Being vaccinated	Yes	9(15%)	93(77.5%)	0.51(0.002-0.12)	0.072(0.026-0.19)	0.000
	No	51(85%)	27(22.5%)		*1*	
Absence of Sick person in the family	Yes	42(68.9 %)	19(31.1%)	0.081(0.039-0.169)	0.078(0.028-0.219)	0.000
	No	18(15.3 %)	101(84.7%)		*1*	
Mother's literacy	Yes	41(68.3 %)	45(37.5%)	0.32(0.012-0.85)	0.278(0.144-0.537)	0.000
	No	19(31.7 %)	75(62.5%		*1*	

Adjustment was made for socio-demographic variables.

Measles outbreak Response intervention

A measles outbreak rapid response team was deployed to districts on September 10, 2018. The team rapidly investigated the outbreak and associated risk factor. Among identified risks, lack of vaccination in districts was significantly associated with contracting the disease. Hence the team

recommended vaccination campaign for all Kebeles of the two woreda by using available oral vaccine. Targeted age-group was identified according to surveillance data analyzed and used, those ranging from 6 months to 15 years. Active case searching was initiated in Kebeles reported measles cases.

The control measures adopted during this outbreak included: increasing awareness of the community on measles; Active case searching and notification of cases to the health care facilities bases on case-dentitions of measles, tracing contact and line listing of cases, reporting of cases, establishing of woreda level coordination and collaboration, intensifying of cases management at Health centers and conducting of measles campaign targeting under 15 were among target(for 98.7% and 95.8 of Adaar and Telalak woreda respectively).

Discussion

The overall case fatality rate (CFR) in this outbreak was 3.03%, which is equivalent with the case fatality of measles expected in Ethiopia (3-6%) [7]. Moreover, it is also equivalent with data expected from developing countries which range between 3–5%.

Our finding showed that highest case fatality rate was reported from children in the age-group of less than 1 year (33.3%) which is in line with the established fact indicating higher case-fatality reported in infants 6 to 11 months of age [7].

In our study, the majority (93.9%) of cases had not been on history of vaccination which is in line with lowest coverage of vaccination in Afar regional as 15% [9]. Epidemics of measles can arise in communities with low immunization coverage and can be a major source of measles outbreaks [8]. Thus, low immunization coverage in the study area could be a possible risk factor for occurrence of the current outbreak.

The overall high attack rates, with wider age range, are good indicators for accumulation of susceptible population within the target age groups, with an undiluted immunity gap in the non-target population. Such remote areas are usually difficult to reach with routine immunization services (with regular schedule and appropriate cold chain system and so on) so they are prone to be overlooked during SIA campaigns; and have low contact with other measles endemic/epidemic areas. These might have created the conditions to develop pool of susceptible population, and may have resulted in the high under five attack rates.

Our study revealed that children whose mothers have education are seven times more likely to protected from illness than those born to illiterate mother and we got similar finding with case control study conducted in India which showed that children whose mother have education are more likely to protected from illness than those born to illiterate mother (4). Also EDHS 2016 survey indicates children whose mothers have secondary education (72%) are more likely to be fully immunized than those born to mothers with no education (9).

To prevent measles outbreaks or interrupt transmission and to enhance elimination of measles, 95% population immunity is needed. However, the administrative coverage of measles vaccination in the region (35%) was very low with great disparity between woredas, which indicates suboptimal population immunity to prevent an outbreak. The absence of functional

fridge at health post level and hardship topography setup coupled with long travel distance to get the vaccine from the health center may have contributed to the potency of the vaccine, and as a result, it could be the contributing factors for low population immunity.

This investigation has limitations: information on vaccination status and mothers illiteracy is obtained by asking mothers and their care givers as well as from adult patients and controls therefore recall bias could have occurred.

Conclusion

Measles outbreak occurred in two neighboring hard to reach woreda of Afar region. Lack of vaccination, mother's illiteracy and presence of sick person in the family were contributing factor for Measles outbreak in the two neighboring hard to reach woreda of Afar region.

Recommendation

We recommend Afar regional health bureau establishing reaching every child (REC) strategy for hard to reach areas, strengthening routine and SIA, monitoring of accumulation of susceptible groups, immunization coverage, and program and technical management of the cold chain should be done at lower administration levels to ensure that pockets of measles susceptibility do not develop. Besides, a robust surveillance system is needed, particularly in such areas with low vaccination coverage and hence, surveillance activities should be strengthened and extended to health extension workers (HEW), volunteer community health workers (VCHW) and to the community, and be made vigilant to report early.

References

1. Ethiopian Health and Nutrition Research Institute. Guideline on measles surveillance and outbreak management.3rded. Addis Ababa, 2012.
2. World Health Organization. Fact sheet on Measles; February 2014. World Health Organization.N0 286 3. World Health Organization, 2013.World health statistics 2013.cause specific morbidity and mortality. WHO 2013.P 61-80
3. Poletti P, Parlamento S, Fayyisaa T, Feyyiss R, Lusiani M, Tsegaye A, et al. The hidden burden of measles in Ethiopia : how distance to hospital shapes the disease mortality rate. 2018;1–12.
4. Mishra A et al. Practical observations from an epidemiological investigation of a measles outbreak in a district of India. Indian J Community Med 2009; 34:117
5. Daba M. et al. Measles Outbreak Investigation and Response in Arsi Zone, Oromia region. Paper presented at AFENET 5th annual conference. Addis Ababa, Ethiopia.
6. Central Statistics Agency (CSA).Demographic and Health survey, 2011.CSA 7. Pomerai, K.W. and Mudyiradima, R.F. and Gombe, N.T. Measles outbreak investigation in Zaka, Masvingo Province, Zimbabwe. 2010. BMC Research Notes. 2012; 5(687).
7. Federal Democratic Republic of Ethiopia Ministry of Health, 2017. Annual Performance Report
8. World Health Organization, 1999.WHO guidelines for Epidemic Preparedness and Response to Measles Outbreaks, Geneva, Switzerland.
9. Central Statistical Agency [Ethiopia] and ICF International, 2017. Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International.
10. Munira N., et al, Epidemiology of measles in the metropolitan setting, Addis Ababa, Ethiopia, 2005–2014: a retrospective descriptive surveillance data analysis, 2018

1.2. Descriptive epidemiology of a cholera outbreak in Amibara district, Afar, Eastern Ethiopia, 2019

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Abstract

Introduction: Cholera is an acute gastrointestinal infection caused by Vibrio cholera. Cases with acute watery diarrhea were notified from Amibara district in 27th November 2018. We investigated to assess the causative agent, source of the outbreak.

Methods: Descriptive cross sectional study was conducted from December, 2018 to January 12, 2019. We reviewed medical records of suspected cases; we interviewed the Health care workers and patients, visited investor camps and affected household. We used line list for describing Cholera cases in terms of time, place and person. We collected nine stool and four water samples from drinking water for Lab confirmation. Data was analyzed using Epi-info 7.

Result: A total of 99 cases with an attack rate of 1.2/1000 population were recorded. The median age was 22 years with an age range of 1 – 70 years. Age specific attack rate is highest (26.3%) among 25–34 years age group. Seven (36.8%) out of 19 kebele were affected by outbreak. The highest attack rate was reported from Badahamo Kebele (6.9/1000). All of affected kebele fetch drinking water from broken pipe line connected with contaminated canal water. In investor camps, latrine coverage (12%) and utilization was very low. The outbreak started from the 40th week and notified in 48th week of 2018.Vibrio cholera 01 serotype Ogawa were isolated from stool and water samples. Case management, active cases search, contact tracing, water treatment chemical distribution and maintaining broken pipeline were intervention to control the outbreak.

Conclusion: Cholera outbreak occurred in the district due to contaminated canal water used for domestic purpose. Using untreated water, lack of latrine and delay in notification of the outbreak could be contributing factor for the outbreak. We recommended district to notify outbreak early to higher level. Investor should provide safe drinking water and prepared latrine for their daily laborer.

Key Words: Cholera, Outbreak, Amibara, Afar, Ethiopia.

Background

Cholera is an acute gastrointestinal infection caused by Vibrio cholera, which are curved aerobic bacilli, which are motile, possessing a polar flagellum(1). The primary symptoms of cholera are profuse diarrhea and vomiting, after an incubation period of about 2 hours to 5 days. Severe cholera, without treatment, kills about 50% of infected patients(2).

Cholera is transmitted by the fecal-oral route. Cholera is transmitted almost exclusively by contaminated water or food. And also transmitted by contact, such as touching patients(3)

Cholera often follows natural or man-made disasters which can lead to internal displacement of persons and subsequent unstable living conditions associated with contamination of food and water sources. Overflowing of latrines and contamination of wells and surface water, seasonal modification of water sources for consumption and human behavior may play a role in the occurrence of cholera outbreaks(4).

The risk for transmission can be greatly reduced by disinfecting drinking water, separating human sewage from water supplies, and preventing food contamination(5).

Cholera remains a global threat to public health and an indicator of inequity and lack of social development. Researchers have estimated that every year, there are roughly 1.3 to 4.0 million cases, and 21 000 to 143 000 deaths worldwide due to cholera(6).

During the 19th century, cholera spread across the world from its original reservoir in the Ganges delta in India. Six subsequent pandemics killed millions of people across all continents. The current (seventh) pandemic started in South Asia in 1961, and reached Africa in 1971 and the Americas in 1991. Cholera is now endemic in many countries (7).

During 2000–2009, sub-Saharan Africa reported over 86% of all global cholera cases and over 90% of all global cholera deaths to the World Health Organization. Except for the explosive outbreak of cholera in Haiti that began in 2010, this trend has continued through 2012 when 27 of 48 countries that reported cholera were in sub-Saharan Africa and accounted for 117, 570 (84%) reported cases and 4,183 (91%) cholera deaths(8).

In Ethiopia it was indicated that, there was cholera epidemic in 1990 which persisted with recrudescence of cases till 1998. During 2006-2009, 8109 cases and 194 deaths of cholera were

reported from three districts of Afar with a total case fatality rate of 2.4%. From these districts Burimedayto and Gewane reported cholera cases only in 2007, but Amibara district reported cholera cases in every four consecutive years(9).

During July 15, 2016-September 9, 2017, 1591 cases were reported from 15 districts of Afar region. Among these, 422 cholera cases were reported from Amibara woreda. In May 23-June 27, 2018, more than 1036 cases and 17 deaths with CFR of 1.6% were reported from four districts (Assayta, Mille, Afambo and Dubti) of Afar region (10).

Ethiopian public health institute notified a rumor of suspected cholera cases in Amibara woreda on 27 November 2018. A team from EPHI immediately contacted the woreda public health emergency management (PHEM) focal person to verify the rumor. The woreda focal person reported12 suspected cholera cases. EPHI communicated the situation to regional health bureau RHB/PHEM coordinator and EPHI EOC about the situation. On 28th November 2018 team consisted of field epidemiology resident deployed to investigate the outbreak in Amibara woreda. The aim of this study was to assess the source of the outbreak and identify potential risk factors and guiding response in the affected Amibara woreda, Zone 3, Afar region, Ethiopia.

Objectives

To assess the source of the outbreak and identify potential risk factors guiding response activities in Amibara woreda, Zone 3, Afar region, Ethiopia, 2018

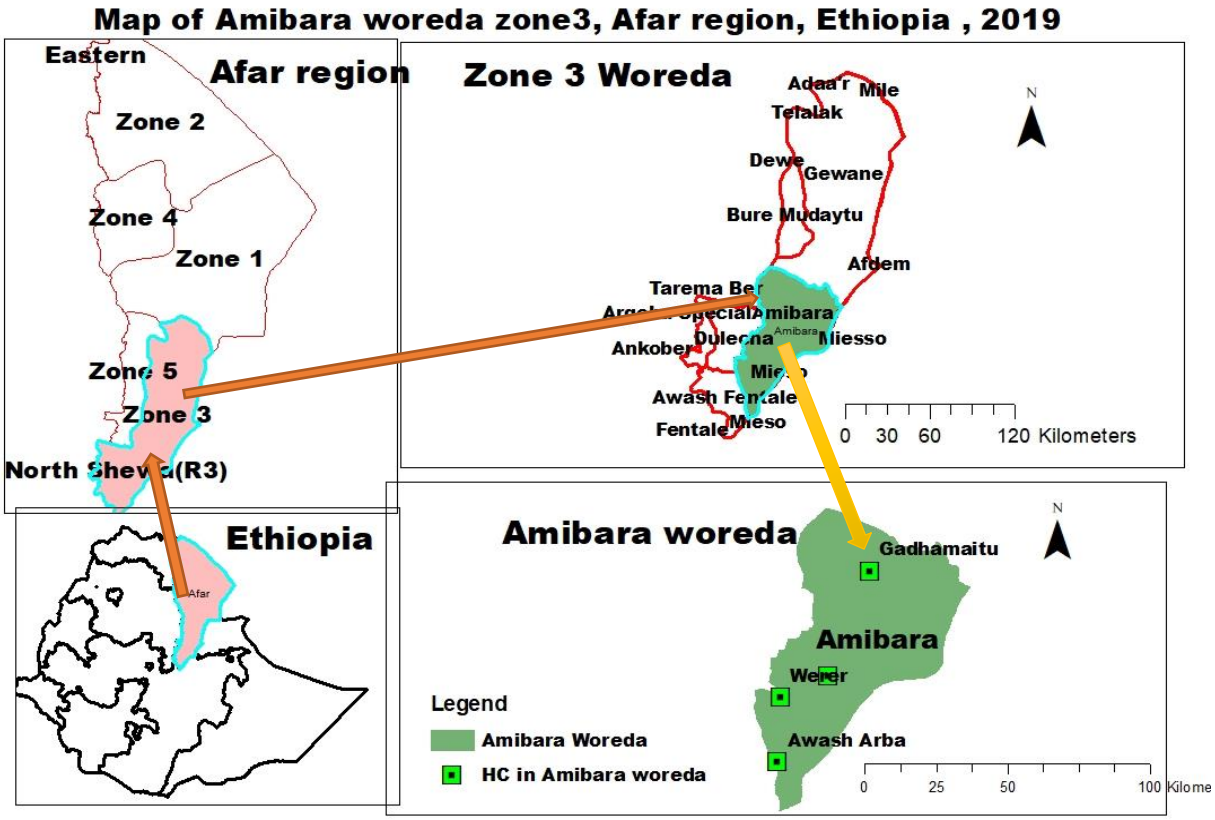
Specific objectives

- ✓ To describe the outbreak in terms of place, person and time
- ✓ To identify the causative agent.
- ✓ To assess source of outbreak
- ✓ To describe the water and hygiene situation of the woreda.

Methodology

Study area

The investigation was conducted in Amibara Woreda, zone 03, Afar regional state. The district covers an area of 3,994.00 square kilometers. It found at 270km and 304Km away from Addis Ababa and Samara respectively on the high way to Djibouti. Amibara district has 19 kebele and total population of 83611 from 2018/19 population projection(10). And Many migrant laborers (around ten thousand; specific list couldn't be discovered) were working for investors which engaged in cotton production. The Amibara woreda have four Health Centers and Seventeen Health Posts.



Map 2: Map of Amibara woreda, Zone 3, Afar region, Ethiopia, January 2019

Study Design and period

Descriptive cross sectional study design was conducted. Secondary data of Medical records and line lists collected from Amibara woreda health center. Line lists contain variables such as date of onset of illness, age, sex, district and Kebele (village) name, disease outcome. Interview was

held with some of the patients at house hold level and at Werer CTC to understand their clinical pictures during the investigation time. The study was conducted from December, 2018 to January 12, 2019

Case definition:

Suspected case: A case of cholera should be suspected when in an area where there is a cholera epidemic, a patient aged 5 years or more develops acute watery diarrhea, with or without vomiting.

Confirmed case: A suspected case in which Vibrio cholera O1 or O139 has been isolated from their stool(3).

Water and Stool sample collection

We collected nine stool samples from patients and transported regional laboratories for conformation. We collected four water samples from river and canal source which served as drinking water for the community. We used Cary-Blair transport medium for stool samples and the cold chain standard was maintained during transportation.

Data quality and analysis

Data was checked and cleaned. We analyzed data in time, place and person using Microsoft Excel 2016&Epi-info 7.

Ethical Issues

Support letter was written to those concerned bodies so as the national investigation team, as a public health emergency response body, can responsibly and accountably undertake the response activity at the site of the outbreak. Stool samples and water were collected only aiming to investigate the causative agent of the acute watery diarrhea and to guide appropriate outbreak control interventions. The direction was given from EPHI, the government organization which has a full mandate to conduct epidemiological and laboratory investigation, and respond to any public health emergencies.

Reporting of findings

The findings of the study were interpreted and shared with Amibara woreda health office, Afar Regional Health Bureau and Addis Ababa University, School of public health, Ethiopian Field epidemiology program and EPHI.

Result

Descriptive Epidemiology

The cholera outbreak was started in Amibara woreda Bonta Kebele Arage camp on September 23, 2018. The index case was daily laborer worked at cotton production farm in Arage camp. Then the outbreak expanded to Badahamo Kebele in October3, 2018.Affect 7 out of 19 Kebeles and stopped after 100 days in January 12, 2019.

In Amibara district, a total of 99 cholera cases with no death were reported during September 23, 2018 to January 12, 2019 with an attack rate (AR) and case fatality rate (CFR) of 1.2 per 1000 population and 0% respectively. Among cases, 65 (66%) were males.

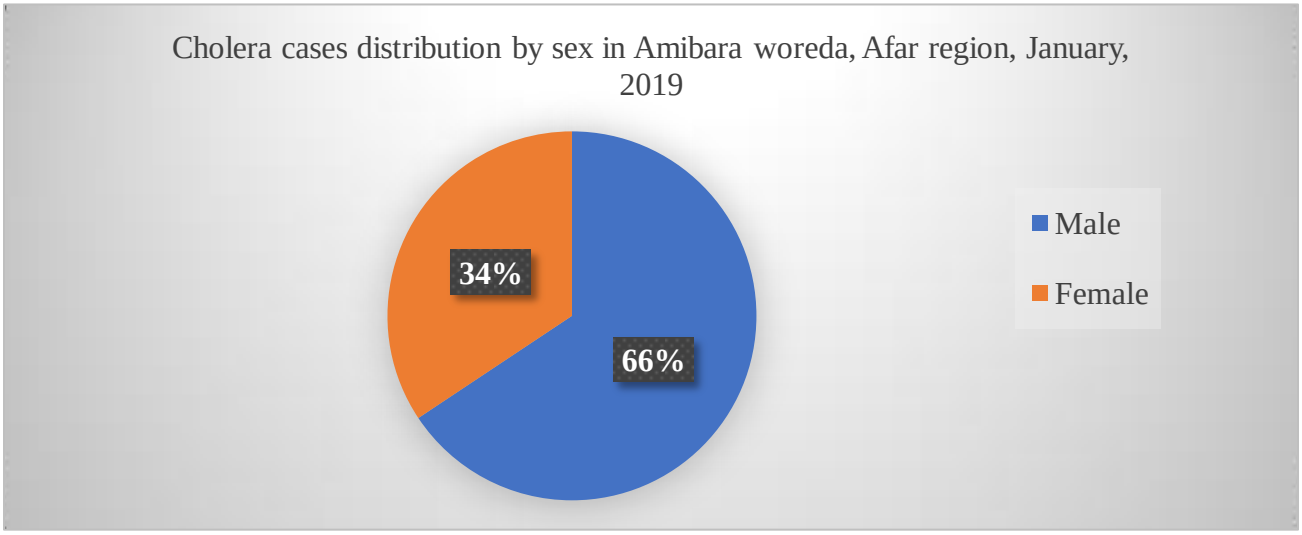


Figure 4: Cholera cases distribution by sex in Amibara woreda, Afar region, January, 2019

The median age was 22 years with an age range of 1 – 70 years. Age specific attack rate (ASAR) is highest (26.3%) among 25–34 years age group, followed by 15–24 years age group (24.2%).

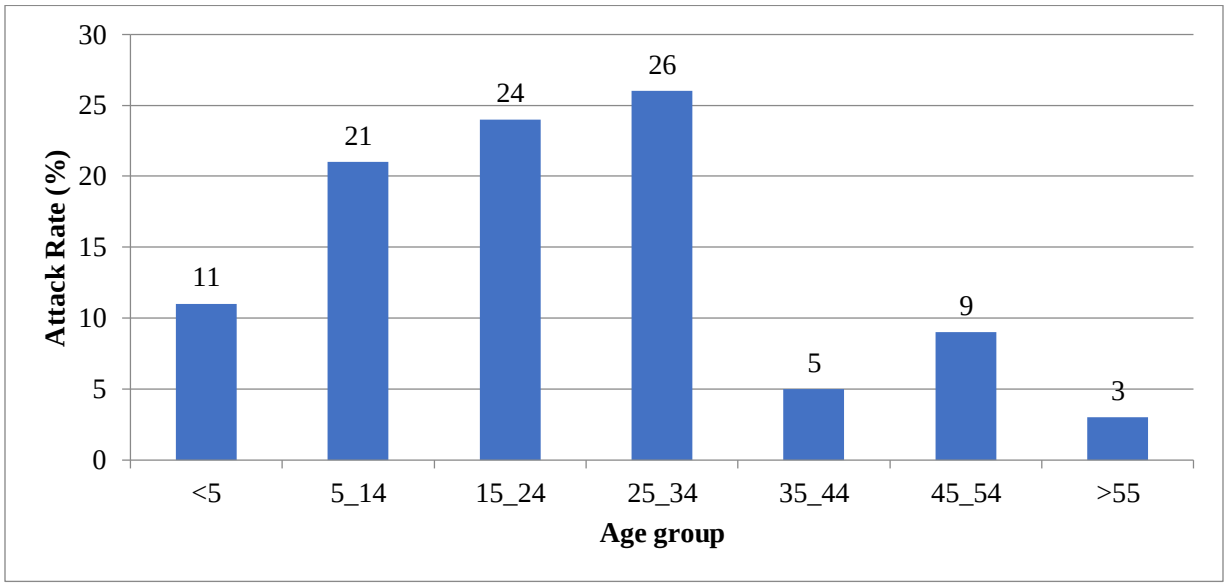


Figure 5: Cholera cases distribution by Age group in Amibara woreda, Afar region, January, 2019

More than half (55%) of reported cases were pastoralist by occupation. And 21% of cases were daily worker in cotton farm in Amibara woreda.

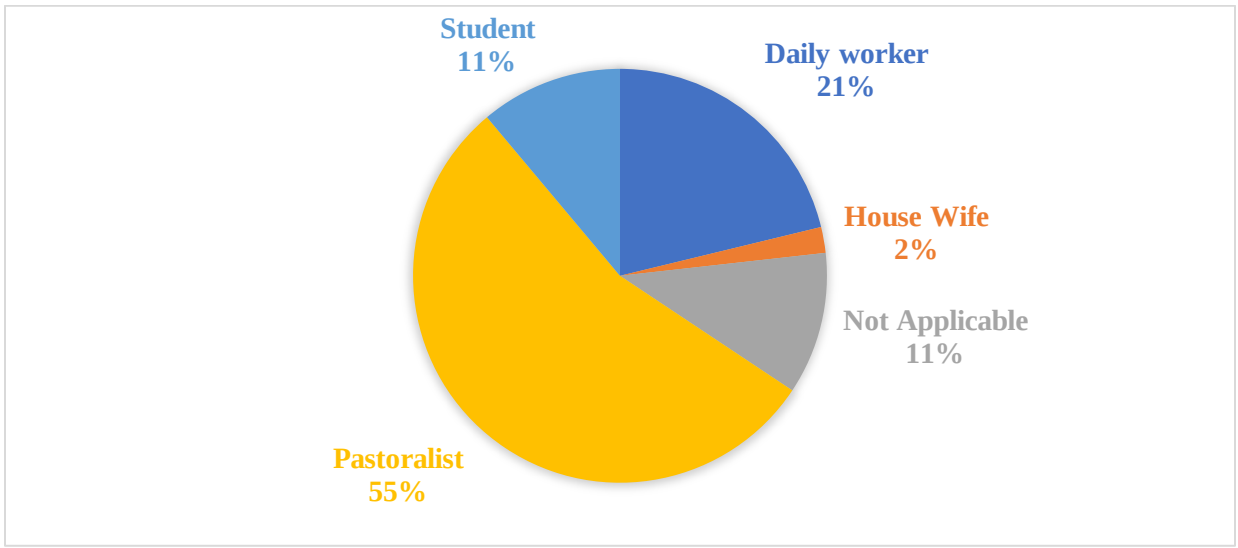


Figure 6: Distribution of cases (n=99) by occupation in Amibara districts of Afar region, January, 2019.

Seven (36.8% kebekes) out of 19 kebele in Amibara district were affected by cholera outbreak in 2018. The highest proportions of cases were reported from Badahamo/Sheleko (47.5 %) kebele. Followed by Bonta (17.2%) and Werer (16.2%) Kebele. Among villages D-3(33%) reported the highest proportion of cases.

Table 5: Cholera cases distribution by Kebele and villages in Amibara woreda, Afar region, January, 2019

Kebele	Cases	Percentage	Village	# of Cases	Percentage (%)
Badahamo	47	47.5	Sheleko	14	14.1
			D-3	33	33.3
Bedulale	11	11.1	Bedulale	11	11.1
Bonta	17	17.2	Arage	11	11.1
			Bonta	6	6.1
Gediyaro	3	3	Gediya	1	1.0
			Tuas	2	2.0
Halaydagi	2	2	Ebroudlaise	1	1.0
			Oudale esi	1	1.0
Sarkemole	3	3	Kifl 3	1	1.0
			Lucy	1	1.0
			Sarkamole	1	1.0
Werer	16	16.2	Dirk	11	11.1
			Werer G-Sefer	5	5.1
Total	99	100	Total	99	100

Cholera outbreak attack rate in Amibara woreda was 1.2 per 1000 population. The highest attack rate was reported from Badahamo Kebele (6.9/1000). Cholera infection spread across kebele sharing the same borders.

Table 6: Cholera outbreak Attack rate by Kebele in Amibara woreda, Afar, January, 2019

Kebele	Number of cases	Population	Attack Rate/1000
Badahamo	47	6852	6.9
Bedulale	11	3873	2.8
Bonta	17	6936	2.5
Gediyaro	3	1857	1.6
Halaydege	2	849	2.4
Sarkemole	3	8525	0.4
Werer	16	11297	1.4
Amibara woreda	99	83611	1.2

Suspected cholera cases were began since September 23, 2018 in Amibara woreda. The outbreak has multiple picks which indicates propagated outbreak due to person to person transmission. Gradually suspected cholera cases increased. In November 22, 2018, the highest numbers of cases were registered. The outbreak was confirmed in December 3, 2018 then intervention activities were strengthened and the outbreak was controlled in January 12, 2019(Fig.5). When we describe the outbreak by WHO epi week, the outbreak was confirmed in week 49, 2018.

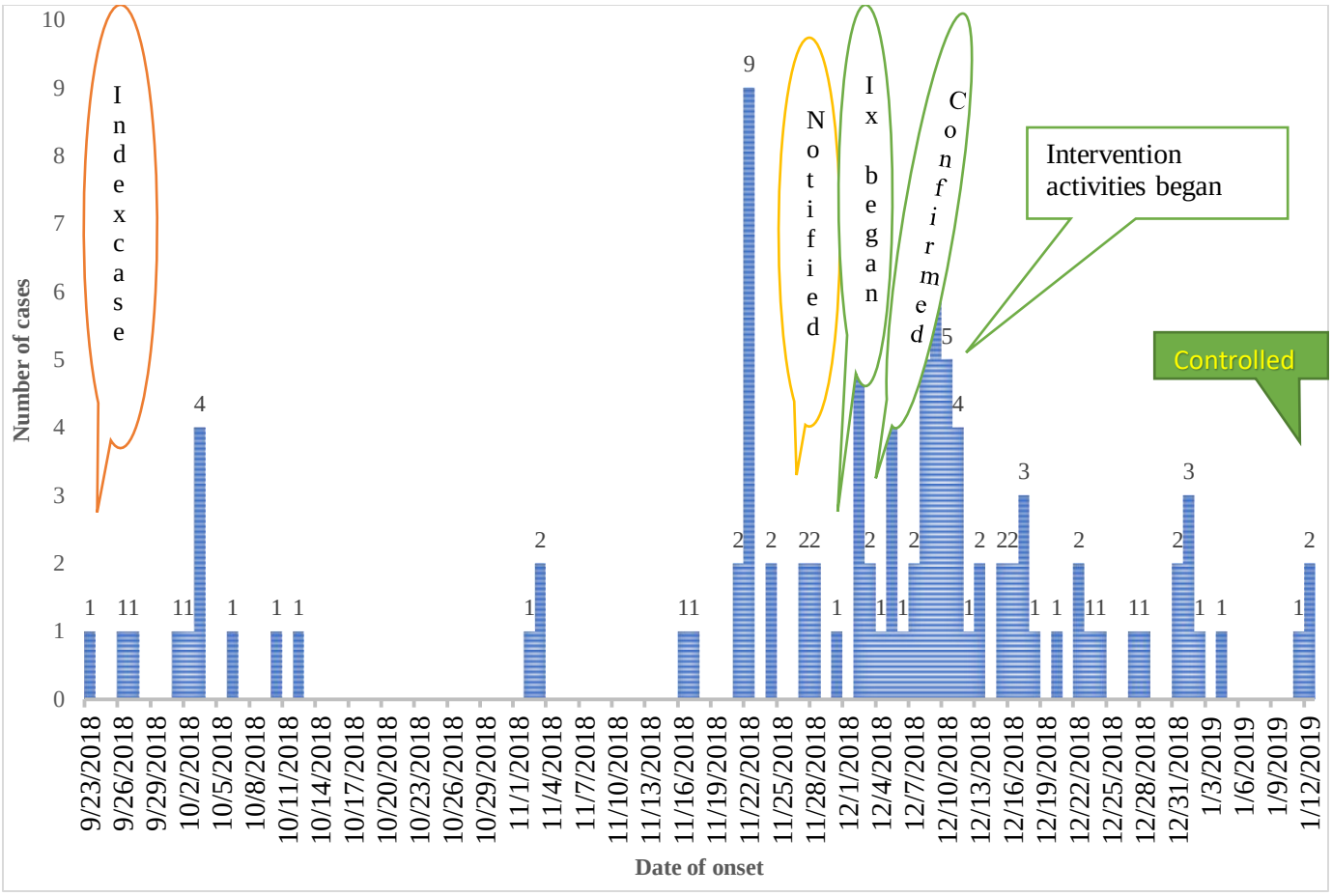


Figure 7: Epicure of Cholera outbreak in Amibara woreda Zone 3, Afar region, January, 2019

In Amibara district Cholera outbreak started in week 40 and reach its pick on week 50 of 2018. The outbreak interrupted for two consecutive weeks (Week 43 & 44). Finally the outbreak was controlled in the second week of 2019.

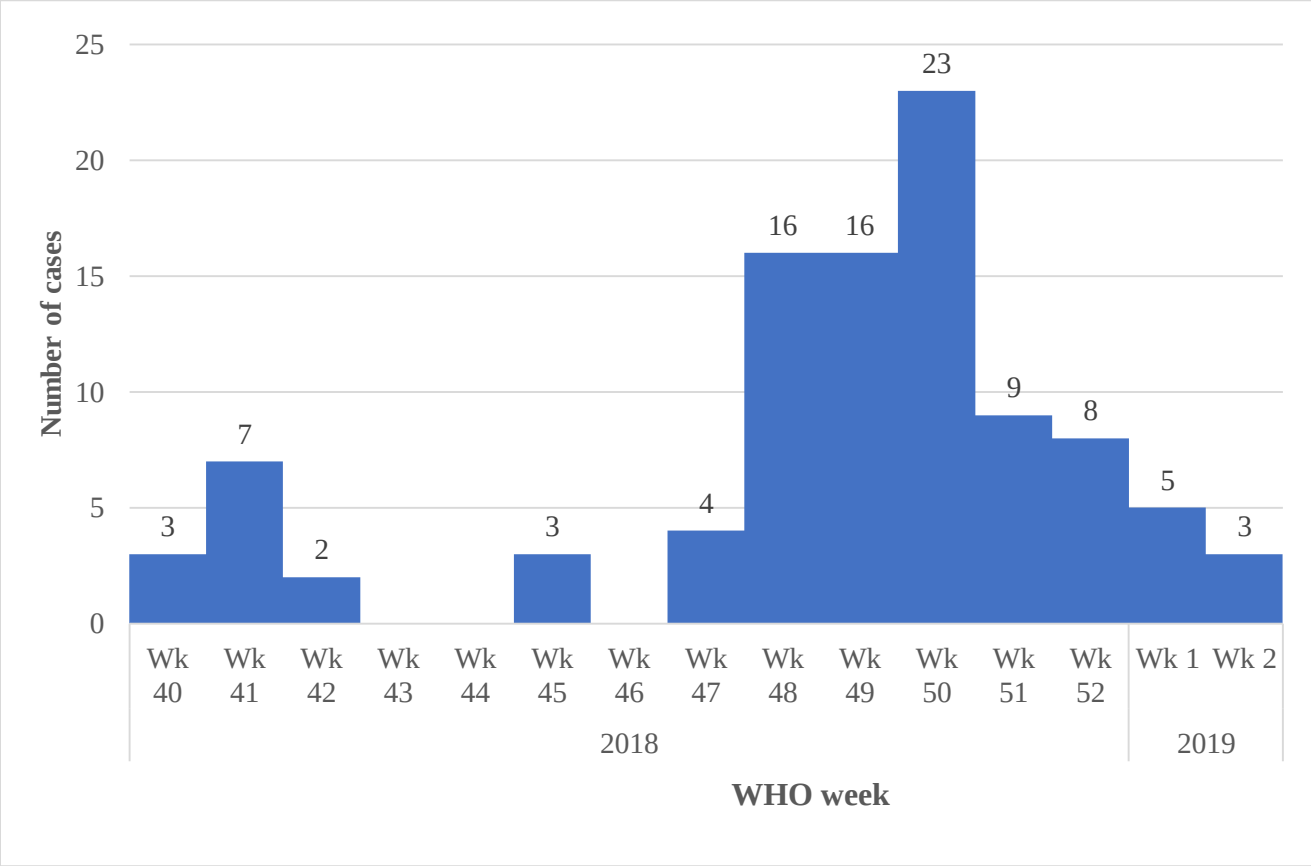


Figure 8: Distribution of cholera cases by WHO week, Amibara woreda Afar region, Ethiopia, January 2019:

The cholera outbreak started in Amibara woreda September 2018 and number of cases increased gradually reaches its pick on December and the outbreak was controlled in January 2019

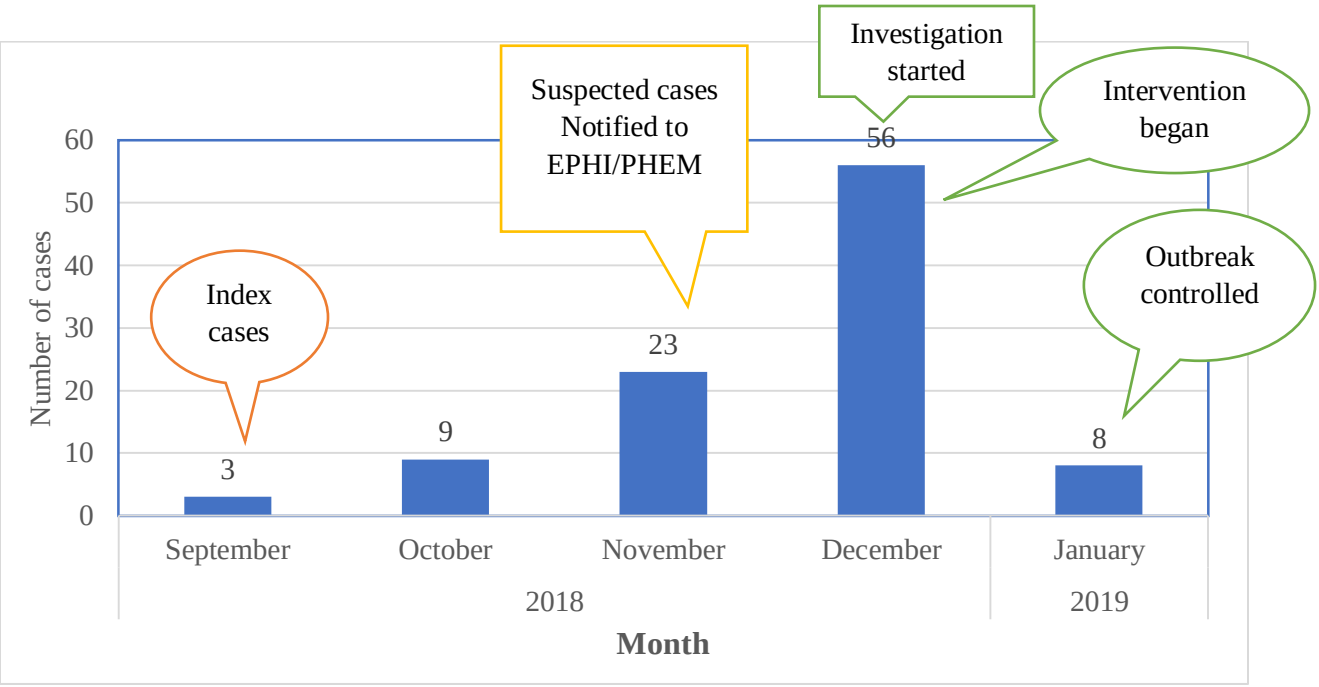


Figure 9: Cholera case distribution by Month in Amibara woreda, Zone 3, Afar region, January, 2019

Laboratory confirmation result

A stool sample was sent to Samara regional laboratory on November 29, 2018 and specimen was positive for Vibrio cholera by culture. A total of nine (9)stool samples were tested by RDT and one sample by culture. One culture and all RDTtests were positive for vibrio-Cholera O1 serotype Ogawa. Water Samples from four different water sites taken to Adama Regional laboratory on December 22, 2018 were positive for Escherichia coli type I and other fecal coliform bacteria were also isolated from all four water samples collected from the canals that residents, Pastoralists and daily laborers were being used for drinking and other home purposes.

Public health Interventions taken to control the outbreak

Cholera outbreak intervention implemented based on major pillars. These pillars were coordination, surveillance, cases management, Social mobilization and Wash interventions.

Coordination of the concerned sectors

The outbreak response task force and committee were established at the region level and at woreda level to coordinate response activities at region and Woreda according to their level. The committee did different activities of outbreak response. Different NGO communicated to provide logistic and material support to outbreak response. We also discussed with Amibara woreda Administration to allocate budget (250,000 Ethiopian birr) for cholera outbreak response activities.

Case Managements activities

There were one cholera treatment centers (CTCs) at Werer health center and three CTU (Badahamo, Bedulale and Bonta Kebele) were established to treat cases. CTC provided twenty four hours service with ambulance service. Health professionals selected from Werer Health center assigned to treat cases in the CTC as per national cholera treatment guideline. Ninety nine Cholera cases were treated in Werer CTC. Among cholera cases 81% of cases were severely dehydrated. Infection prevention and control activities were done in the CTC. Cases were treated with IV flood and ORS based on their dehydration status. Antibiotics and chemoprophylaxis were provided for Sever cases and contact with severe cases based on national cholera guide line respectively.

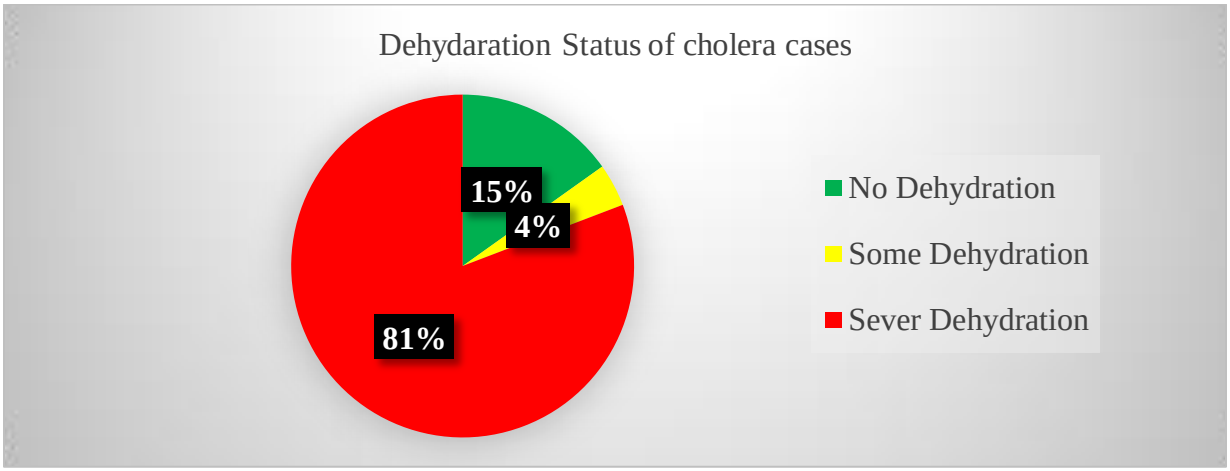


Figure 10: Dehydration Status of cases of cholera outbreak in Amibara woreda, zone 3 Afar region, Ethiopia, January, 2019

Surveillance activities

We began working from rumor verification to outbreak confirmation. We collected stool and water sample to confirm out break and to identify risk factor. We also support Surveillance team during active cases search and contact tracing activities in pastoral community (In the farm area). We followed Contacts for five days. Cases were register on line list, analyzed and interpreted shared for decision maker. Daily SITREP was prepared and shared to respective Stakeholders and partners. Disinfection of cases households, clothing, and other materials that have contact cholera cases

Social Mobilization

Woreda cabines were assigned to supervise their respective Kebele to facilitate social mobilization activities. Health education was provided to 13120 HH in affected Kebele and neighboring Kebele in Amibara woreda by using Ambulance Megaphone. Daily laborer gets health education about Cholera by assigned health professional in their working area. Also Health education was provided in Market and school places with local language. Health education was provided for care takers in continuous bases.

Wash Activities.

Contaminated water source (Canal water) was identified as source of infection for Cholera in Amibara woreda. Water source contaminated due to broken pipelines were also identified and maintained; contaminated Rottos were cleaned and treated with chemicals; Water treatment chemicals distributed for all affected Kebele; 400 Soap, Jerri cans and baldis were distributed to affect Kebele; Latrine audit was done for more than 14,000 HH.

Observation for farm camps situation

We observed the daily workers hygiene and sanitation condition in Arage investor camp and there were no latrines and no safe drinking water sources for daily workers. Water was fetched directly from contaminated canal water from river Awash. They live in overcrowded (about 20 persons per room) conditions, with shared drinking and eating utensils (1 utensil for more than 20 individuals), inadequate /no provision of medical supplies.

Observation for local community situation

We visited and observed different villages in the Amibara woreda; similar to the investor camp, the local communities which reside in villages (rural) without access to safe drinking water and latrines. The team found also that awareness of the rural community to personal hygiene, to the causes and prevention of diarrheal disease was low.

Discussion

The cholera outbreak began on September 23, 2018 in Arage camp, Bonta Kebele, Amibara woreda, Afar Region. The index case was daily laborer worked at cotton production farm in Arage camp. And outbreak expanded to Badahamo Kebele in October3, 2018 and stopped after 100 days in January 12, 2019. The highest cholera cases were recorded in Badahamo Kebele with AR (0.69%). The high Attack rate (AR) in Badahamo could be due tothe high number of daily laborers residing in the kebele;weak hygiene sanitation condition and intervention in farm camp, Shortage of safe water supplyand presence of contaminated canal water.

The overall attack rate (AR) was 0.12% (total districts' population for AR); which is almost similar with the cholera outbreak done in Afar 2009(9). Age and sex specific attack rate could not be calculated due to lack of estimate population and uniformity in data compilation system in the districts.

The cases fatality rate (CFR) was zero. This belowthe mean overall CFR of 2.4% reported in Africa from 2000-2005 and the WHO acceptable rate of 1%. And also CFR low as compared to previous outbreak in 2009(9).This could be due presence of experienced health professionals in cases management from previous outbreak.

In the district most of the cases were males (66%) and daily laborers employed in the farm companies (cotton plantations). This could be due to overcrowding compared to the much dispersed local community and which in fact the farms employed males as daily laborers.

The Epi-curve has many peaks (Figure 7) which showed a progressive person to person transmission, this could be due to the absence of health infrastructure in the investor companies and weak response activity of the districts epidemic task force. Risk factors like presence of contaminated canal water and lack of latrine.

The outbreak was prolonged due progressive person to person transmission for three and half months, this could be due to late notification and high number of pastoralist settled in the district for cattle grazing in cotton farm.

The cholera outbreak in Amibara district lingered for a prolonged period, spreading across seven Kebeles sharing the same borders. This only shows the failure of surveillance system to detect the outbreak early and hence delayed effective response and curtailment of its spread. Also, the

very high attack rates recorded in some kebele like Badahamo show the presence of specific contaminate water source and poor protective measures instituted at home and poor infection control measures at health facilities.

Eighty one percent of cases were severely dehydrated but here was no death occurred due to cholera outbreak with CFR=0% in the district compared to the national cholera guideline; which was supposed to be less than 1 % (6). This could be adequate medical supplies and good case management in case treatment centers (CTCs). And also lower value than previous outbreaks occurred in Amibara district with CFR (1.9%) case fatality (9). This might due to good cases management and previous experience on cholera outbreak response.

Conclusion

Amibara district experienced cholera outbreak, especially throughout the third half of 2018 and the first half of 2019. The outbreak occurred due to presence of contaminated canal water in the district. *Vibrio cholera* 01 serotype inaba was responsible for the Cholera outbreak in the district. Drinking untreated water, lack of latrine, close contact with a case, and not practicing hand washing could also be possible cause of the outbreak. The hygiene and sanitation condition in the farm camps was found worst. The outbreak was prolonged due to person to person propagation and failure of early detection by the surveillance system.

Recommendation

RHB and partners should work on provision of safe drinking water supply and raising community awareness about hygienic practices to control diarrheal disease. Investors work in the district should avail safe water supply for daily workers in the investor companies and in the local community. We recommended the strengthening of surveillance system and the need for proper training and motivation of front line health workers towards timely detection and response to outbreaks. Hence, early notification, investigation and strong rapid response is indispensable to control further spread and not to encounter extended outbreaks.

References

1. Sule IB, Yahaya M, Aisha AA, Zainab AD, Ummulkhulthum B, Nguku P. Descriptive epidemiology of a cholera outbreak in Kaduna state, northwest Nigeria, 2014. Pan Afr Med J. 2017;27(April).
2. OXFAM. Cholera Outbreak Guidelines: Preparedness, Prevention and Control. Oxfam GB. 2012;
3. Ethiopian health and nutrition research institute. cholera treatment guide line, Ethiopia [Internet]. Addis Ababa; 2012 [cited 2019 Jun 1]. p. 109.
4. Dalhat MM, Isa AN, Nguku P, Nasir SG, Urban K, Abdulaziz M, et al. Descriptive characterization of the 2010 cholera outbreak in Nigeria. BMC Public Health. 2014;
5. Penguele A, Djeintote M., Balekouzou A., Tembeti J, Feilema P, Kazambu D DD. Cholera Outbreak Investigation in the Central African Republic, October – November 2011. 2011;(November):20. Available from: www.cdcfoundation.org/2011CholeraOutbreakReport.pdf
6. WHO | Cholera Fact Sheet. Who. 2018.
7. Ali M, Nelson AR, Lopez AL, Sack DA. Updated Global Burden of Cholera in Endemic Countries. Remais J V., editor. PLoS Negl Trop Dis [Internet]. 2015 Jun 4 [cited 2019 Jun 3];9(6):e0003832. Available from: https://dx.plos.org/10.1371/journal.pntd.0003832
8. Jambai A, Leone S, Dafae F, Surveillance ND, Leone S, Alemu W, et al. Sierra Leone Cholera Outbreak Investigation , 2012. 2013;1–66.
9. Beyene BB, Tumato M, Abera B, Maskai O, Luce R. Epidemiology of Acute Watery Diarrhea Outbreak and Challenges of Control — Afar , Ethiopia , 2009. 2014;1(10):162–9.
10. CSA. Central Statistical Agency/CSA/Ethiopia and ICF. 2016. Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF. [Internet]. 2016. 1–555 p. Available from: https://dhsprogram.com/pubs/pdf/FR328/FR328.pdf

1.3. Reemergence of Chikungunya fever in Ethiopia after 3 years, 2019: epidemiological and entomological investigations

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Abstract

Background: Chikungunya (CHIK) is an alphaviridae that causes febrile illness in humans. It was first isolated in Tanzania in 1953. It has a cyclical trend of reemergence 4-30 year's interval once it is identified in a particular place. In Ethiopia, the first outbreak was reported in 2016 in Somali region. A number of cases with unknown febrile illness reported from Adaar district Afar region starting from 8th March 2019. This investigation was conducted to identify the causative agent, source of the outbreak and recommend appropriate interventions.

Methods: Cross sectional study design was conducted. Medical records were reviewed and Patients and clinicians involved in managing the case were interviewed. Descriptive data analysis was done by time, person and place. Serum samples were collected and confirmatory tests were done using Real Time Polymerase Chain Reaction (RT-PCR) techniques in a national arbovirus laboratory. Breteau and container indices were used for the entomological investigation to determine the risk of epidemic.

Results: A total of 1181 Chikungunya cases (AR = 18.9%) were reported from March 2019 to May 24, 2019 from Eliwuha town, Adaar district. All age groups were affected (mean 26, Range 1–90 Years). In week 12, 30% of cases were recorded. Of the total cases, 98.6% cases had fever, 97.9% cases had arthralgia and 96.3% cases had headache. Fourteen of the 19 samples were positive for Chikungunya virus nucleic acid. Aedes mosquitoes (56) were identified as responsible vectors of Chikungunya in affected area. The Breteau indices of Eliwuha town were 22.5%, whereas the container indices were 45%. Indoor residual spray was conducted to control the outbreak in the district.

Conclusion: The investigation revealed that Chikungunya outbreak was reemerged after 3 years in Ethiopia. Aedes mosquito found the area responsible for the outbreak. We recommended to vector control and public awareness campaigns.

Keywords: Chikungunya fever, Mosquito, Outbreak, Adaar, Ethiopia.

Introduction

Chikungunya is a vector borne virus in alphaviridae family passed to humans by Aedes mosquito bite(1). It was isolated in Tanzania where a massive outbreak with unusual illness characterized by crippling joint pain and severe fever in 1953(2). The name Chikungunya was derived from *Makonde* (a language spoken by Makonde, an ethnic group who live in southeast Tanzania and northern Mozambique) root verb kungunyala meaning ''that which bends up'', '' to become contorted'', or ''to walk bent over''(3).

Chikungunya is believed to have originated from Africa and spread to islands off the eastern coast of Africa(4). The first emergence of Chikungunya was confirmed in April 2005 in southwestern Indian region, Comoros Islands which are near to the eastern coast of Mozambique(2). The virus was spread to Mayotte, Mauritius, and the French island of La Reunion. The attack rates for this outbreak in 2005 ranges from 35% to 75%. In 2006, after an apparent gap of about 32 years during which CHIKV was not detected, CHIKV disease has attacked many people in India in numerous states, suspected number of cases ultimately reaching more than 1.3 million(2)(4). The CHIKV outbreak has spread causing large out- breaks in many other countries in Southeast Asia. CHIKV was introduced into countries where it is not endemic by viremic travelers, including Italy, France, New Caledonia, Papua New Guinea, Bhutan, and Yemen(5)(4).

CHIKV was also introduced to the Americas by end of 2013. WHO reported the first local transmission of Chikungunya virus in Saint Martin, a Caribbean island(6). The rapid and explosive spread of CHIKV had caused a morbidity of about 440,000 people in more than 20 American countries, including USA's Florida. In general,CHIKV has spread from the coast of Kenya throughout the Indian Ocean, Pacific, and Caribbean regions, causing millions of cases of disease in over 50 countries.In general, Chikungunya virus epidemics have shown cyclical trends, with inter-epidemic periods ranging from 4 to 30 years(2)(7).

Three genotypes of CHIKV, called West African, East/Central/South African (ECSA), and Asian have been defined, of which the latter two caused large outbreaks. ECSA genotype virus, which had originated from Kenya, was responsible for the epidemics on islands in the Indian Ocean. Thus, it was quite unexpected when the ongoing outbreaks in the Caribbean region were found to be due to an Asian genotype virus. Chikungunya virus has been transmitted by Aedes aegypti

and Aedes albopictus mosquitoes. There is evidence that ECSA strains have been adapted to A. albopictus whereas A.Aegyptus have greater competence for Asian strains over ECSA strains(8)(4)(2).

Laboratory confirmation can be done via detection of CHIKV in blood samples using enzyme linked immune-sorbent assay(ELISA), reverse transcriptase real time polymerase chain reaction (RT-PCR) , real time RT-PCR , indirect immunofluorescence assay, viral culture(virus isolation), neutralization assays, and/or hemagglutinin inhibition assays. Chikungunya virus, as it is a risk group 3 pathogen, is containment in biosafety Level 3 facilities, equipment, and operational practices for work involving infectious or potentially infectious material(9)(10).

The Chikungunya outbreak occurred in Ethiopia in Somali region dolo ado woreda from June 4-27, 2016. The outbreak affects the two Kebeles (kebele 01 and kebele 02) of suftu town. A total of 864 Chikungunya fever cases with no death were reported. Among the cases 439 (50.81%) were females and the rest 425 (49.19%) were males. The attack rate of the outbreak was 4.5%, separately it was 4.4% for males and 4.6% for females(11).

A number of cases with unknown febrile illness reported from Adaar district Afar region starting from 8th March 2019. National and regional RRT deployed for outbreak investigation and response activities in Adaar district Afar region. This investigation was conducted to identify the causative agent, source of the outbreak and recommend appropriate interventions.

Objective

General Objective

- ✓ To assess the source of the outbreak and guiding response activities in the affected Adaar woreda, Afar region, Ethiopia.

Specific Objectives

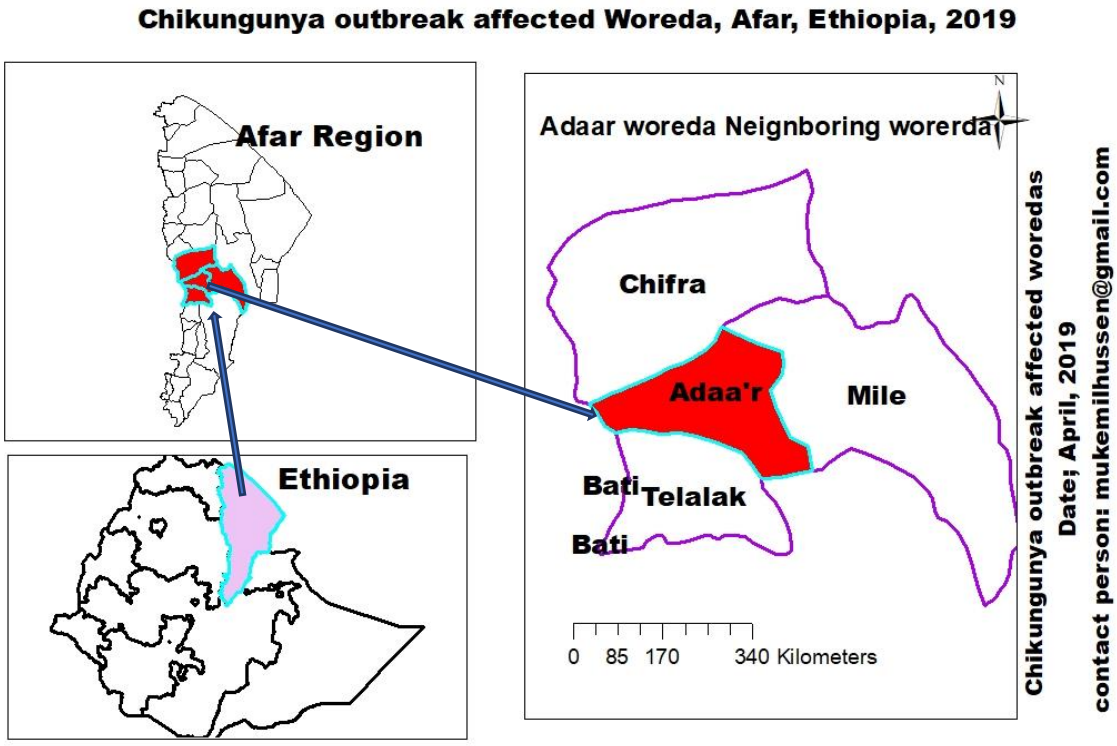
- ✓ To describe the outbreak in terms of place, person and time
- ✓ To identify the causative agent and implement control measure
- ✓ Provide a base line information to help further research

Methods and Materials

Study Area:

The investigation was conducted in Adaar Woreda; it located 122 km far from Samara, which is a capital city of Afar region. The Adaar has neighboring woredas; Chifra in north, Mile in the northeast, Adaytu in south east, Telalak in south, Bati in west (Map 1). The total population of Adaar woreda is 64556, from 2018/19 population projection. Male to female population are 36409 and 28146 respectively. Adaar district has a total of 12 Kebeles (11rural and 1 urban Kebele). Eliwuha is urban kebele with a total population of 6227. Adaar woreda has three Health Centers and eight health post (Source: Adaar Woreda Health Office).

Adaar is one of 32 woreda of Afar, is characterized by an arid and semi-arid climate with low and erratic rainfall. The temperature of the region varies from 25°C during the rainy season (September-March) to 48°C during the dry season (March-September).



Map 3: Map of Adaar Woreda and Neighboring woreda, Afar region April, 2019

Study Design and period

Study design and period: Cross sectional study design was conducted from March to April, 2019

Data Collection: Medical records were reviewed and daily line lists were collected from March 8 to May 24 2019 from Eliwuha health center, house to house visit and Adaar woreda health office. Line lists contain variables such as date of onset of illness, age, sex, district and Kebele (village) name, disease outcome. Patients and clinicians involved in managing the case were interviewed. Case definition from WHO Regional Office for South-East Asia guidelines for prevention and control of Chikungunya fever(12) was used for identifying cases.

Case definition:

Clinical criteria: acute onset of fever >38.5°C and severe arthralgia/arthritis not explained by other medical conditions.

Epidemiological criteria: residing or having visited epidemic areas, having reported transmission within 15 days prior to the onset of symptoms.

Laboratory criteria: Virus isolation or Presence of viral RNA by RT-PCR or Presence of virus specific IgM antibodies in single serum sample collected in acute or convalescent stage

Specimen Collection and Laboratory Investigation:

Serum samples were collected and transported according to the recommended cold chain to identify the cause of the unusual febrile illness.

Entomological Investigation

Entomological investigation was conducted. Container holding water was searched in each of the households in indoor and outdoor environment. Larval sampling would cover the domestic and peri-domestic environments in order to estimate risk indices. The entomologist was accompanied by health extension workers for each of the HHs and possible larval breeding sites during the survey period. The health extension workers explained the purpose of the visit to the owner of the houses visited. Informed oral consent was obtained from the head of the households for larval and adult mosquito collection. As result, different techniques have been applied to identify mosquito breeding sites, immature (larval and pupa) and adult collection have been tried.

Data quality and analysis

Data was checked and cleaned. Description of the line list was performed by time, person and place using Microsoft Excel 2016. Attack rate was calculated by dividing the number of cases to the population (Source: Adaar Woreda Health Office) and multiplied by 100.

Ethical Issues:

Support letter was written to those concerned so as the national investigation team, as a public health emergency response body, can responsibly and accountably undertake the response activity at the site of the outbreak. Serum samples were collected only aiming to investigate the causative agent of the unusual febrile illness and to guide appropriate outbreak control interventions. The direction was given from EPHI, the government organization which has a full mandate to conduct epidemiological and laboratory investigation, and respond to any public health emergencies.

Result

Laboratory Investigation result.

Laboratory tests were performed for Dengue fever Virus and Chikungunya viruses for a total of19 serum samples by Real Time Reverse Transcriptase Polymerase Chain Reaction (rRT-PCR) technique to identify the etiology of the existing febrile illness. Five serum samples were received by the national arbo virus laboratory (based in the national influenza laboratory). Two (2/5) serum samples were positive for Chikungunya virus by Real Time Reverse Transcriptase Polymerase Chain Reaction (rRT-PCR) technique. Additional 14(12/14 Positive) specimens were taken by the investigation team and the test was done at EPHI arbo virus laboratory. A total of 14(73.6%) samples were positive for Chikungunya virus. The remaining 5(26.3%) cases were negative for Chikungunya fever virus by rRT-PCR.

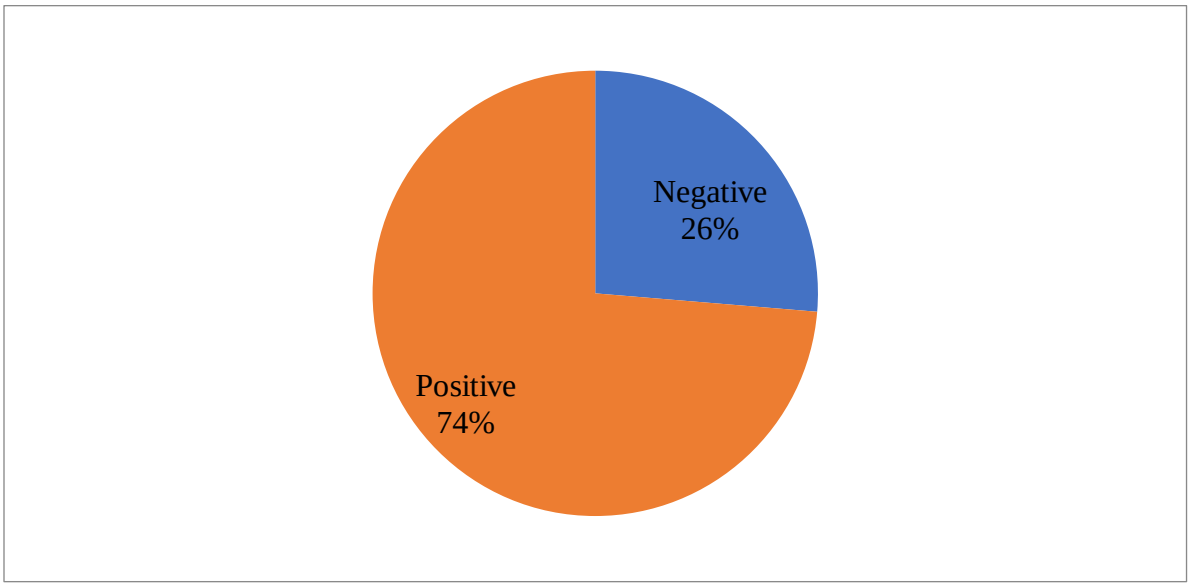


Figure 11: Laboratory result of specimens taken from Chikungunya fever cases Adaar woreda, Afar region, April 2019

Entomological Findings

Different artificial water holding containers have been identified and Larval and pupa were collected three times and grown at room temperature. The adults grown were initially seen only *Culex* (120) and *Anopheles* (65) mosquitoes. However, after frequent investigation of almost all areas both day and night, significant numbers of Aedes species (56), mosquitoes have been identified.

The artificial water holding usable containers investigated were mostly metal barrels and plastic rottos found in local flour mill grinder fabrics. Almost all (8) existing flour mills were seen to be observed with larvae and adult mosquitoes.

Table 7: Entomological investigation findings in Eliwuha town Afar region, Ethiopia, April, 2019

Woreda	Kebele	Type of vector found	Vector Indices				
			Breteau Index	House Index	Container Index	Adult collection (Yes / No)	Vector RT-PCR
Adaar	Eliwuha	Culex, Anopheles and Aedes	22.5 %	11.25 %	45%	Yes	Pending

High larval index = House Index ≥5% and/or Breteau Index ≥ 20;

Low larval index = House Index ≤5% and/or Breteau Index ≤ 20;

Breteau index = (Number of positive containers / Number of houses inspected) X 100

House index = (Number of infested houses / Number of houses inspected) X 100

Container index = (Number of positive containers / Number of containers inspected) X 100 RT - PCR = Real time polymerase chain reaction

Adult Mosquito Collection

Adult mosquito collection was conducted using WHO standard hand aspirators from around artificial water holding containers from both indoor and outdoor during late night and early morning and transferred to prepared paper cups then preserved in cryogenic tubes for further identification.

Figure 12: Aedes aegypti mosquito Causing Chikungunya outbreak in Adaar district, Afar, Ethiopia, April, 2019

Descriptive Epidemiology

Chikungunya fever confirmed outbreak began in Eliwuha town, 01 Kebele, Adaar Woreda (district), Zone 1, Afar region. The main signs or symptoms associated with this outbreak due to Chikungunya infection were fever (99.2 %), joint pain (98.6 %) and headache (96.9%) of all patients.

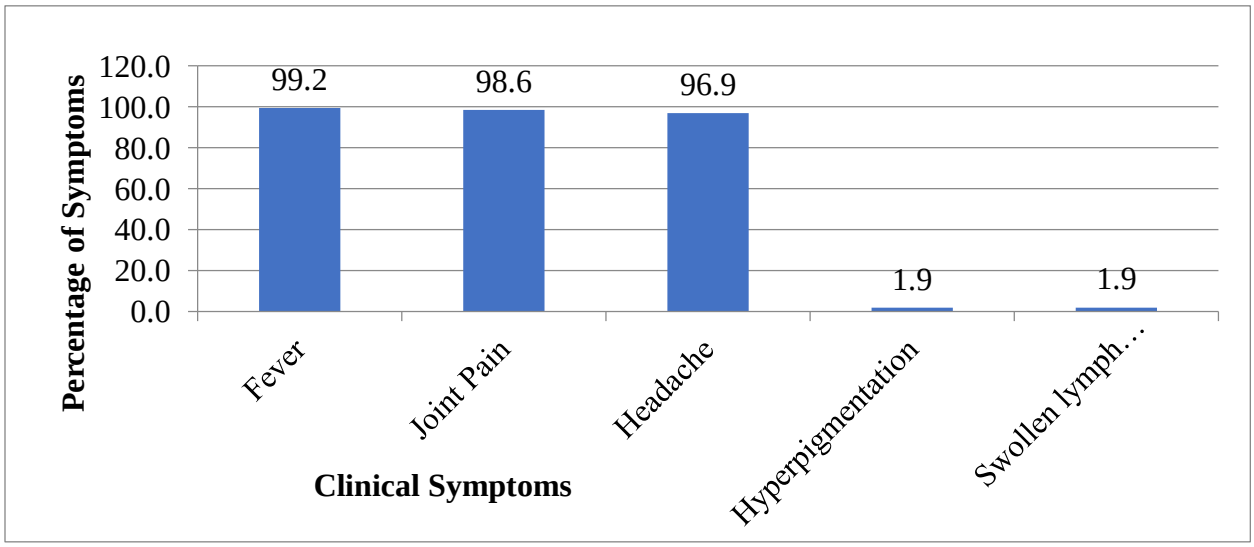


Figure 13: Clinical symptoms of Chikungunya outbreak in Adaar District Afar, Ethiopia, April, 2019

A total of 1181(AR=18.9%) Chikungunya fever cases with no death related to this outbreak. The outbreak hits almost all village of Eliwuha town 01 Kebele (1102(93.3%)) and only 79(6.7%) cases from other Kebeles (Adaar town, Jeldi, Abaco, Ledi, Woranso, Woanto, and Furso).

Table 8: Distribution of Chikungunya Cases by kebele in Adaar woreda Afar region, April, 2019

Outbreak Affected Kebele	Number of Cases	Percentage (%)
Adaar	11	0.9
Adaytu & Abaco	10	0.8
Busidima	2	0.2
Eliwuha	1102	93.3
Jeldi	14	1.2
Ledi	6	0.5
Seilu & Woki	6	0.5
Woantu & Fursa	7	0.6
Woranso& Hormati	23	1.9

Among the cases, 687 (58%) of Males were affected by the outbreak. Separately sex specific attack rate in the district was 14.5% for males and 17.5% for females.

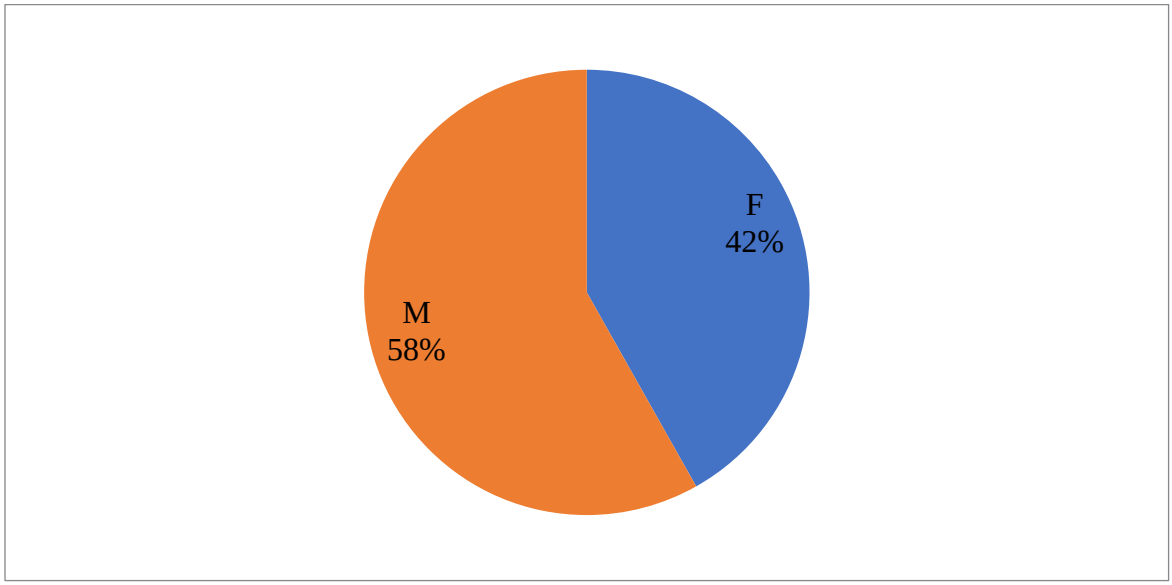


Figure 14: Distribution of Chikungunya cases by sex, Adaar district, Afar, Ethiopia April, 2019

Table 9: Distribution of Chikungunya cases by sex, with sex specific attack rate, Adaar district, Afar, Ethiopia 2019

Sex	Number of cases	Percentage (%)	Population	AR (%)
Male	687	58	3400	14.5
Female	494	42	2827	17.5

The age of cases ranges from 1 year to 90 years with a mean of 26 years old. Almost all age groups were affected. Among age group 10-29(55.4%) years old was most affected age group.

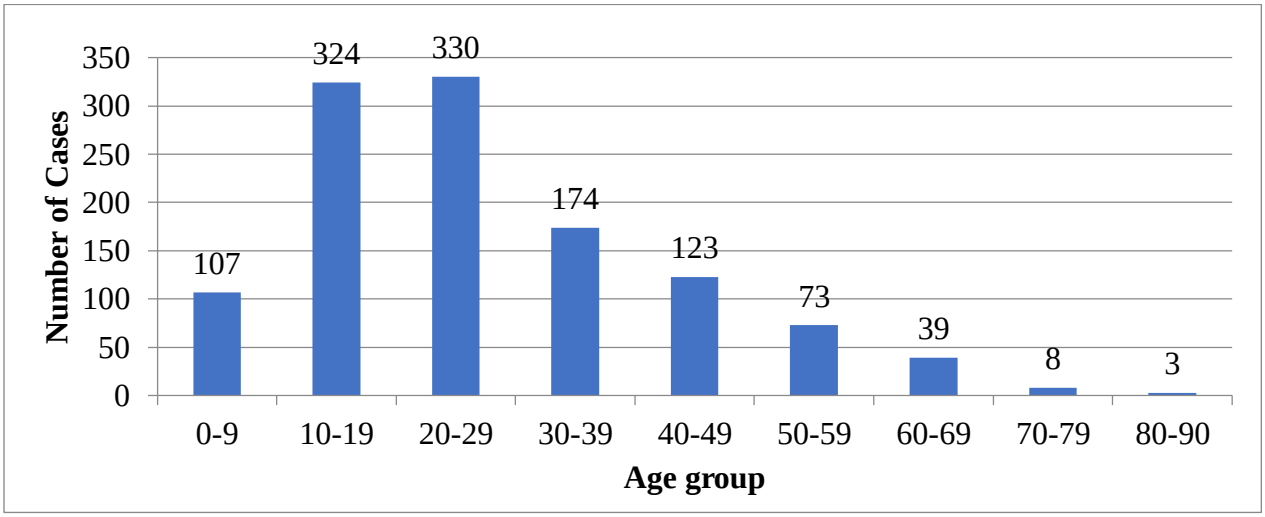


Figure 15Distribution of Chikungunya Cases by age group in Adaar woreda Afar region, April 2019

Three suspected index cases from one family have a travel history to Eritrea-Asab before 25 days ago and developed symptom of joint pain and fever treated at Eliwuha in Health center was reported in March 8, 2019.

Mrs. Zahara Oumer is homemaker of the family. She, her young son and her husband have travel history to Asab in Eritrea. They were in Asab for 4 days. She told us that an outbreak with the same sign and symptom happened. As she told us, most of the people in Asab affected by the disease. They used to call it by *welcome or Ferkis*.

The Chikungunya outbreak began in Adaar district in March 7 and notified to regional health Bureau and Ethiopian public health institute, Public emergency management (EPHI/PHEM) in March 8, 2019.immediately outbreak investigation began and response interventions were conducted and the outbreak was controlled in May 22, 2019.

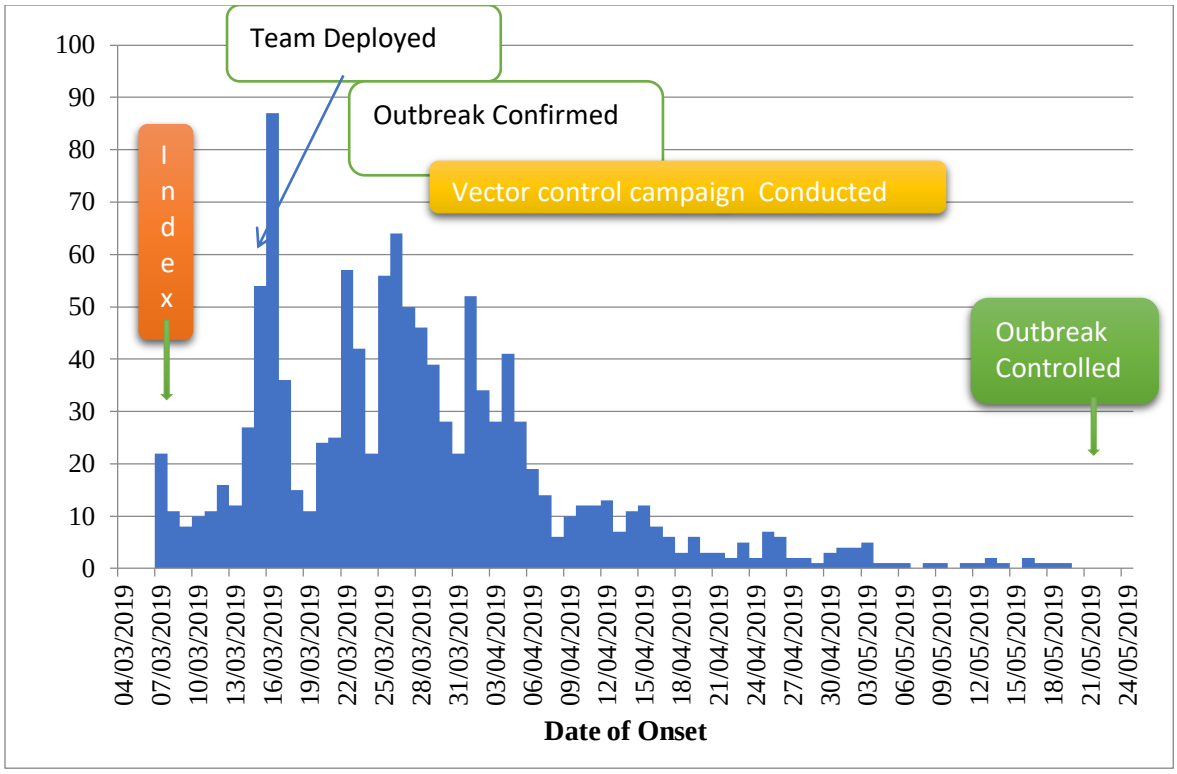


Figure 16: Epi curve of Chikungunya Fever outbreak, Adaar woreda, Afar region, May, 2019

Chikungunya outbreak began in week 8 and reaches its pick in week 12(the highest number of cases recorded), then start to decline after vector control campaign conducted after week 13, and finally the outbreak was controlled in week 20, 2019.

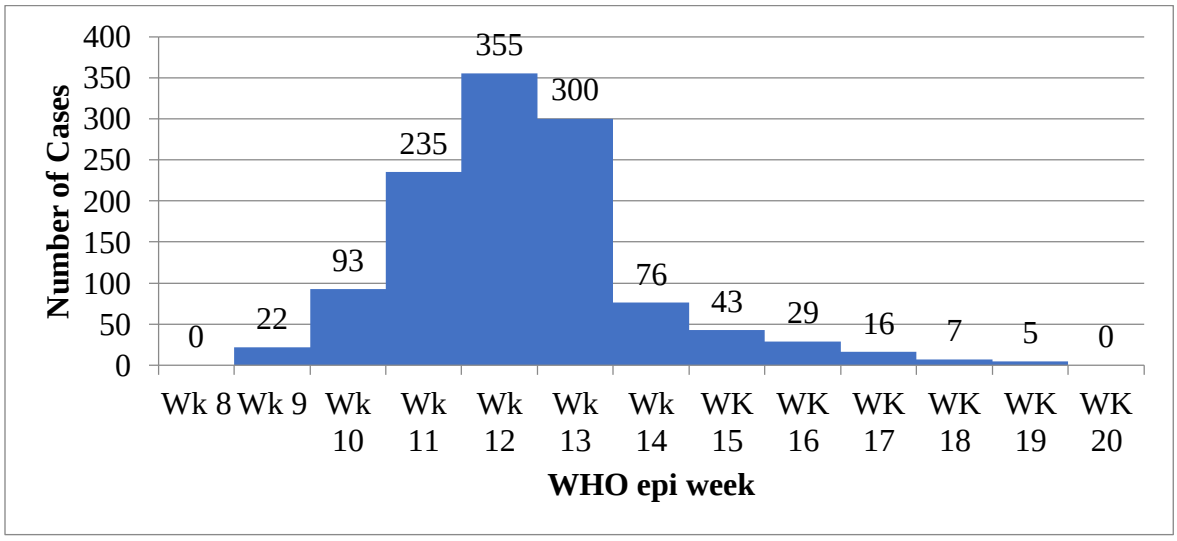


Figure 17: Distribution of cases by WHO epi week, Chikungunya fever outbreak, Adaar woreda Afar region May, 2019

Outbreak Interventions

Coordination of the outbreak response in the district and case management at health facility, surveillance, and Social mobilization and Vector control (IRS) activities were conducted at community and house hold level to control the outbreak.

- Regional command post meeting held weekly with all partners working in the region
- Response plan was prepared and shared to all stake holders to support the response activities.
- the cases were managed in Eliwuha Health center symptomatically as it has no treatment yet,
- Epidemiological, entomological and laboratory investigations were done, control and prevention activities were implemented.
- Briefing of the vector type and way of prevention and control of the vectors, for the officials at regional level.
- Vector control (IRS) campaign was done all villages of Eliwuha Kebele, Adaar woreda.
- Social mobilization and health Education activity on ITN utilization was also implemented to curb the outbreak.
- Active cases search using case definition was done

Discussion

Chikungunya is endemic in Africa, south-east Asia and on the Indian subcontinent with outbreaks occurring beyond the well-known endemic areas from 2005(13). Compared to this historical occurrence, this is the second documented Chikungunya outbreak occurred after three years in the Ethiopia. It might have been introduced by travellers from Eritrea where outbreaks were suspected.

CHIKV is transmitted by the bite of Aedes mosquitoes mainly A. aegypti(14). In entomological investigation have been identified significant numbers of Aedes species (56), mosquitoes causing Chikungunya outbreak in Ethiopia.

Typical clinical signs of the disease include fever and severe arthralgia, which may persist for weeks, months, or years(13). The main signs or symptoms associated with this outbreak due to Chikungunya infection were fever (99.2 %%) and sever arthralgia -joint pain (98.6 %) of all patients.

The attack rate (AR=18.9%) of this Chikungunya virus outbreak was much higher than that of previously documented outbreak in Ethiopia (AR=4.5%)(11). And also higher than Chikungunya virus outbreak in Sint Maarten, 2013–2014(AR=1.76%)(15). The difference may due high number of susceptible population in Adaar district Eliwuha town and the presence disease transmitting vector in the area.

In this outbreak, More reported cases among females (AR=17.5%) than males affected by the outbreak. As reported in other CHIKV out-breaks, there were more reported cases among females than males. This may be due to greater health-seeking behavior, differing levels of exposed skin, and greater exposure due to peri-domestic activities among women versus men.

The largest proportion of CHIKV cases (28%) were in the 20–29 year age group, and 80.5% of those occurred within patients 10–59 years old, suggesting both short- and long-term economic effects from the disease, including a drop in workplace productivity due to absenteeism, as a result of disease sequelae. Another possible effect, given that symptoms may persist for weeks, months, or years, is an increased burden on health and social services.

The number of affected people in the period of outbreak is nearly numerous with that reported in Indonesia in 2007 although the later had reported cases from multiple districts(12). The number

of reported cases associated to this first outbreak 1181cases is much lower than what neighboring Kenya had experienced for the first time in 2004 that attached 13,500 people in Lamu county which represents 70 per cent of the population(16).

An outbreak of Chikungunya in Comoros in 2005 was once the cause of morbidity to 450 case per week in May 2005 and peak at the end of January 2006 (45,000 cases / week), which resulted in cumulated cases of 266.000 end of June 2006(About 1/3 of the population has been infected)(17).in our case, all the cases were report in the month March to April, 2019, which resulted in a maximum number of victims of 355 cases per week at epidemiological week 12.This may be due to the smaller number of population living in and limited movements into and out of this Kebele, or prompt response in environmental management to interrupt Chikungunya transmission.

Knowing the genotype of Chikungunya is crucial to understand the source and linkage of the outbreak because its pathogenicity may worsen as it mutates like that in La Reunion islands(2)

Unexpectedly, a new lineage, the East- Central -South African genotype, was introduced from Angola in the end of May 2014 in Feira de Santana (FSA), the second largest city in Bahia state, Brazil, where over 5,500 cases have now been reported(8). In this year, Chikungunya is reported in much number than last year (2015) in India(18). This may be the conduciveness of the environment for the spread of *Aedes* mosquito as a result of the global climate change.

The massive outbreak of Chikungunya virus which started in 2013 in the Americas has resulted in nearly 1 million cases and 71 deaths by the end of 2015(8). Although the genotyping was not done for this outbreak in Ethiopia, having no reported death due to Chikungunya is fortunate unlike could have been deaths attributed to Chikungunya outbreak in Americas by the Asian type.

Limitations

- The association of possible risk factors with the cases was not evaluated in this description as it needs analytical approach

Lessons Learned and Opportunities

As part of capacity building, Ethiopian public health institute had provide frontline field epidemiology training for woreda PHEM focal person to build their capacity on outbreak Investigation. Hence they can detect unusual event that never be reported before like Chikungunya for the first time. This will support surveillance and outbreak investigation for timely detection and response of public health emergencies. But they have no necessary material like guide lines Chikungunya and Budget from government that hinders their activity.

Conclusion and Recommendation

The investigation revealed that Chikungunya outbreak was reemerged after 3 years in Ethiopia. Aedes mosquito found the area responsible for the outbreak. Hence the outbreak may be spread to neighboring regions and woreda. We recommended to vector control and public awareness campaigns. Health professionals should be equipped with training regarding detection, response and management of reemerging diseases like Chikungunya. Preparing Chikungunya guideline should be an immediate task to facilitate detection and management.

Further analytical study should be conducted to identify risk factors.

Reference

1. Weaver SC, Lecuit M. Chikungunya Virus and the Global Spread of a Mosquito-Borne Disease. N Engl J Med. 2015;

2. Morrison TE. Reemergence of Chikungunya Virus. jvi,asm. 2014;88(20):11644–5.

3. Seppa BN, America L, Africa E. Chikungunya is on the move. Sci News. 2016;1–2.

4. Sam I, Chan Y, Roques P, Al SAMET. Updates on Chikungunya Epidemiology, Clinical Disease, and Diagnostics 1 1. 2015;15(4):223–6.

5. Staples JE, Breiman RF, Powers AM. Chikungunya Fever : An Epidemiological Review of a Re-Emerging Infectious Disease. 2009;49(figure 1):943.

6. Martin S, Barth S, Barth S, Islands BV, Guiana F, Public C, et al. 2013–14 chikungunya outbreak. Wikipedia, Free Encycl. 2016;(December 2013):1–3.

7. cdc. Preparedness and Response Plan for Chikungunya Virus Introduction in the Caribbean sub-region. 2012. 1–2 p.

8. Faria R, Junior C, Epidemiology AL, Virus C, Currents P, Faria NR, et al. Epidemiology of Chikungunya Virus in Bahia ,. 2016;(May 2015):2–5.

9. Canada Pha Of. Chikungunya Virus Pathogen Safety Data Sheet - Infectious Substances Section I - Infectious Agent. In: Pathogen Safety Data Sheet,Infectious Substances. 2010. P. 1–5.

10. Sahadeo N, Mohammed H, Allicock OM, Auguste AJ, Widen G, Badal K, et al. Molecular Characterisation of Chikungunya Virus Infections in Trinidad and Comparison of Clinical and Laboratory Features with Dengue and Other Acute Febrile Cases. PLoS Negl Trop Dis. 2015;6–11.

11. Desalegn Belay Takele1, 2, Diriba Sufa1, 2 , Mesfin Mengesha1, Adamu Tayachew1, Abyot Bekele1, Solomon Abebe2, Mohammed Wali3 , Berhane Beyene1 DJ. Chikungunya Final-Descriptive. 2016. p. 18.

12. WHO S. Guidelines for Prevention & Control of Chikungunya Fever. 1 p.

13. Van Bortel W, Dorleans F, Rosine J, Blateau A, Rousseau D, Matheus S, et al. Chikungunya outbreak in the Caribbean region, December 2013 to March 2014, and the significance for Europe. Eurosurveillance. 2014;

14. Vu DM, Jungkind D, LaBeaud AD. Chikungunya Virus. Clinics in Laboratory Medicine. 2017.

15. Henry M, Francis L, Asin V, Polson-Edwards K, Olowokure B. Chikungunya virus outbreak in Sint Maarten, 2013-2014. Rev Panam Salud Publica [Internet]. 2017;41:e61. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28902274

16. Dahir MD. 540 admitted in Mandera following Chikungunya outbreak. 2016;

17. Charrel R. Chikungunya outbreaks. In p. 14.

18. Ist PM, News H, Delhi N, Supplements B, Olympics S, Opinion EV, et al. AIIMS records 241 cases of chikungunya this year. 2016;(August):1–3.

CHAPTER-II

2. Surveillance Data Analysis Report

2.1. Dysentery Surveillance Data Analysis report in Afar region, Eastern Ethiopia 2013-2017 GC.

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Abstract

Background: Dysentery is an intestinal inflammation that can lead to severe diarrhea with mucus or blood in the feces. In March 2018**,** we conducted a Dysentery surveillance data analysis to describe the trend, incidence, and prevalence of dysentery in the, Afar region.

Methods: We conducted descriptive cross sectional study on dysentery surveillance data of the years from (2013-2017). We reviewed Integrated Disease Surveillance and Response system database and HMIS report of the Afar regional health Bureau trend analysis, incidence, and prevalence rates were calculated. Data was analyzed using Excel-2016.

Results: A total of 88751 dysentery cases and 11 deaths were recorded during the study period (CFR=0.012%). Of which 46216(52.1%) were males. Higher dysentery cases 36589(41.2%) were reported among age group greater than 15 years old. There were 25736(29%) dysentery cases in Zone one followed by 20590(23.2%) Zone three. The Prevalence was 4.9% and the highest (1754 per 100000 populations) incidence rate was reported in 2015. Dysentery cases were begun to increase in summer season from June to September. Almost half (49.9%) of dysentery cases were not reported by Surveillance system compared to HMIS report.

Conclusion: Dysentery is common in Adult age group greater than 15 years old. The disease is widely distributed throughout the region and it is common in both rural areas than urban areas. Peak of dysentery cases observed from June to September. Half of dysentery cases were not reported through surveillance system. Hence, the region should strengthen surveillance system and implement proper public health intervention such as health education regarding personal hygiene and proper case management so as to alleviate the problem from the community

Key word: Dysentery, Incidence, Afar

Introduction

Background

Dysentery is an intestinal inflammation, especially in the colon, that can lead to severe diarrhea with mucus or blood in the feces. The micro-organisms that can cause bloody diarrhea include Shigella, Escherichia coli (E. coli), non-typhoidal salmonella, Campylobacter jejuni and E.hytolytica. Shigella is the most common causes of outbreak of bloody diarrhea and can cause lead to severe bloody diarrhea. The genus Shigella includes S.dysenteriae, S.flexneri, S.boydii and S.sonnei, also designated as A, B, C and D sero-groups respectively [1].Shigella can mainly spread among people through contaminated food and water as well as poor sanitation (2).

After an incubation period of one to four days, patients typically present with diarrhea, characterized by the frequent passage of small liquid stools that contain visible blood, with or without mucus. All cases of bloody diarrhea should be treated promptly with an antimicrobial that is known to be effective against Shigella. The prevention of dysentery caused by Shigella relies primarily on measures that prevent spread of micro-organism within community and from person to person. These measures include hand-washing with soap, availability of safe drinking water, safely disposal of human excreta, breast feeding of infants, safe handling and processing of food and control of flies [3].

Since the early 1990's, the emerging of strains of Shigella dysenteriae type 1 resistant to most antibiotics, the high case-fatality rate (up to 50%) and the epidemic potential(up to 30% of population) make dysentery one of public health concerned disease under surveillance to detect its outbreaks and control endemic burden as essential [4, 5].

Statement of the problem

Globally, bloody diarrhea (dysentery) is wide spread and can occur as outbreak. It affected 164.7 million people yearly with 1.1 million deaths worldwide. Annually, Shigella is responsible for 160 million infections in developing countries with an estimated 1.1 million deaths [7]. In Africa, the outbreak of dysentery caused by shigellosis had reported in different times in different part of the continent [8]. In Zambia, from June 1990 to November 1991, there were close to 30,000 dysentery cases reported [9]. There were 110,361 dysentery visits in 1991 in Burundi and was estimated to be 16.3 per 1,000 [10]. In 2016 first week only, there were 263,457 suspected dysentery cases with case fatality rate 0.01% reported in Africa [11].

In Ethiopia, the first massive dysentery outbreak was occurred in 1979 with approximately 5000 dysentery cases reported in one month interval and the overall attack rate was 7.3% percent [12]. In December 2008, there was 566 suspected and confirmed cases of shigellosis outbreak were reported in Jimma City [13]. In March 2010, Addis Ababa technology campus reported 104 suspected cases with attack rate of 6.8% [14]. In 2013G.C, there were 263,457 dysentery morbidity cases with CFR of 0.01% reported in Ethiopia from all health institutions [15]. According to DHSA 2010 stated that the prevalence of bloody diarrhea in Afar is 3% [16]. Annual IDSR 2017 report of Afar indicated there were 1602 dysentery cases annual. But HMIS 2017 report of the region indicates there were 16,858dysentery cases no death [15].

Diarrheal disease outbreaks are common in overcrowded communities and in developing countries where poor hygiene, unsanitary conditions and unsafe water supplies are present and such living conditions create an environment in which diarrheal pathogens are easily transmitted. Refugees, internally displaced persons and children are at high risk. The most common ways of transmission in such outbreaks are food and water-borne via fecal–oral route. Transmission of diarrheal pathogens through the food supply is a major problem both in the developing world and in the United States, where 400-600documented food-borne outbreaks and millions of cases are estimated to occur each year. (4)

Study Rationale

Analysis of dysentery surveillance data analyses is useful for public health authority because is used for guiding immediate public health action, program planning and evaluation and monitor trends in the burden of disease in order to have proper planning in the future outbreak.

Literature review

The study conducted in low income country reveals dysentery estimated incidence among the age groups of 5-14 years, 15-59 years and above 60 years was 13.5%, 15.6%, and 18.5% respectively [7]. The largest outbreak of dysentery occurred in western Africa was reported in 1999, by Medicines' Sans Frontiers' (MSF) in the Kenema district in the southeastern part of Sierra Leone. The total number of cases was 4,218, with an overall attack rate and CFR of 7·5% and 3.1% respectively. The attack rate 11·2% and CFR 6·1% was higher among children under the age of 5 years compared to the rest of the population [8].In 2013G.C, there were 263,457 dysentery morbidity cases and 17 mortality case reported in Ethiopia from all health institutions [15].

Diarrheal disease outbreaks are common in overcrowded communities and in developing countries where poor hygiene, unsanitary conditions and unsafe water supplies are present and such living conditions create an environment in which diarrheal pathogens are easily transmitted. Refugees, internally displaced persons and children are at high risk. The most common ways of transmission in such outbreaks are food and water-borne via fecal–oral route. Transmission of diarrheal pathogens through the food supply is a major problem both in the developing world and in the United States, where 400-600documented food-borne outbreaks and millions of cases are estimated to occur each year [16].

In December 2008, 566 suspected and confirmed cases of shigellosis were reported in an outbreak in Jimma City. This outbreak witnessed that there was male dominances 77% of dysentery case among total suspected and confirmed cases [13]. The study conducted in Nanning province of china revealed that the burden of dysentery among males was more than females but study conducted in Iran explained that the ratio of dysentery cases among male and female was equal that is 1:1 [1]. December 31st, 2012, a total of 4775 BD confirmed cases were reported in Guangzhou province of china, of which 55.4% (2481) were male patients and 44.6% (1994) were female patients. The study conducted in Beijing, China, revealed that the incidence of

dysentery was higher in males than females *[17].*Bacillary dysentery was observedin all age groups, butchildren <5 years of age and adults ≥60 years of age had higher incidence rates of bacillary dysentery others in Iran [18]. The proportion dysentery in children <5yrs in Guangzhou, chinawas 36.08% of all ages [19].

The environmental factors that lead to seasonal transmission of dysentery may be peaks during the rainy season may be related to increased contamination of water supplies, seasonal worsening of nutritional status, or increased susceptibility to infection. In China during 2004–2014, bacillary dysentery presented obvious seasonal characteristic. The majority of bacillary dysentery cases occurred from June to September, during which 57.60% of cases were reported. The seasonal index was highest in August with average monthly incidence rate was 41.97 per 100,000 person-years [20]. More recent study in Iran indicated that the incidence of dysentery highest in August and September while lowest in January and February [1]. High temperature directly affected the health of population especially by increasing incidence of communicable disease like dysentery. The study conducted in yang's province of china indicated that if weather temperature increased, the incidence of dysentery increased from 12% to 16%. The increased temperature affects the incidence of dysentery cases in several ways. Firstly, when temperature increased, the survival and replication highly increased. Secondly, the increase of temperature is optimal for growth of bacillary dysentery reproduction of fly [21].

Objective

General Objective

To describe burden of dysentery cases in Afar regional state from 2013- 2017

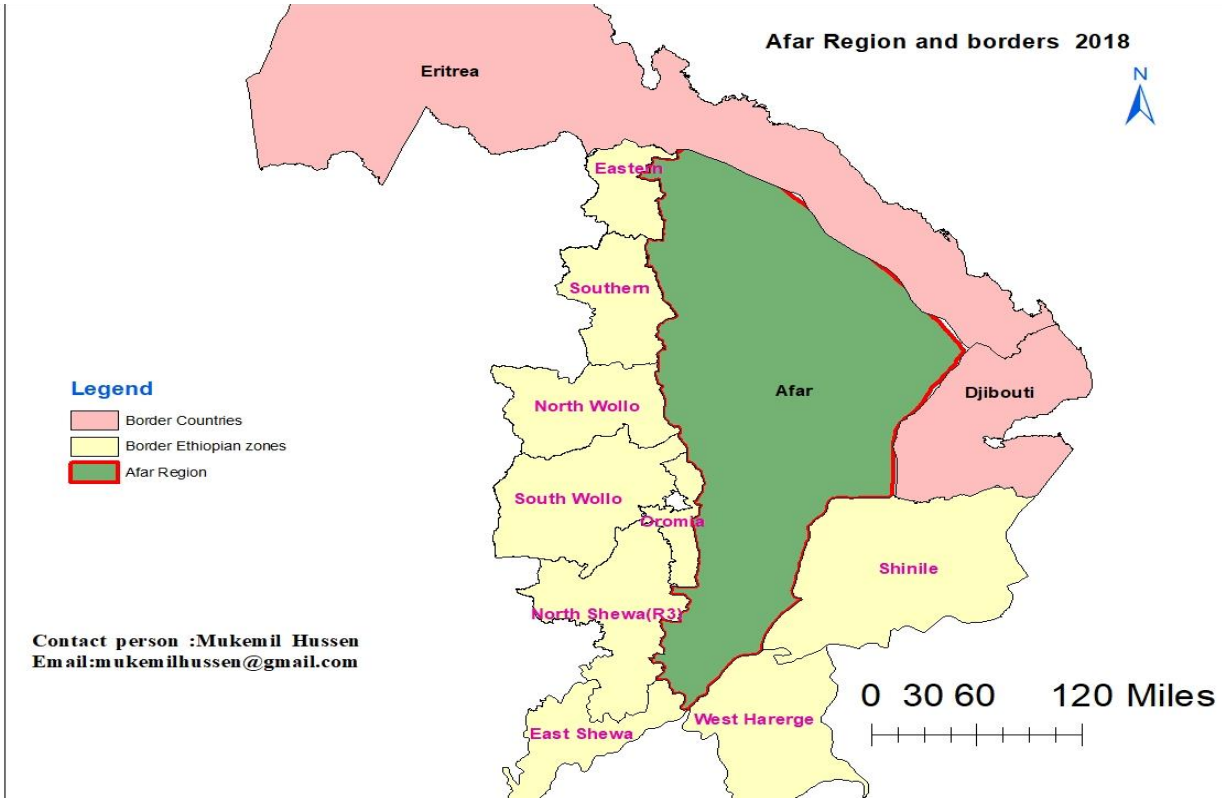
Specific Objectives

- To assess burden of dysentery cases in the region,
- To describe dysentery cases in terms of person, time and place.
- To look for case trends by time.

Methods and Procedures

Study Area

Afar is located in the eastern part of Ethiopia. The region has common boundaries with the State of Eritrea in the north-east, with Tigray in the north-west, with Amhara in the south-west, with Oromia in the south, with the State of Somalia in the south-east and with the Republic of Djibouti in the east. Based on the 2017 projections by the Central Statistical Agency of Ethiopia (CSA), the Afar Regional State has a population of 1,812,002, consisting of 991,000 men and 821,002 women; urban inhabitants number 346,000 of the population, a further 1,466,000 were pastoralists. With an estimated area of 96,707 square kilometers, this region has an estimated density of 14.38 people per square kilometer. For the entire region 247,255 households were counted, which results in an average for the Region of 5.6 persons to a household, with urban households having on average 4 and rural households 6 people.



Map 4: Map of Afar region, Ethiopia, 2018

Study design and Study period

We conducted descriptive cross sectional study design on dysentery surveillance data of Afar region. Five consecutive years (2013-2017) dysentery surveillance data and HMIS data was obtained from Afar RHB PHEM in March 2018. We analyzed and interpreted it from 5-15, March, 2018.

Data source: Review of Dysentery surveillance data from EPHI/PHEM data base & Afar RHB HMIS databases

Case definitions

Suspected

Any person with a diarrhea with visible blood in stool diagnosed clinically as Dysentery.

Confirmed

A suspected case confirmed by stool culture positive for *Shigella dysenteriae*.

Data Analysis Procedures

Trend analysis, incidence, and prevalence rates were calculated. Data analysis was carried out by using Microsoft office excel 2016 and Epi info version 7.2.

Dissemination of Results

Analysis result of this dysentery surveillance data was submitted timely to AAU/School of public health/Department of EFETP, EPHI/FMOH and Afar Regional Health Beauro by hard copy and electronic soft copy.

Ethical consideration

Official permission was obtained from EPHI/PHEM and Afar Health Beauro before the data review.

Result

Descriptive Epidemiology

HMIS reported dysentery cases distribution by Person

In Afar regional state a total dysentery 88751 cases (AR=49/1000 population) and 11 deaths (CFR=0.012%) were reported from 2013 to 2017. Among these cases, 46216(52.1%) were male patients and 42535(47.9%) were female patients.

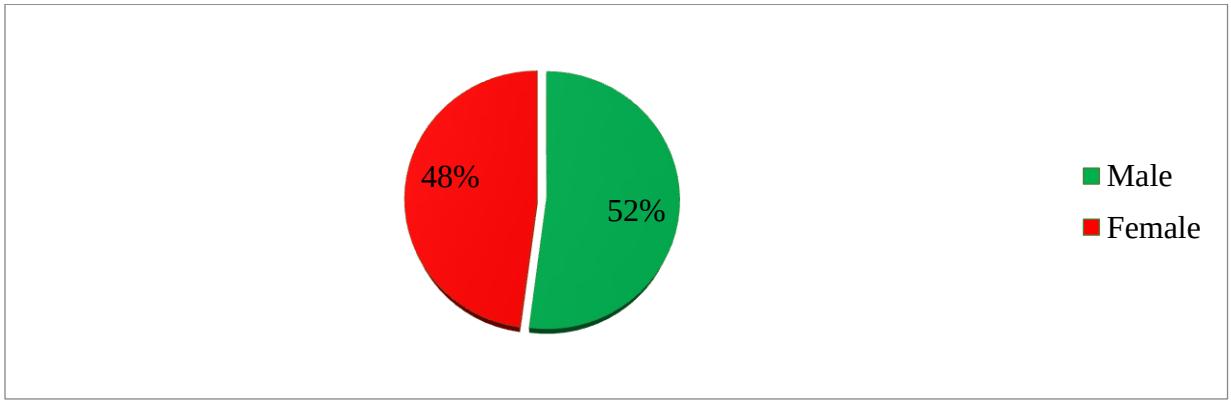


Figure 18: The distribution of dysentery cases by sex reported by HMIS from 2013-2017, Afar region Ethiopia, 2018

The most affected age group were adults >=15 years 36589(41.2%) followed by age group 5 to 14 years 26859 (30.3%) cases.

Table 10: The distribution of dysentery cases by age reported by HMIS from 2013 to 2017, Afar region, Ethiopia, 2018

S.N	Age of reported cases	Frequency	Percentage
1	0-4yrs	25303	28.5%
2	5-14yrs	26859	30.3%
3	>=15yrs	36589	41.2%
Total		88751	100%

HMIS reported dysentery cases distribution by Place

The highest dysentery cases were reported from Zone 01 (25736 cases (29%)), followed by Zone 03(20590 cases (23.2%)) and least report was from Zone 04 (13135 cases (14.8%)) of the region.

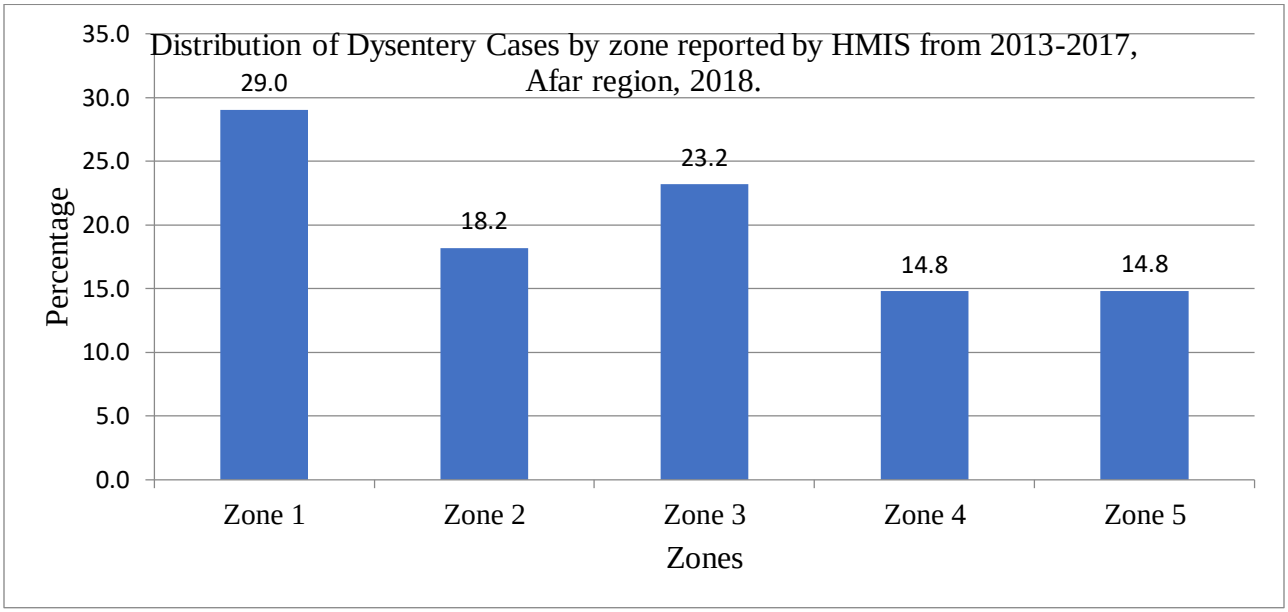


Figure 19: Distribution of dysentery cases by zone reported by HMIS from 2013-2017, Afar region, 2018

Five year cumulative prevalence of dysentery in Afar region was 49 cases per 1000 population and the prevalence of the disease was higher (50 cases per 1000 population) in zone 2, 3, & 4 while the least prevalence was recorded in zone 5 (45 cases per 1000 population).

Table 11: Cumulative Prevalence of Dysentery in each zone from 2013-2017 reported by HMIS, Afar region, 2018

Zone	Total number of dysentery cases	Midyear population in Zones	Prevalence per 1000 population
Zone 1	25736	521,649	49
Zone 2	16153	322,519	50
Zone 3	20590	411,106	50
Zone 4	13135	261,079	50
Zone 5	13138	291,567	45
Total	88752	1,807,920	49

HMIS reported dysentery cases distribution by time

The highest numbers of dysentery cases were reported in 2015(28824 cases (32.5% of the total cases) and the trend decreases later on.

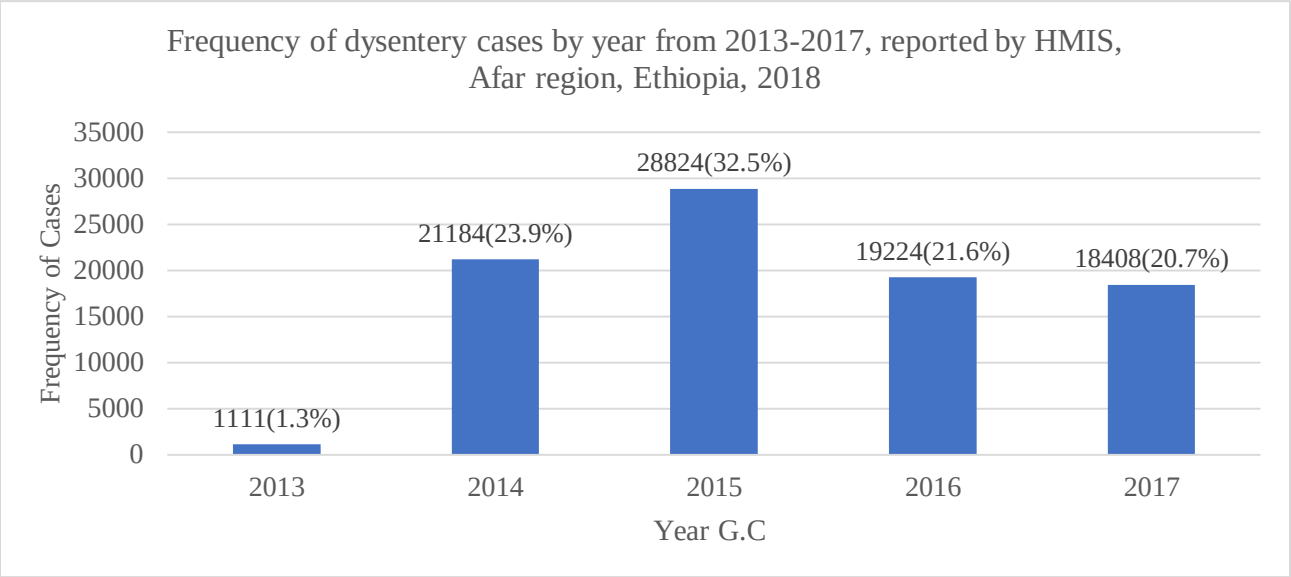


Figure 20: Total number of dysentery cases by year from 2013-2017, reported by HMIS, Afar region, Ethiopia, 2018

Trend of dysentery shows highest incidence rate (1754 cases per 100000 populations) was recorded in 2015 G.C.

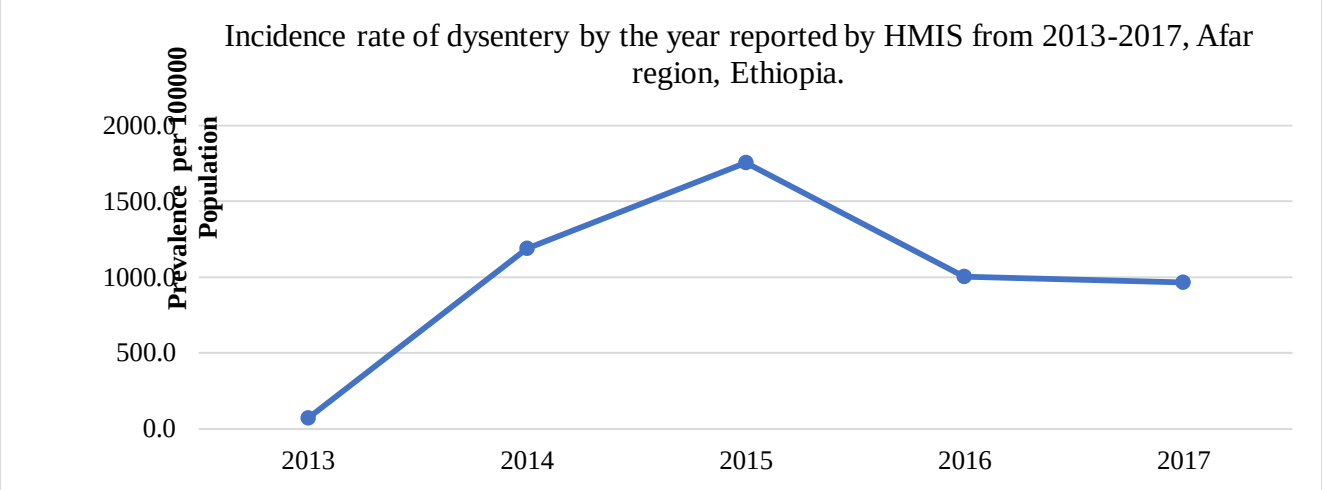


Figure 21: Trend of dysentery by the year from 2013-2017, reported by HMIS, Afar region, Ethiopia, 2018.

Regarding seasonal Changes, HMIS report indicate that dysentery cases were begun to increase in summer season of the year (from June to September) and decreased in dry season of the year (from February to March). In 2015 the highest numbers dysentery of cases were recorded in November.

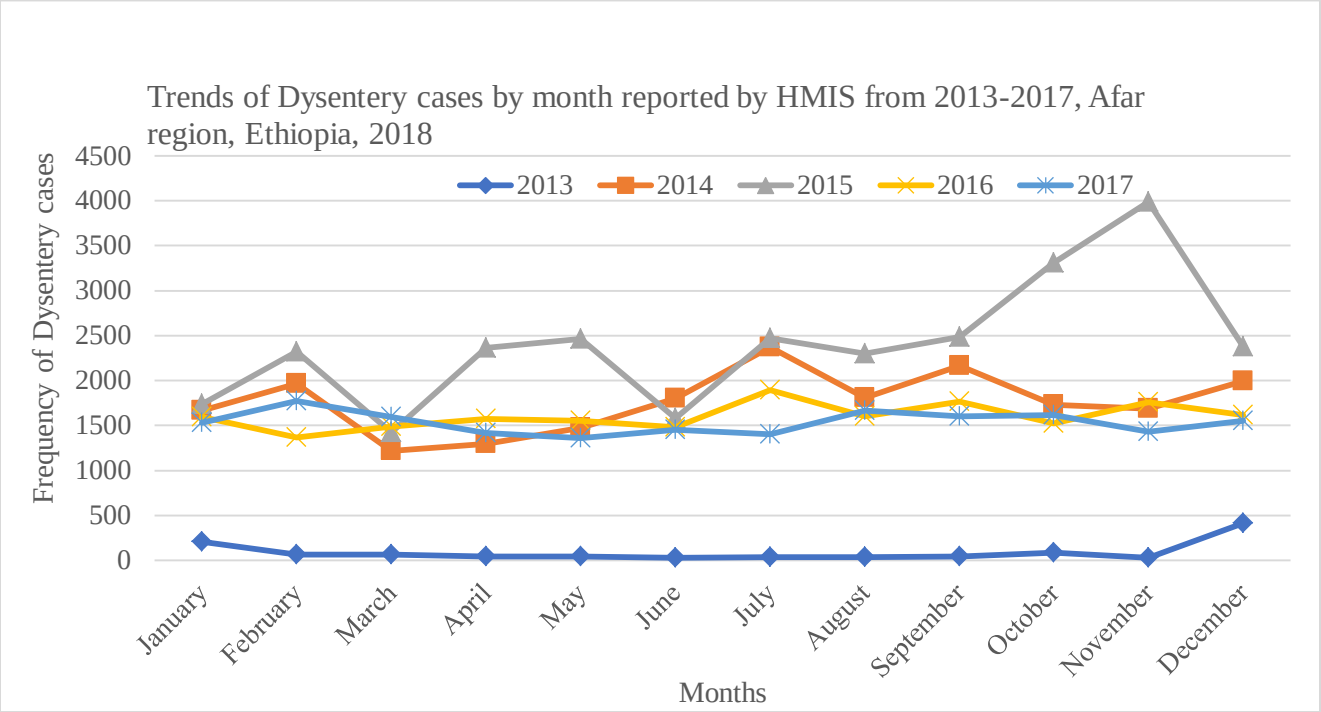


Figure 22Frequency of dysentery cases by month reported by HMIS from 2013-2017, Afar region, Ethiopia, 2018

Descriptive Epidemiology of PHEM Report of Dysentery cases 2013-2017 in Afar region

A total 44487 dysentery cases were reported by PHEM from 2013 to 2017 in the region. There were 44161(99.3%) of cases were out patients and 326(0.7%) cases were in patients. Almost half percent (49.9%) of dysentery cases were not reported to Surveillance system compared to HMIS report.

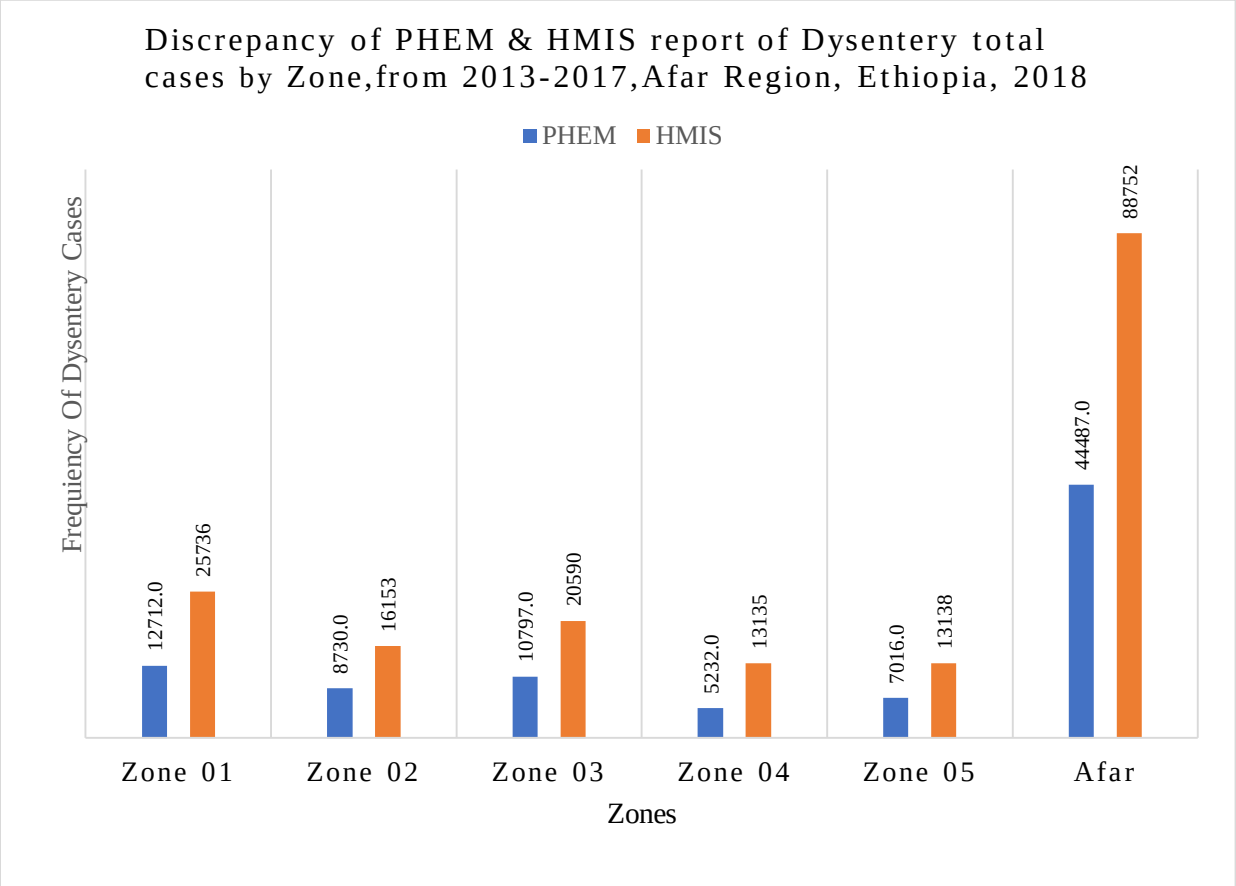


Figure 23: Discrepancy of PHEM & HMIS report of dysentery by zone, from 2013-2017,Afar region, Ethiopia, 2018

PHEM reported Dysentery distribution by place

The highest number of dysentery cases were reported from Zone 01 (28.6%), followed by Zone 03(24.3%) and least report was from Zone 04 (11.8%) of the region.

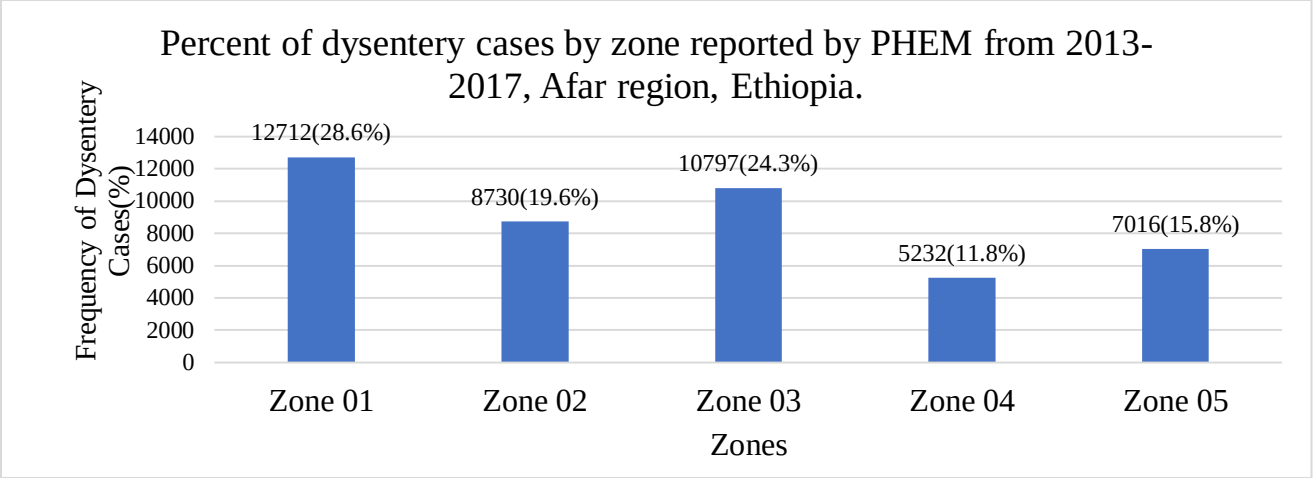


Figure 24: Total number of dysentery cases by zone reported by PHEM from 2013-2017, Afar region, Ethiopia.

The prevalence of dysentery in Afar region from 2013-2017 reported by PHEM was 25 cases per 1000 population. However in HMIS report Prevalence rate was 49 cases per 1000 population. The highest prevalence rate was in zone 02(27 cases per 1000 population).

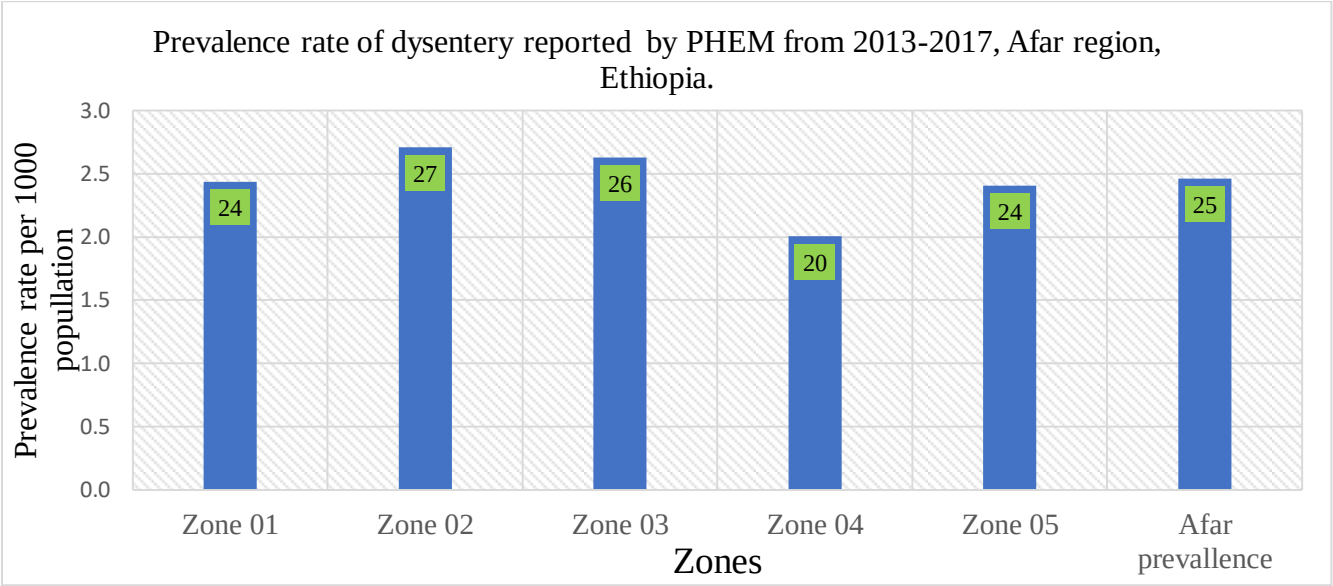


Figure 25: Prevalence rate of dysentery reported by PHEM from 2013-2017, Afar region, Ethiopia, 2018.

PHEM reported dysentery cases distribution by time

Five year (2013-2017) surveillance data analysis of dysentery cases show that highest number of dysentery cases were reported in 2015 (11671 cases(26.3%)) and the lowest numbers of dysentery cases were reported in 2014 (5444 cases (12.2%)).

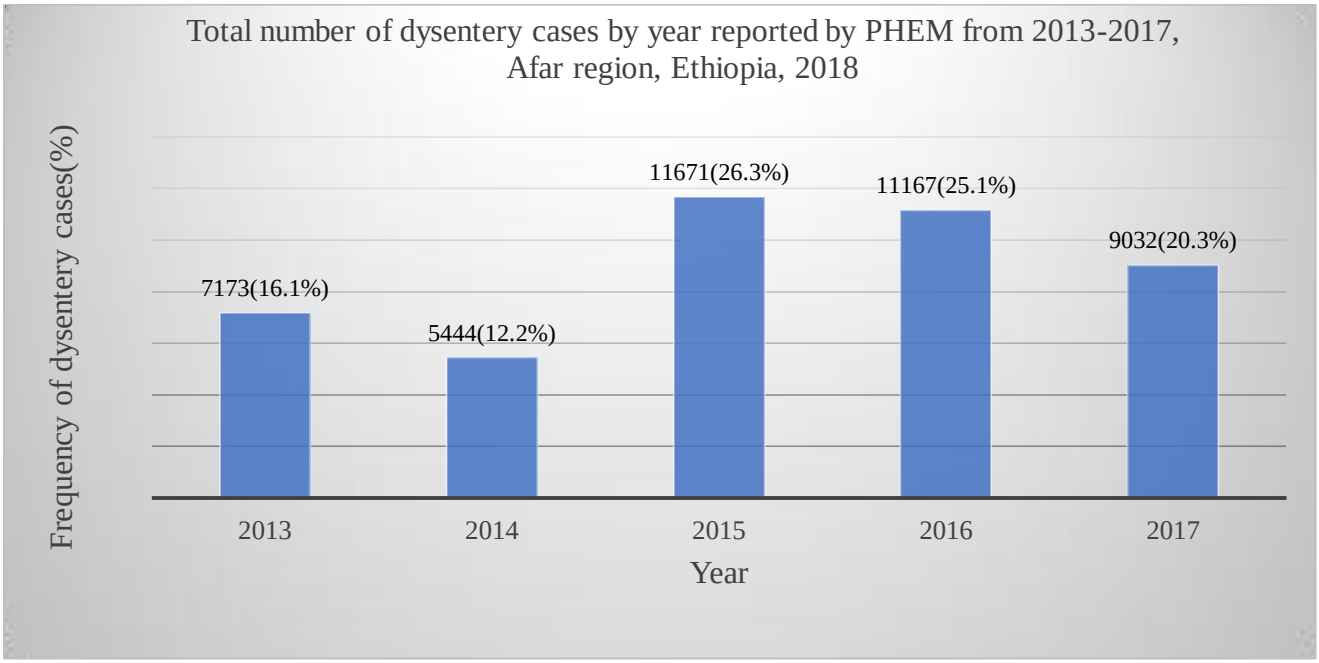


Figure 26: Total number of dysentery cases by year reported by PHEM from 2013-2017, Afar region, Ethiopia, 2018

The highest incidence rate (654 per 100000 population) of dysentery was in 2015 and lowestincidence rate (331/100000 populations) dysentery was seen in 2014 G.C.

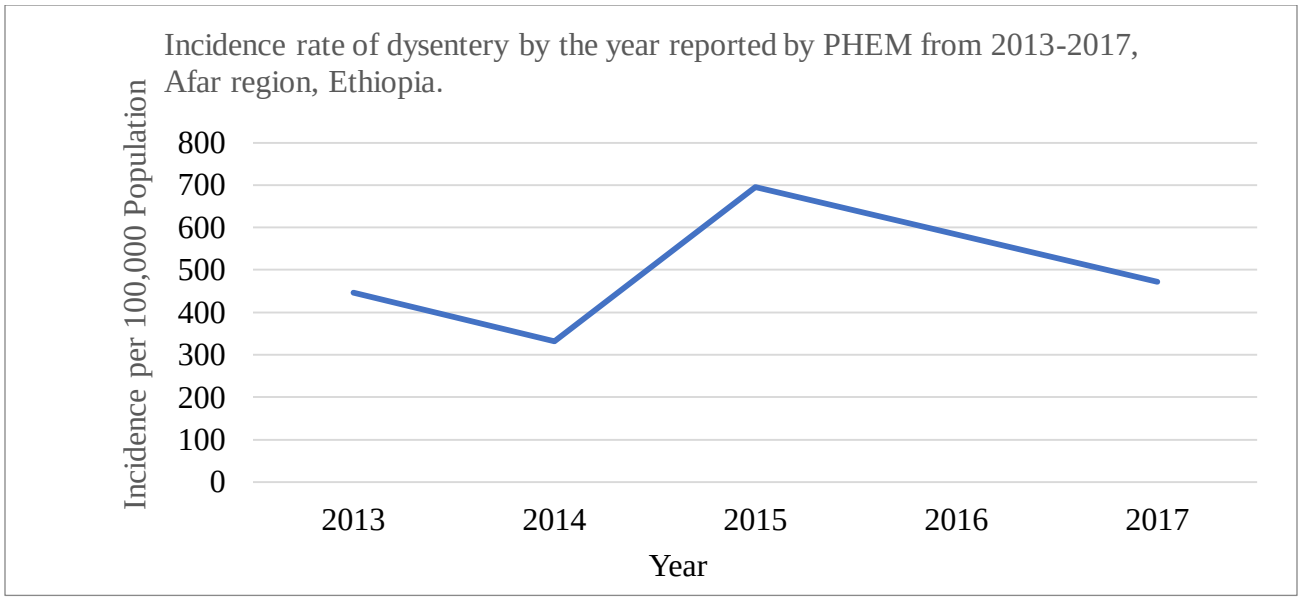


Figure 27: Trend of dysentery by year reported PHEM from 2013-2017, Afar region, Ethiopia, 2018

Distribution dysentery cases by zone shows the highest incidence rate was recorded in 2015 in all zones. Among zone the highest incidence rate was recorded in zone 1 and zone 3.

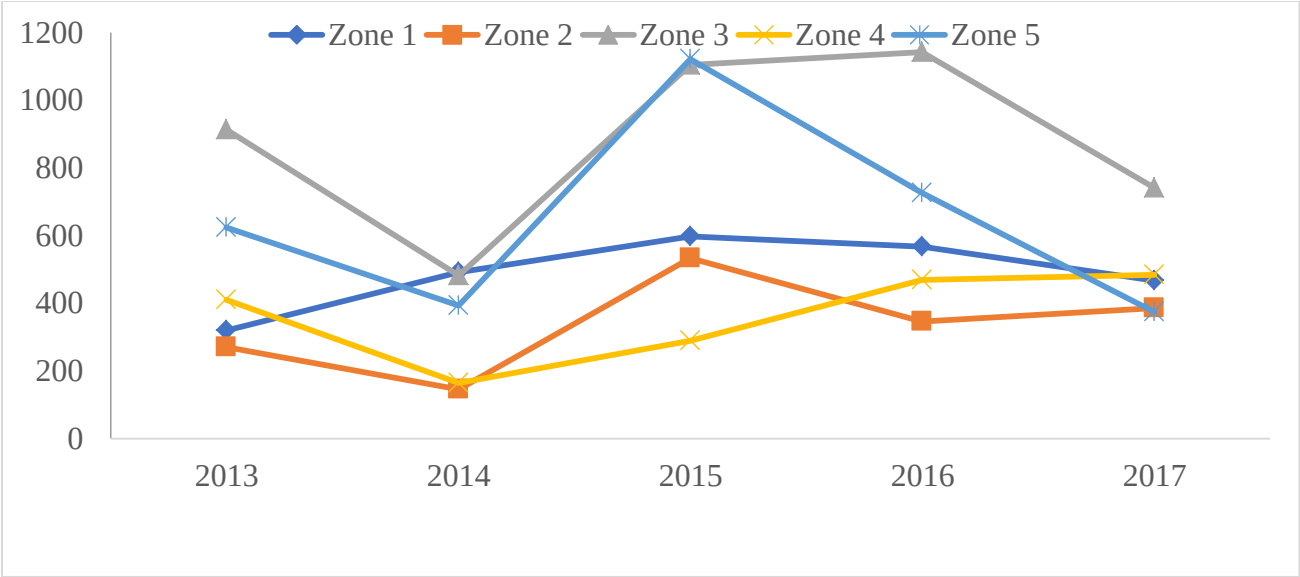


Figure 28: Trends of dysentery cases by zone reported by PHEM from 2013-2017, Afar region, Ethiopia, 2018

Regarding seasonal Changes, PHEM report indicate that dysentery cases were begun to increase in summer season of the year (from June to September) and decreased in dry season of the year

(from February to March). In 2015 the highest numbers dysentery of cases were recorded. The following figure indicate surveillance data were interrupted for three month in 2014 G.C.

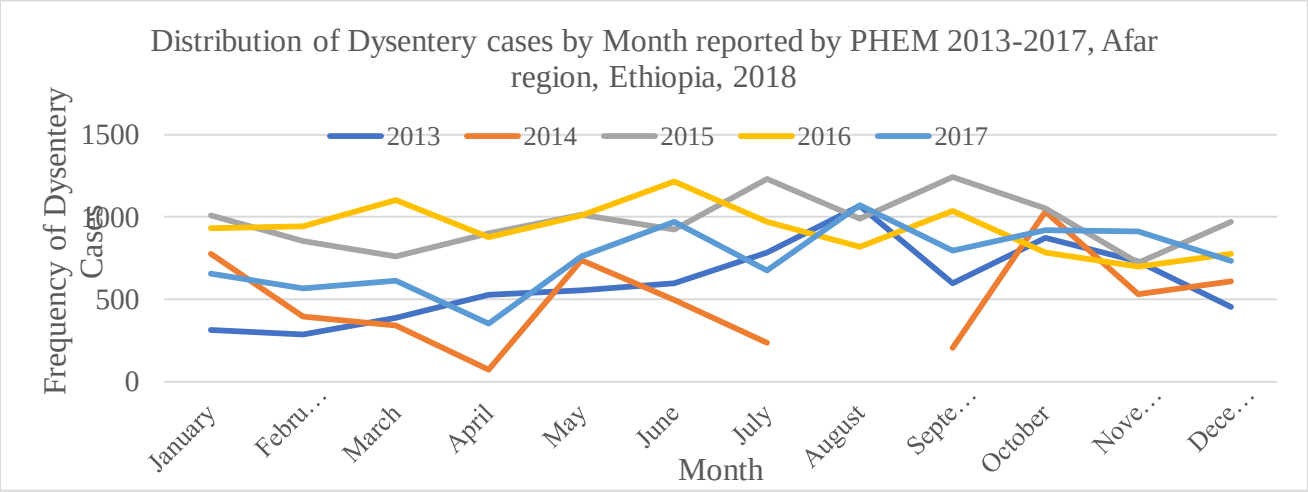


Figure 29: Distribution of Dysentery cases by Month reported by PHEM 2013-2017, Afar region, Ethiopia, 2018

The following Figure (Fig. 23) also shows distribution of dysentery cases by epi week, which showed that IDSR reporting, was interrupted frequently in PHEM report.

The lowest and highest number of dysentery cases was recorded in week34 and 36 by WHO week in 2015 respectively.

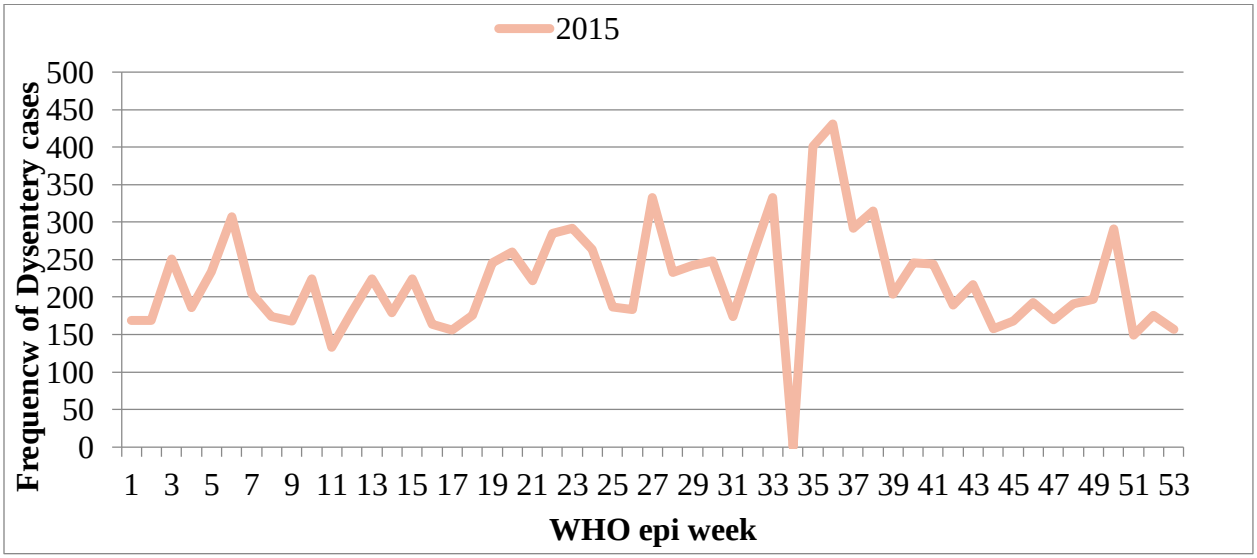


Figure 30: Distribution of dysentery cases by epi week reported by PHEM from 2015, Afar region, Ethiopia, 2018

Discussion

The result of this study revealed that 52.1% of dysentery cases were males. It is lower than the study conducted in Jimma 77% [13] and Addis Ababa 81% [14]. In this analysis, adult population was more affected by dysentery than other age group. It contrast to the study conducted in Tigray [24] in which the highest incidence rate of dysentery among young age group. The difference might be due to adults were more active in outdoor activities than other age group.

The majority of cases 25736 (29%) were in Zone one and least cases 13135(10%) were reported in Zone three. The reason for increase of dysentery cases in these Zones might be related to firstly, the presence more population density and health institution than other Zones. So there might be increased report from this zone. Secondly, more investment choices like Tendaho Sugar Corporation, Elidar salt mining process increase high population movement to these zones may increase disease transmission.

The dysentery cases was highest in summer season (from June to September) and lowest in dry season of from February to March. It is similar with the study conducted in Mazandra province of Iran (highest in August and September, lowest in February and March) [1] and Changsha city of china most of the cases occurred from June to September. In Afar region increased dysentery cases in summer season might be due to most of population in the region used running and pond Ella water for drinking. In the summer season floods take dirty materials to ponds and running water. These things might increase the numerous infectious diseases including dysentery.

The result of this study revealed that during the five years, a fluctuating trend of occurrence of dysentery cases was observed in Afar region. A reduction in dysentery cases occurrence from 2013-2014 and an increase of cases from 2014-2015 with peak cases occurring in 2015 was observed.

The increase in 2015 might be EL-NINO impact in Ethiopia including Afar region. In 2015, El-Niño caused irregular climatic changes characterizing increased warm of the air and drought in World. Majority of African countries including Ethiopia, were highly affected by impact of the El-Niño in 2015 [24]. As any region of Ethiopia, Afar region was also highly affected by Elnino induced drought which increased infectious disease like dysentery due to shortage of water.

The result of this study revealed that almost half (49.9%) of dysentery cases were not reported to EPHI/PHEM Surveillance system compared to HMIS report. The reason for discrepancy for PHEM report might be due to under reporting and absence of continuous reporting of surveillance weekly report through PHEM.

Limitations of the study

- The discrepancy between HMIS and PHEM report
- Since the data is secondary it is not representative

Conclusion

Dysentery is common in Adult age group greater than 15 years old. The disease is widely distributed throughout the region and it is common in both rural areas than urban areas. Peak of dysentery cases observed from June to September. Half of HMIS reported dysentery cases were not reported in surveillance system.

Recommendations

It is recommended to Afar regional health bureau and other responsible bodies:

- To strengthen regional PHEM surveillance system to detect disease outbreak early and timely;
- To implement preventive and control measures targeted at zones with high burden of the disease,
- To give health education in season with high incidence of the disease to minimize the burden of the disease.
- To improve the completeness of Surveillance data.
- To narrow the difference between HMIS & PHEM report.

References

1. L., H.D., Shigellosis, Control of Communicable Diseases Manual 19th edition,. American Public Health Association, 2008.
2. FMOH,Guideline for the prevention and control of selected epidemic diseases in Ethiopia. Department of Disease Prevention and Control, 2010.
3. Du Pont Herbert L. Mandell GL, B.J., Dolin R Principles and Practice of Infectious Diseases: Shigella Species (Bacillary Dysentery). 7th ed, 2009.**8**: p. 556-560.
4. WHO, Recommended Surveillance standards,. WHO/CDS/CSR/ISR/99.2. 2nd edition.
5. Ministry Of Health Liberia, W., National Technical Guidelines for Integrated Disease Surveillance & Response. 2016.
6. W.H.O, Guidelines for control of shigellosis including epidemics due to Shigella dysentery type1, Geneva, Switzerland, 2005.
7. KotloffKf. Winickoff JP. Ivannff B, C.J.S.D.S.P., Global burden of Shigella infections: Implications for vaccine development and implementation of control strategies. Bulletin of the World Health Organization, 1999. **77**(8).
8. Claudine C, D.A.S., J Control of Epidemic dysentery in Africa. Johns Hopking University, 1996.
9. Freund PJ, C.L.a.S.D., The importance of Dysentery to national CDD program A case study from Zambia. Occasional Operations Papers. 1993.
10. CDC/MOH, B., Population-based survey of dysentery in Kibuye Health Sector. Burundi. Final Report, 1993.
11. WHO Region office for Africa, Integrated Disease Surveillance. Quarterly Bulletin,, June 2016.
12. C., G.A.a.B., Trimethoprim-sulphamethoxazole resistant: Shigella dysentery serotype 1(Shigasbacillus) in Gimira, South west Ethiopia,.1983.
13. Fessehaye A, A.Y., Wondwossen B, Zewdineh S, Kenate W, . Investigation of dysentery outbreak and its causes, Jimma city, Southwest Ethiopia,.2008.
14. Mer'AwiAragaw, M., MPH, TilahunTafese, BSc, MPH, ZayedaBeyene, BSc, MPH, Zegeye Hailemariam, DVM, MPH, AkliluAzaze, MD , Richard Luce, DVM, MPhil,

Adamu Addissie, MD, MPH, MA , , Shigellosis outbreak at Addis Ababa University March -April. 2010.

15. FMOH, Health and Health related indicators. 2013G.C.
16. FMOH, Demographic and Health survey. 2010.
17. Gexin Xiao1, C.X., 3 Jinfeng Wang2, 3*, Dongyang Yang4 and Li Wang2,Spatial–temporal pattern and risk factor analysis of bacillary dysentery in the Beijing–Tianjin–Tangshanb urban region of China. MC Public Health 2014.
18. Nadi A, A.G., Isa Z, Rostami F, Epidemiologic investigation of dysentery in north of Iran; use of GIS. Mater Sociomed, December 28, 2016.**28**(8): p. 444-448.
19. Zhang J, M.X., Mulatifu M, Muheyati M, Epidemiology and etiology of bacillarydysentery in Xinjiang Uigura. 2016.
20. Zhaorui C, J.Z., Lu R, Junling S, Fengfeng L, Li L, Lingjia Z, Liping W, Zhongjie L, Hongjie Y and Qiaohong L. T, The changing epidemiology of bacillary dysentery and characteristics of antimicrobial resistance of Shigella isolated in China from 2004–2014. BMCInfectious Diseases, 2016.

    Lu Gao, Y.Z., Guoyong Ding, Qiyong Liu, Maigeng Zhou, Xiujun Li, and Baofa Jiang*, Meteorological Variables and Bacillary Dysentery Cases in Changsha City, China. Trop. Med.Hyg., 90(4).

21. Godana W, M.B., Determinants of acute diarrhea among children under five years of age inDerashe District, Southern Ethiopia. Rural Remote Health 2013.
22. F*, S., Excreta-Related Infections and the Role of Latrines to Control the Transmission inEthiopia. J Community Med Health EducDecember 2016.
23. Atsebaha G, T.A., Getahun K, Araya G. Wasihun, Prevalence and antimicrobial susceptibilitypatterns of Shigella among acute diarrheal outpatients in Mekelle hospital, Northern Ethiopia. BMC Infectious Diseases, 2015.
24. UNICEF, El Niño's impact on children. UNICEF Briefing notes, 2016.

CHAPTER-III

3. Evaluation of Surveillance System

3.1. Evaluation of Malaria surveillance system in Addis Ababa city Administration, Ethiopia, March, 2018

Executive Summary

Background: Evaluation is an important part of communicable disease surveillance. Ethiopia plan to eliminate malaria by 2020. We evaluated the malaria surveillance system in Addis Ababa city administration to determine whether the system meeting set objectives and to assess its attributes.

Methods: A Descriptive Cross-sectional study design was conducted from March 15-25/2018. A total of 17 study units, 1 Regional Health Bureau, 2 sub cities, 2 hospital, six woreda health offices and six health centers were selected. We used Center for Disease Control updated guidelines for public health surveillance system evaluation. Data was cleaned and analyzed using Excel sheet.

Result: There were 4801 Malaria cases of all outpatient cases for the region in 2017. Among sub cities, Nifas silk Lafto sub city had accounted 1111 (23.2%) outpatient visits in 2017 for the Region. The completeness of the region in 2017 was 93.4%. Completeness of report for Nifas Silk Lafto and Arada sub city were85.1% and 87.1% respectively. The health facility coverage of the city administration was 100% with health centers. National PHEM and malaria treatment guidelines were available in 100% (17/17*100) and 76.5% (13/17*100) of the health facilities respectively. Supportive supervision 11.7 %(2/17*100) was conducted in few of visited sites in 2017. And there were no documented feedback given. All visited sites had epidemic preparedness and response plan but there was no budget for epidemic response.

Conclusion: Periodic assessment of public health surveillance system is a key activity to identify strengths and weakness of the existing system. In Addis Ababa city administration the surveillance system was satisfactory. However, elimination will require the system to function at an even higher level. The surveillance system of malaria is useful to detect outbreaks, estimate magnitude of the morbidity and mortality of the disease in the area. These surveillance systems are simple and flexible and acceptable by all assessed sites. We recommend, continuous data monitoring, timely feedback system, refreshment training and close supportive supervision should be conducted and earmarked budget for epidemic response should be allocated.

Introduction

Background

Public health surveillance is an ongoing systematic collection, analysis, interpretation and dissemination of data regarding a health related event for use in public health action to reduce morbidity and mortality, and to improve health. This is through revealing disease burdens and guiding the action to be taken, the health policy, planning, evaluation of health programs, providing a basis for research and so on (1). It is carried out through a system which has legal support and extending from the central health authorities down to the peripheral health facilities and community level through sets of communication channels. These sets include upward and down ward reporting and feedback mechanism (1, 2).

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

Currently, since 2008 the Federal Ministry of Health launched a reform and restructuring of the health sector in to different core processes, and in particular the disease surveillance and response with the concept of BPR. This helps the surveillance of priority disease to be a dependable system as Public Health Emergency management (PHEM) center. This new structure is extended down to the district level in their capacities. This is designed as a cutting edge for better tracking and monitoring of diseases of public health concerns. Moreover, as member state of the WHO, Ethiopia is on preparatory phase to implement the International Health Regulation (IHR) which was declared by member states in 2005. These all are good opportunities to strengthen surveillance (3). The FMOH of Ethiopia identified 22 top priority diseases which are epidemic prone, of international concern and diseases on eradication and elimination programs

for surveillance activities. These diseases are monitored by a designated bodies through available means of communication- telephone, paper based reporting etc. These diseases are set to be reported as mandatory notification which are immediately reportable diseases and routine surveillance which are to be reported weekly (3).

Malaria is within 22 priority diseases reported weekly. It is significant disease burdens to the public. Those diseases are selected Based on: Diseases which have high epidemic potential, required internationally under IHR 2005, diseases targeted for eradication or elimination, diseases which have a significant public health importance and diseases that have available effective control and prevention measures for addressing the public health problem they pose (4).

The overall purpose of surveillance of these diseases is to monitor the trend against the seated tolerance limits, and pick any deviation from the limit at the earliest point in time and have prompt response. Furthermore, as early warning system, it guides prevention and risk reduction actions like vector control and so on (5).

For these purposes, malaria has case definition(s) and integrated diseases reporting formats defined by the FMOH and the WHO; and reporting is institutionalized into the health facilities and health offices (3). The general frame of work flow is shown in figure below.

Assessing the effectiveness and efficiency of this system in achieving the stated objectives is part of the development or improvement of the existing resources, infrastructure and design. This improves the information provided and thereby helps improve service provision and delivery. Especially, with the implementation of the new structure for surveillance system (PHEM) in the sector, the change in the quality of information need to be assessed particularly for diseases which exert high public health stress. Malaria is one of the most virulent infectious diseases which are highly sensitive to climate conditions. It is a persistent threat to health in developing nations including Ethiopia where it represents a major constraint to economic development measures and reduces the likelihood of living a healthy life(6). And these selected diseases have a public health importance in Addis Ababa city Administration. Also it is under elimination in 2020 but malaria surveillance data analysis indicate that higher number of cases were reported from Addis Ababa especially Nifas silk lafto sub city contributes 23.7% of malaria cases of the region. Therefore this study was conducted to evaluate public health surveillance systems in

Addis Ababa city administration in line to malaria elimination of core activities and attributes in city Administration.

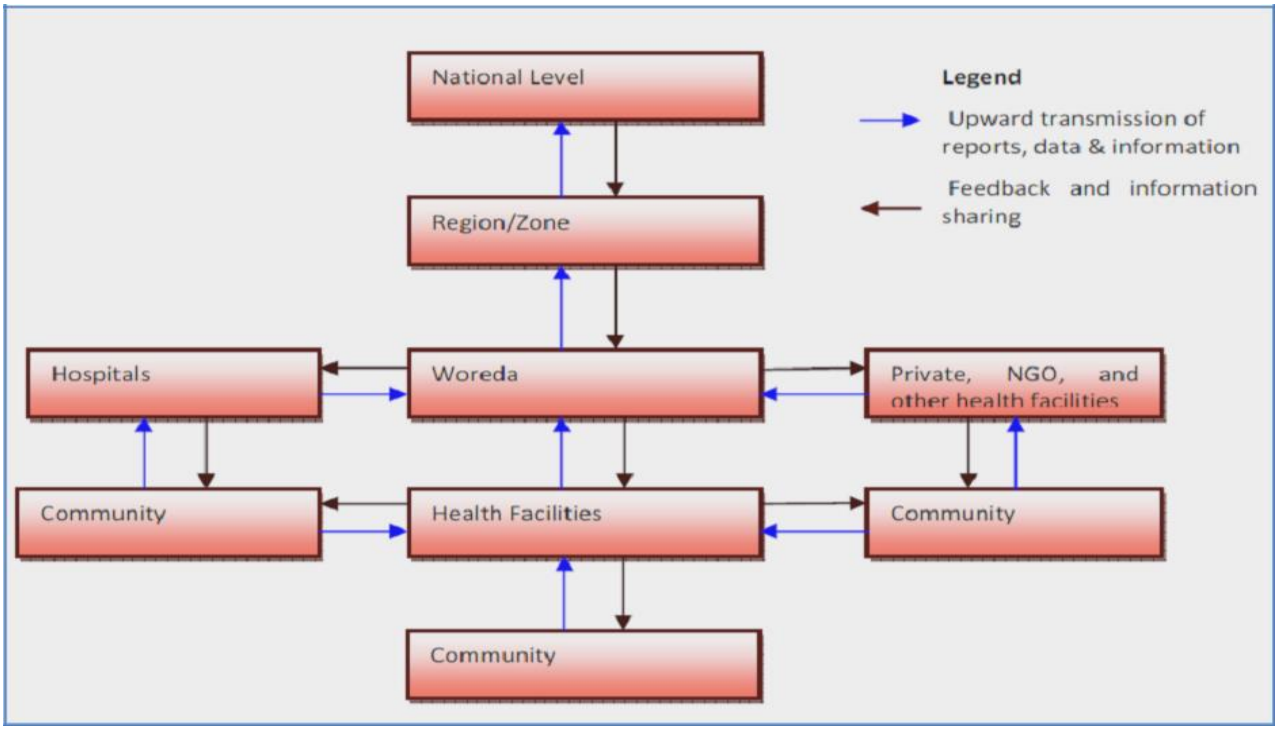


Figure 31: Diagram illustrating the formal and informal flow of surveillance data and information throughout a health system (source Public Health Emergency Management Guidelines for Ethiopia 2012

Rationale of the study

Malaria is also main indicator of the surveillance system. It is necessary to assess the surveillance status in relation to malaria surveillance and elimination. Since malaria disease is under elimination program 2020. The purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively. Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and usefulness. Evaluation of a public health surveillance system focuses on how well the system operates to meet its purpose and objectives. This evaluation was conducted with the purpose of describing the state of communicable disease surveillance in the city administration indicating how well the system is working to meet malaria elimination.

Objectives

General objective

To describe the surveillance system for malaria and evaluate the key system attributes of Addis Ababa City Administration March 2018

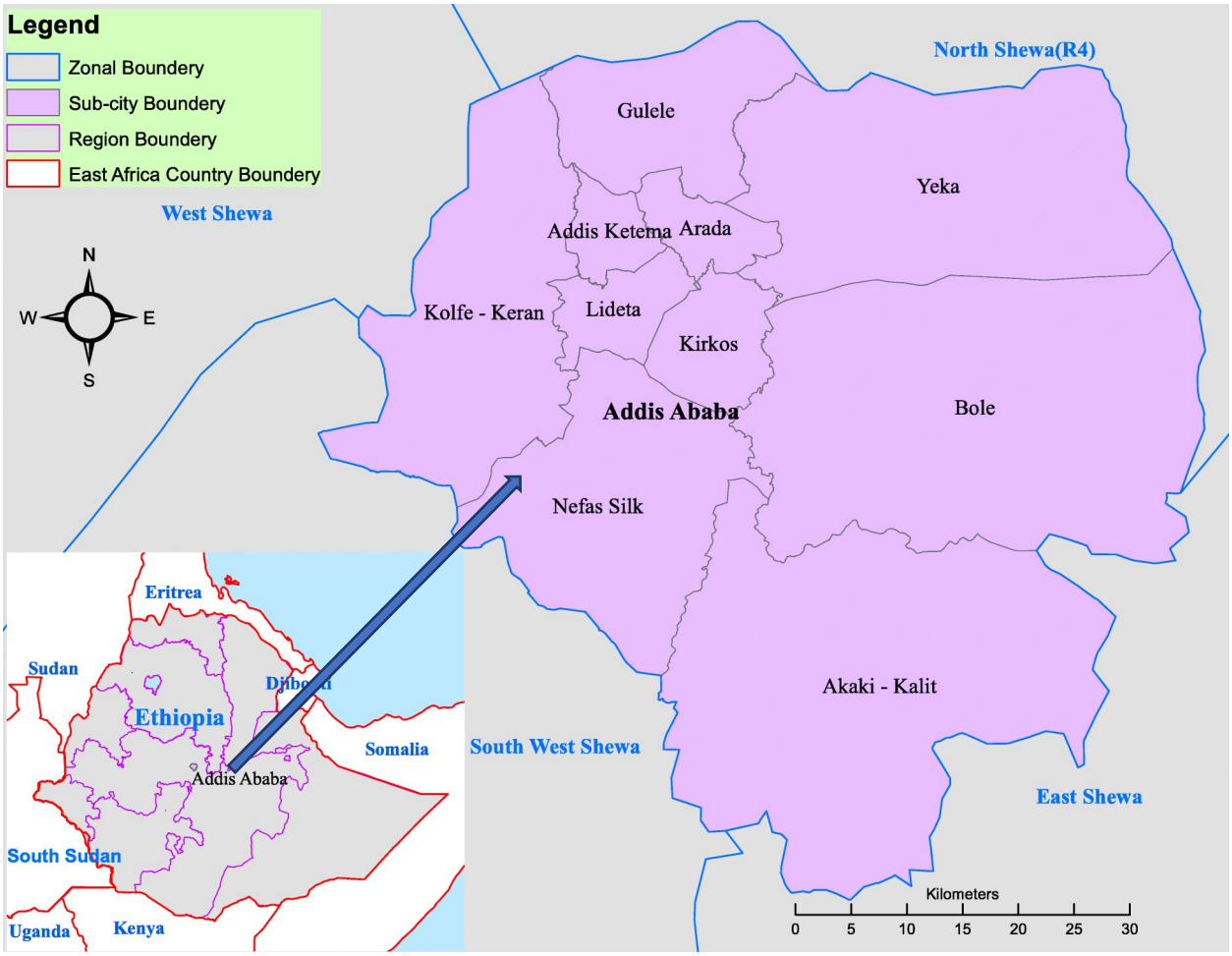
Specific objectives

- To assess the core activities (case detection, reporting, data analysis and response) of the surveillance system in Addis Ababa city administration
- To evaluate the key attributes of surveillance system
- Determine whether the system is meeting its 'objective

Methods and Materials

Study area

The surveillance system evaluation was conducted in Addis Ababa city administration, capital of Ethiopia and political capital of Africa. It has a total population of 3384569 projected from 2007 census and has 10 sub cities. Among sub cities two sub cities (Nifas Silk Lafto and Arada sub city) were included in the study.



Map 5: Map of Addis Ababa City Administration, Ethiopia, 2018

Study design and period

A descriptive Cross-sectional study design was used to evaluate the system. The study was conducted from March 15- 25, 2018.

Study unit: The study subjects were the health facilities (Health Centers, and Hospitals), health offices (District Health Offices, Sub city Health department, and the Regional Health Bureau).

Sample Size: A total of 17 study units; the Regional health bureau (RHB), two sub cities health department, six district health offices, six health centers and two hospitals were assessed. Selection of the districts and the district health facilities was done as in the steps below:

Sampling Technique: Two sub cities were purposively selected based on burden of malaria cases reported to city administration. Higher malaria cases reporting sub city (Nifas silk Lafto) and low malaria cases reporting sub city (Arada) were included in the study. Three woreda health offices and three health centers were selected in each sub city randomly. Two Hospitals were included in the evaluation.

Data collection methods

An updated CDC guideline for evaluating public health surveillance systems was used. The evaluation aimed to evaluate the following system performance attributes, such as: simplicity, data quality, flexibility, acceptability, representativeness, timeliness and stability. Interviews were conducted with representatives from regional health Beauro, sub city and woreda health office, assigned PHEM officer, focal person of HCs and Hospitals. Usefulness, flexibility and acceptability were evaluated.

Document review

The purpose of the document review was to understand and assess the data reporting process, and to compare data across different sources to identify any problems with data quality, completeness, and aggregation.

Data analysis

After the data was cleaned, entered and analyzed using the Microsoft Excel work sheet 2013 and qualitative data was summarized to supplement the quantitative findings.

Result

Performance of existing surveillance system

Population under surveillance

The total population of Addis Ababa city Administration is about 3,384,569 (projected from the 2007 national census) [8].

Table 12: Population under surveillance in the Addis Ababa city Administration, Sub city and woreda in 2017/2018

S.N	Population under assessment	Total projected population in 2018	Residence
1	A.A city Administration	3,384,569	Urban
2	N/S/L Sub city	404,606	Urban
3	Arada Sub city	273,356	Urban
4	N/S/L sub city woreda 02	48,178	Urban
5	N/S/L sub city woreda 03	58,148	Urban
6	N/S/L sub city woreda 06	41,289	Urban
7	Arada sub city woreda 03	12,185	Urban
8	Arada sub city Woreda 06	29,789	Urban
9	Arada sub city Woreda 08	21,742	Urban
10	Yekatit-12 HMC?	---------	Urban
11	Ras dasta Hospital?	----------	Urban

Almost all of the communities live in the urban area of the region.

Health Facilities under Surveillance

Addis Ababa city administration has nine referral hospitals, 96 health centers, 11 non-governmental health facilities, 865 private Hospitals & clinics. There is no health post in the city administration. Nifas silk Lafto sub city has 10 Health centers and 125 private clinics and Arada sub city has two Hospitals, nine Health centers and 92 private clinics. The health care coverage of the city administration was 100% with health centers.

Table 13: Number of health facilities in Addis Ababa city administration, Ethiopia, 2017/2018

	Number of health facilities expected to report					
Administrative area	Hospital	HC	NGO	Others	Total	Health service coverage
A.A city Administration	9	96	11	865	981	100%
Arada Sub city	2	9	0	92	103	100%

N/S/L Sub city	0	10	0	125	135	100%
N/S/L woreda 02	0	1	0	11	12	100%
N/S/L woreda 03	0	1	0	12	13	100%
N/S/L woreda 06	0	1	0	13	14	100%
Arada woreda 03	1	1	0	2	4	100%
Arada Woreda 06	1	1	0	8	10	100%
Arada Woreda 08	0	1	0	2	3	100%

In Ethiopia, twenty two diseases are under surveillance. Malaria is one of weekly reportable disease in Ethiopia.

Table 11: List of PHEM immediately and weekly reportable diseases, in Ethiopia, 2018

S.N	Immediately Reportable	Weekly Reportable
1	Acute Flaccid Paralysis	Dysentery
2	Avian Human Influenza	Malaria
3	Anthrax	Meningitis
4	Cholera	Relapsing Fever
5	Dracunculiasis (Guinea worm)	Typhoid Fever
6	Measles	Typhus
7	Neonatal Tetanus	Malnutrition
8	Pandemic Influenza A(H1N1)	Scabies
9	Rabies	
10	Smallpox	
11	Sever acute respiratory syndromes(SARS)	
12	Viral Hemorrhagic Fever (VHF)	
13	Yellow Fever	
14	Maternal and Perinatal Death	

Malaria is among the major public health problems of the 22 priority diseases under surveillance in Ethiopia. In Addis Ababa city administration, population movement from malaria endemic areas high is favorable for malaria transmission and 25% of the populations are at risk of malaria each year. Malaria accounted for 4801 (1.43%) of all outpatient cases of all sub cities in 2017/2018. From 25942 fever examined, 4801 were confirmed cases for malaria tested with microscopy or RDT; 1566 (32.5%) cases were positive for Plasmodium falciparum whilst 3223(67.5%) cases were positive for Plasmodium vivax. Among sub cities, Nifas silk Lafto sub city had accounted 1111 (23.2%) malaria outpatient visits and followed by Akaki sub city 795 (16.6%) of outpatient visits in 2017/18 for the Region.

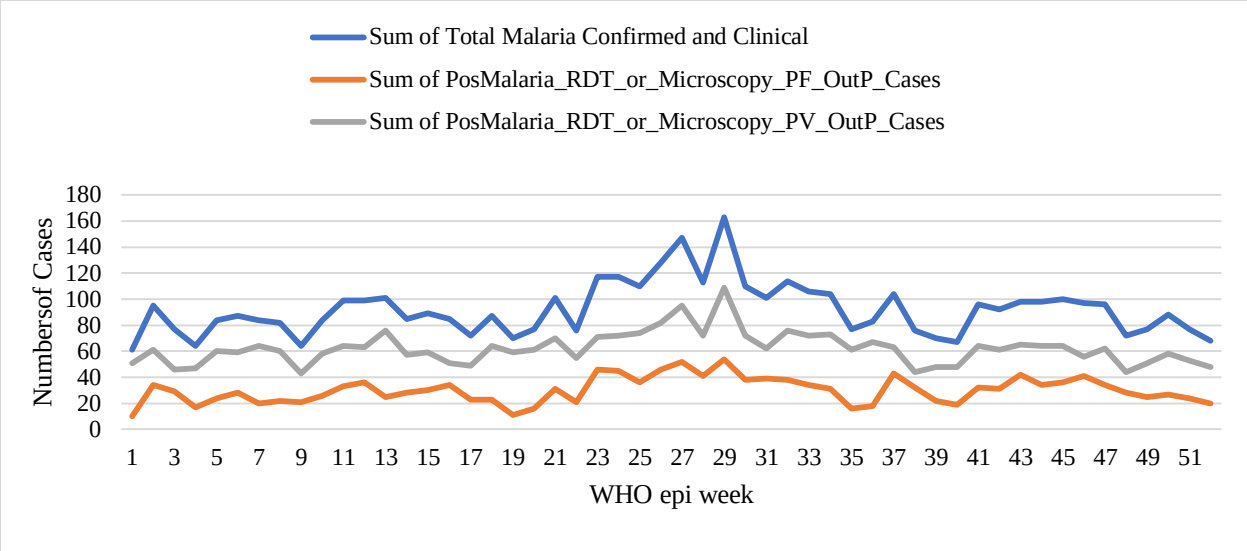


Figure 32: Weekly Malaria cases, Addis Ababa city administration, Ethiopia, 2017/18

Case detection and registration

The case definition of malaria was available in all of (8/8) visited health facilities. All health care providers in the visited health facilities understand case definition well, as demonstrated by all of the health care providers at the time of the field visit. Even though the handling was poor, clinical register was found in all visited health facilities. National PHEM guide line and malaria treatment guidelines were available in 100% (17/17*100) and 76.5% (13/17*100) of the health facilities respectively.

Reporting

A simplified flow chart of the surveillance system showing data transmission channels from health facilities to the national level has been found and functioning at all levels. When a suspected case presents to a health facility, health workers diagnose it based on case definition and confirmed using RDT and/or microscopy and recorded on a registration book. Using weekly standard reporting forms, health facilities report cases to the woreda level on Monday of each week. Reports from health facilities are compiled at the woreda and submitted to the sub city on Tuesdays. Reports from woreda are compiled at sub cities and the summary reported to the Region till mid Wednesday. At the Regional level, reports are compiled and sent to the Ethiopian Public Health Institute on Thursday using standard PHEM weekly reporting forms.

There was no shortage of reporting form in the past one year in all visited health facilities. The weekly reporting rate for Addis Ababa city Administration over the past 10 weeks was 94.9/95.6 (99.3%) for health centers and 9/9 (100%) for Hospitals. All reports were sent to the next level via telephone, E-mail, and sometimes directly. The reporting rate of Addis Ababa city administration in first 12 weeks of report in 2018 was 92.7%.

Table 12: Reporting rates of Addis Ababa city administration in 10 week's period, Ethiopia, 2018

WHO week	Hospitals		Health Centers		Others		Total # of HFs	
	Reported	Expected	Reported	Expected	Reported	Expected	Reported	Expected
1	9	9	93	95	793	862	895	966
2	9	9	93	95	797	863	899	967
3	9	9	94	95	793	863	896	967
4	9	9	95	95	782	863	886	967
5	9	9	95	96	804	866	908	971
6	9	9	96	96	799	866	904	971
7	9	9	96	96	787	868	892	973
8	9	9	96	96	810	870	915	975
9	9	9	95	96	798	870	902	975
10	9	9	96	96	792	870	897	975
Average # of report /week			94.9	95.6	795.5	866.1	899.4	970.7
Average reporting rate per week (%) by facility type		Hospital- 9/9*100 =100%		HC- 94.9/95.6*100 =99.3%		Other HF- 795.5/866.1*100=91.8 %		
Regional average reporting rate(%) in a week [Average no of reports in 10 weeks in region /expected no of reports]*100							**92.7 %**	

Data analysis

In all sampled health offices and health facilities, there was a responsible person for data analysis; however, the data was not analyzed regularly at the visited health facilities. There was a threshold for action of malaria at all woreda. The sub city health offices and Addis Ababa Health Bureau analyzes and follows trend for malaria. The woreda have no analysis for malaria other than monitoring chart. None of the visited health facilities (Health centers and Hospitals) analyzed the data collected for surveillance at their capacity.

Epidemic preparedness and response

All the assessed woreda did not experience malaria outbreak in the previous years. All the woreda had epidemic preparedness and response plan for malaria, and epidemic management committee. All woreda have no any stock and budget line for emergency. In all woreda the epidemic management committee and the rapid response teams were activated only when there was an event/outbreak. Moreover, they did not evaluate their experience and preparedness

Feedback and supervision

There was supportive supervision from the regional and sub city to woreda and health facilities once in a year. The region and sub city was given oral feed-back to woreda but had no written feedback.

Training

All health facilities (HCs and Hospitals) and woreda, responded that all staffs working on surveillance units got short term training or workshops of 3-5 days by the Addis Ababa Health Bureau and EPHI. At health facilities, only the focal person assigned for surveillance was trained, but other health care providers were not.

Resources available for surveillance

Resources for data management, communication, and logistics were available at health facility and woreda, sub city and regional levels. The computers at health facility, woreda, sub city and region levels were properly functioning. All PHEM surveillance units at the woreda and health facility levels did not have internet services. All of the health facilities have telephone services. Budget constraints were aired by all health units. Those were indicated to be the reasons for poor supervision and monitoring of the health facility reports.

Laboratory

Laboratory capacity in the surveillance of malaria was assessed at health facilities. All the health center and Hospitals laboratories were able to test malaria by microscopy and RDT. Malaria was confirmed at all levels of health facilities (Hospitals and health centers).

Performance and attributes of the surveillance system

Malaria surveillance is integrated with all other priority diseases which include laboratory support and passive surveillance which becomes active during outbreaks. We assessed system attributes including usefulness, simplicity, flexibility, data quality, acceptability, sensitivity, timeliness, stability and representativeness and usefulness.

Usefulness

Early detection of epidemics of diseases under surveillance and assessment of the effect of prevention and control programs were common understanding of all the respondents as the major use of the surveillance system. In general, the users of the surveillance system agreed that they understood its usefulness in this regard.

Simplicity

All respondents agreed that the case definitions of malaria for identification of suspected cases are easy to understand and apply by all levels of health professionals. Cases were detected using case definition and confirmed with RDT and microscopy at health center Hospital level. Most of report forms were easy to complete. Weekly reports were communicated by telephone from woreda to next level. The route of the data flow is clear and simple as it was set in the surveillance guideline and the reporting bodies do not criticize any problem in this regard. And the data collection is assumed to be time taking particularly the weekly reporting. Data from the health facilities were sent to the woreda health office in a paper form and use of the data was also very limited at all levels. However, transcribing the paper based data in to a data base is practiced at the sub city health department and Regional Health Bureau.

Flexibility

The reporting form can be modified to include other variables to report other newly occurring health events without much difficulty, and the formats are assumed to be easy and comprehensive. E.g. maternal and perinatal death and scabies included in to the surveillance system. The standard reporting formats for suspected & confirmed malaria cases and standard epidemic reports were integrated into PHEM, which make the system flexible. The woreda health offices and respective focal persons of facilities responded that as the system is flexible enough to add new health events without affecting other contents.

Data quality

The data quality was also assessed on the basis of completeness of the reporting format and timeliness of the report. There were some missed variable in reporting formats like week number, the expected number of health facilities to report, and blank variables rather to fill zero cases, especially in Health centers (2 HCs). The main reasons were either lack of experience or not considering some of the variables as important. In addition to this, there were no any regular cross checking of the data and feedback.

Acceptability

The acceptability of the surveillance system was assessed based on the engagement of the reporting agents and active participation in the case detection and reporting. In Addis Ababa city administration the engagement of the reporting agents was good and the reporting rates were 92.7% as seen over 10 reporting weeks (Tables 4).

Sensitivity

The sensitivity of the surveillance system of malaria in the detection of the cases and outbreaks were seen separately.

The surveillance system to detect cases of malaria

Since the surveillance system is based in the health facilities, the capacity of the surveillance system to capture cases in the community is dependent on different reasons: one factor could be the health seeking behavior of the community. Another factor could also be the technical and logistic capacity of the health facilities in detection and laboratory confirmation of cases. These factors undermine the burden of cases in the community and hence the sensitivity of the surveillance to pick the case to be low.

The surveillance system to detect an outbreak of malaria

The capacity of the surveillance system to detect an outbreak is influenced by the definition of the outbreak. The sensitivity of the surveillance system is depend on different reasons, like regular analysis of the data, definitions of the thresholds, case detection and reporting rate of the expected health facilities and so on. Unfortunately, the reporting rate of the health facilities was good as shown in the table 4. But there was no regular analysis of the collected data, however,

the sensitivity of the system increases once the number of cases is higher or death starts to occur, i.e. the surveillance system would be sensitive for high epidemics.

Predictive value positive

It was not possible to measure the PVP of the surveillance system in this assessment of the surveillance of these diseases. Because, laboratory confirmation of all suspected cases using case definition was not done and health facilities surveillance focal person register only those malaria positive cases which seem to be positive, the PVP is 100%. But for case definitions that are broad at the community level, the PVP is expected to be low, especially for febrile illnesses.

Timeliness

The reporting rates of the health facilities in the region were found to be somewhat good irrespective of some reporting gaps at health facility level. But, of those that reported, the number of facilities which reported timely was difficult to know exactly, for the reason reports were not segregated, or date report received were not recorded in almost all forms.

Stability

The surveillance system was stable based on availability of standard reporting format at region, sub city, woreda and Health facility level. And malaria system can easily integrated with other diseases. Case definition was available in all health facilities. The system is stable.

Representativeness

The representativeness of the surveillance system is related to the health service coverage, the reporting rate of the health facilities, the health seeking behavior of the community, and the technical capacity of the health care providers and so on. Though, these factors are not well met for some of the reasons mentioned above, the representativeness of the system is somewhat good.

Usefulness of surveillance

All of the participants agreed up on that the surveillance system is helpful to detect the outbreak of priority diseases early, to estimate the magnitude of morbidity and mortality related to these diseases, including identification of factors associated with these diseases. Even though there

was no malaria epidemics, all woreda, sub city and regional health Beauro Officers believe that outbreaks should be investigated and response given within 48 hours of occurrence. All woreda and sub city have prepared written epidemics preparedness and response plan (EPRP). The challenge of all assessed area was none of epidemic management committee evaluated their preparedness and response activities. In general the system was useful and utilizes the existing health system to provide evidence based information for action.

Case recording and reporting

PHEM targeted diseases were reported on weekly basis by E-mail, telephone and hard copy using standard reporting format from health facility to woreda were reported from Monday to Sunday. Woreda compiled and reported to sub city and finally reported to Addis Ababa regional health Beauro Public Health Emergency Management Core Process. The reporting forms and register books were available in all woreda and Health facilties.

Data analysis and interpretation

There was no analysis of malaria surveillance data completeness, timeliness, trends observed in woreda and Health facilities. But there were PHEM weekly bulletin prepared by region and sub city level.

Epidemic preparedness

The epidemic preparedness and response activities of the city were well organized and had planning, but there was no financial and/or logistic support. There was woreda epidemic response committee in each sub city. Besides the epidemic response committees and rapid response team had no regular meetings and they do not review their plans, actions. Addis Ababa Health Bureau, Sub city health office and woreda health Offices were allowed for emergency budget from the Administration only after an event has occurred which hampers timely investigation, and mitigation of expected events in the City

Supervision

Supportive supervision 2/17(11.7%) was conducted last year from higher level. But there were no documented feedback given, from woreda to health facilities to improve the surveillance system. Feedback to lower level was provided, mainly verbally.

Training

Few woreda surveillance focal person 4 (23.5%) was trained on PHEM basic training. But most of the health facilities staffs were not trained.

Laboratory function

All health centers consistently confirm malaria. All laboratories in all health centers and Hospitals were equipped with microscope and all of them consistently confirmed malaria with microscope. However, there were shortage of reagents, supplies, and breakage of electric power.

Discussion

The malaria surveillance system in Addis Ababa city administration 2017/2018 was evaluated using CDC guidelines for the evaluation of public health surveillance systems for its attributes and system of operations. This surveillance system captures data related to malaria morbidity and mortality.

The understanding of the healthcare providers to the case definitions was found to be good but the collection and registration of data had some gaps and clinical registers and reporting formats are not uniform. As well, the clinical registers and reporting formats are not distributed with good orientation to the surveillance focal persons and the health care providers. In some of the health facilities cases definitions of malaria were posted to the public but not utilized appropriately.

The structure of data reporting flow from the lower to the upper level is well organized with unidirectional flow of data, with simple and defined role and responsibility of each reporting entities. However, the reporting flow has a number of obstacles such as inadequate computers for data management and analysis. These impacted the overall generation of reports by the expected health facilities and make the surveillance system to relay on very limited reports. This low reporting rate joined with delay of the collected data can make the surveillance system less useful to meet its objectives. For example, as stated above, if only some of the health facilities in the district analyze and use the data, the utility of the surveillance system was minimum. This makes the system too weak to pick highly public health sensitive diseases. This could be due to the poor orientation of all parties, poor supervision and feedback system, low or no legal enforcement to the surveillance activities, lack of incentives, lack of refresher training, lack of sense of ownership, and lack of logistics.

The epidemic preparedness and response activities of the city was well organized and had planning, but there was no financial and/or logistic support. Besides the epidemic response committees and rapid response team had no regular meetings and they do not review their plans, actions. Addis Ababa Health Beauro, Sub city health office and woreda health Offices were allowed for emergency budget from the Administration only after an event has occurred which hampers timely investigation, and mitigation of expected events in the City.

Laboratory experience of quality assurance program and participation in the surveillance system is found to be good. But lack of feedback, supervision and training may hinder on the overall performance of the surveillance system.

Limitations

Information is not easily accessed, as a result of turnover of professionals

Conclusion

Periodic assessment of public health surveillance system is a key activity to identify strengths and weakness of the existing system. This will be more effective if it was done in collaboration with key stakeholders. In Addis Ababa city administration the surveillance system was satisfactory. However, elimination will require the system to function at an even higher level and efforts should be exerted to improve the system mainly on supervisory activities, proper and timely feedback, data management and analysis of prioritized diseases. Finally, the surveillance system of malaria is useful to detect outbreaks, estimate magnitude of the morbidity and mortality of the disease in the area. These surveillance systems are simple and flexible and well accepted by all assessed sites.

Recommendations

It is recommended that Addis Ababa Health Bureau and other sectors office:-

- Strengthen data processing capacity at all levels by providing necessary facilities where needed.
- Provide regular Supportive supervision to strengthened lower levels and
- Give documented feedback.
- Secure earmarked budget for epidemic response.

Data analysis for prioritized diseases at district and health facility level should be performed regularly. Utilization of National PHEM guideline and different manuals for management of prioritized diseases should be optimized at all levels; mainly at health facilities.

References

1. CDC. MMWR, Morbidity and Mortality Weekly Report, Update guide lines for evaluating Public Health Surveillance Systems, Vol.50, No.RR-13, 2001.
2. Health Sector development Programme- IV, annual performance report EFY 2003 (2010/11, version 1.
3. National strategic plan for malaria prevention, control and elimination in Ethiopia 2010 – 2015, (2002/2003 –2007/2008EFY.
4. WHO, Technical guide lines for IDSR in Africa region, 2nd edition, 2010.
5. CDC, "MMWR updated guidelines for evaluating public health surveillance system," 2001.
6. FMOH, IDSR National technical guideline, 2002.
7. FMOH, Public Health Emergency Management guideline for Ethiopia, 2012.
8. Federal Democratic Republic of Ethiopia. Population Census Commission Summary and Statistical Report of the 2007 population and Housing census. December 2008. Addis Ababa.

CHAPTER-IV

4. Health Profile Description Report

4.1. Health Profile Description Report of Woreda 06, Nifas Silk Lafto Sub City, Addis Ababa, March 2018

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Abstract

Background: Health profile is vital for prioritizing and planning social services on prominent health and health related problems of the community. The purpose of this document is to assess and describe the profile of woreda 06, N/S/L sub city, Addis Ababa city administration and communicate with stakeholders

Methods: A descriptive cross sectional study was conducted from February 25-march 4, 2018 in Woreda 06 N/S/L sub city. Health and health related data were collected using standard check list by interview and reviewing medical records in the woreda and analyzed using Microsoft excel.

Result: Woreda 06, Nifas Silk Lafto sub city lies at an elevation of 2211-2327 meters. The district has estimated population of 39,902 in 2018, from which females account 20,350(51%) and has one health center. A total of 768(82.6%) pregnant women attended first antenatal care visit while 424(45.4%) of them attended the fourth visit. PNC coverage and contraceptive acceptance rate was 46.6% and 17.7% respectively. AURTI was the leading cause of morbidity in the district both in adult and under five outpatient departments (35.86%, 54.6%respectively) followed by non-bloody diarrheal disease (10.5%, 16.14%resp.). Vital statistics such as crude birth rates and death rate were not recorded. There was 2.4 % school drop out in the district.

Conclusion: Acute Upper Respiratory Tract Infect and diarrheal disease were the leading cause of morbidity in the district. The fourth ANC and PNC seeking behavior and contraceptive acceptance rate of the women after delivery was low. Health related indicators like, mortality, total fertility rates, crude rates were not recorded appropriately. Prevention and control measures should be strengthened to reduce the morbidity due to AURTI and diarrheal diseases. Woreda Health Office should give emphasis for community awareness about contraceptive utilization, ANC and PNC seeking behavior. Woreda health office and district sectors should have proper records on births and deaths.

Key Words: Health profile, Woreda 06, N/S/L Sub city, Addis Ababa,

Introduction

Back ground

Health Profiles are about the health of people and about the conditions in which they live. It is essential tool for change and thus must be an integral part of local decision-making and strategic planning processes. The preparation of profiles provides a lively, scientifically and evidence based account of health in the district; it can stimulate public interest and political commitment; and it can identify targets for the future and monitor progress towards them. The Health profile is a summarized auditing and discussion of health related data and important health related indicators to describe the health and related social, economic, political and cultural factors in the geographic area under discussion (1).

Health profile is vital for prioritizing prominent health and health related problems of the community. It is basic for planning and appropriate intervention; and it is an entry point for operational research. Stakeholders in health and health related areas of the community will have evidence-based information from well compiled health profile (2). As the purpose of this assessment is to describe health and health related issues in the given district (woreda) and communication of the local burden of morbidity, mortality, any disaster and other public health related information of the district, it is very important document to be utilized by any stake holders in general and public health professionals in specific. The study is also helpful in reminding the woreda officers, their past accomplishment and what to be done in future planning and implementation activities, including plan updates based on the feedback of this assessment in the area.

Rationale of the Profiling

Health profile is important for prioritizing health program and health related problems of the community at any level. So far in our country, it is not familiar to find prepared district health profile even though basic for planning and for appropriate intervention; and is an entry point for operational research. As we know, many Stake holders were working on health and they may need compiled health and health related issues health profile.

Therefore this woreda health profile description hopefully makes access of compiled health and health related issues of the district for planning, prioritizing health program and health related problems.

Objective

General Objective

To assess health & health related issues/the profile about social services and livelihood of woreda 06, Nifas Silk Lafto Sub City, Addis Ababa, Ethiopia, March 2018.

Specific objectives

- To asses existing health infrastructure of the Woreda.
- To assess and describe health indicators
- To identify problems for priority setting
- To compile and simplify health related information of the woreda and making it easily accessible/ready to utilization

Method

Study Area

The study was conducted in Woreda 06, Nifas silk Lafto (N/S/L) sub city, Addis Ababa city administration (Map 33).

Study Design and period

A descriptive cross sectional study was conducted from February 25-March 4, 2018 in Woreda 06, N/S/L sub city, Addis Ababa city administration.

Data collection and Analysis

Health and health related data were collected from Woreda Health, Education, Water Resource Offices and other sectors. All Ketenes of the District were included. Health and health related data were collected from the Woreda Health Office while data of safe water supply coverage were collected from the Sub city Water Resource Office. Education related data were collected from the Woreda Education Office and other data were collected from other relevant sectors. Structured questioners were developed and administered to collect secondary data. Interviews were conducted with relevant officers of the above specified processes, based on the needed data. Different registry books were also assessed. Data analysis was conducted using MS excel 2013.

Ethical Considerations

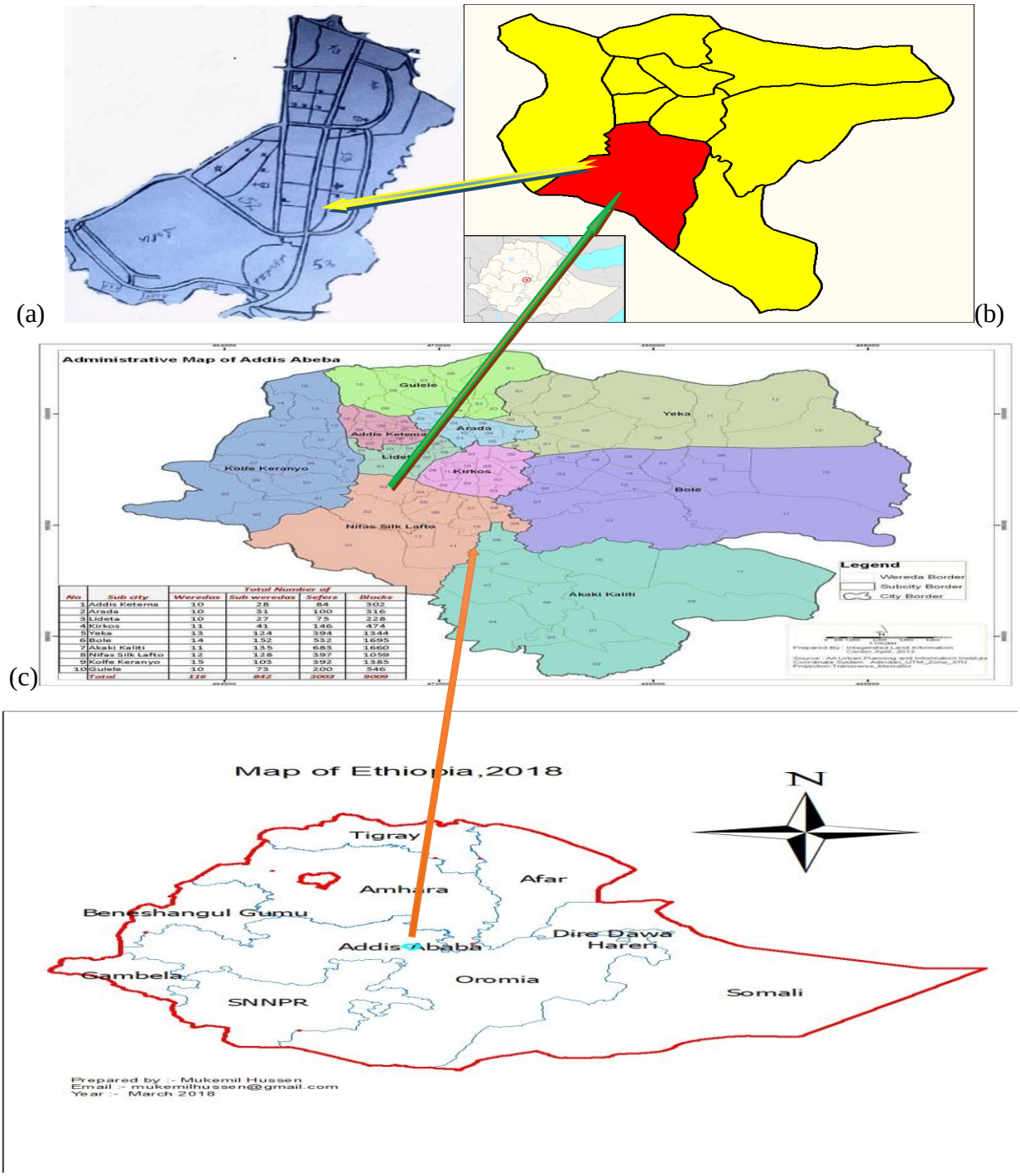
Formal letter was written from the Ethiopian Public Health Institute (EPHI), Public Health Emergency Management (PHEM) director to Addis Ababa Health Bureau & all concerned sectors in Woreda 06 N/S/L sub city; avail them the letter and got permissions to proceed with the study.

Result

Geographic and climatic conditions

N/S/L Woreda 06 is one of the thirteen administrative woredas of Nifas Silk Lafto Sub City administration. Nifas silk Lafto sub-city is one of the ten sub-cities of Addis Ababa city administration, Ethiopia. As shown in Figure below, N/S/L sub-city is located at the South west of Addis Ababa. Woreda 06 covers a landmass area of 63.59 km^2. It has 5 ketenes (gots) which are small divisions of the administration with the total population of 39,902. Boundaries of the area are: North-with Kirkos Woreda 4, East- with Woreda 07, South East – with woreda 10, South woreda 12, North West with Woreda 05 and South west with woreda 02. It covers an area of 312.84 hectares. It lies at an elevation of 2211-2,302 meters above sea level. The geographic coordinates of Nifas silk Lafto Woreda 06 is 8°58'40.44"Latitude and 38°45'5.76" longitude. Annual average temperature and rain fall of the woreda is 10.6-22.8 ^{0}cand 1089 mm ^{2} respectively. The woreda is completely urban.

Woreda 06 Administration map



No	Sub city	Total Number of Weredas	Sub weredas	Sefers	Blocks
1	Addis Ketema	10	28	84	302
2	Arada	10	31	100	316
3	Lideta	10	27	75	228
4	Kirkos	11	41	146	474
5	Yeka	13	124	394	1344
6	Bole	14	152	552	1695
7	Akaki Kaliti	11	135	685	1660
8	Nifas Silk Lafto	12	128	397	1059
9	Kolfe Keranyo	15	103	392	1385
10	Gulele	10	73	200	546
	Total	116	842	3003	9009

Map 6: Map of (a) Woreda 06 ,(b)Nifasilk Lafto subcity ,(c) Addis Ababa, (d) Ethiopia, 2018.

Demographic Information

According to the projection for 2017, Woreda 06 population is 39,902, of which 19552(49%) are male and 20,350(51%) are female. From the total population 2857 (7.2%) and 894 (2.2%) are children less than 5 year and 1 year respectively. Women with the reproductive age constitute 13822 (34.6%). The table below shows the summary of the major demographic parameters in Woreda 06. Average house hold size was 4.7 per house hold. Information about ethnic group/language, religion, main source of income of the woreda is not available.

The population pyramid of the woreda was predominantly age <30 years old with 26615 (66.7%) of the population. The population in the productive age group (15-64 years) constituted about 28650 (71.8%) of the total population. Population > 64 years were only 1317 (3.3%) of the total population).

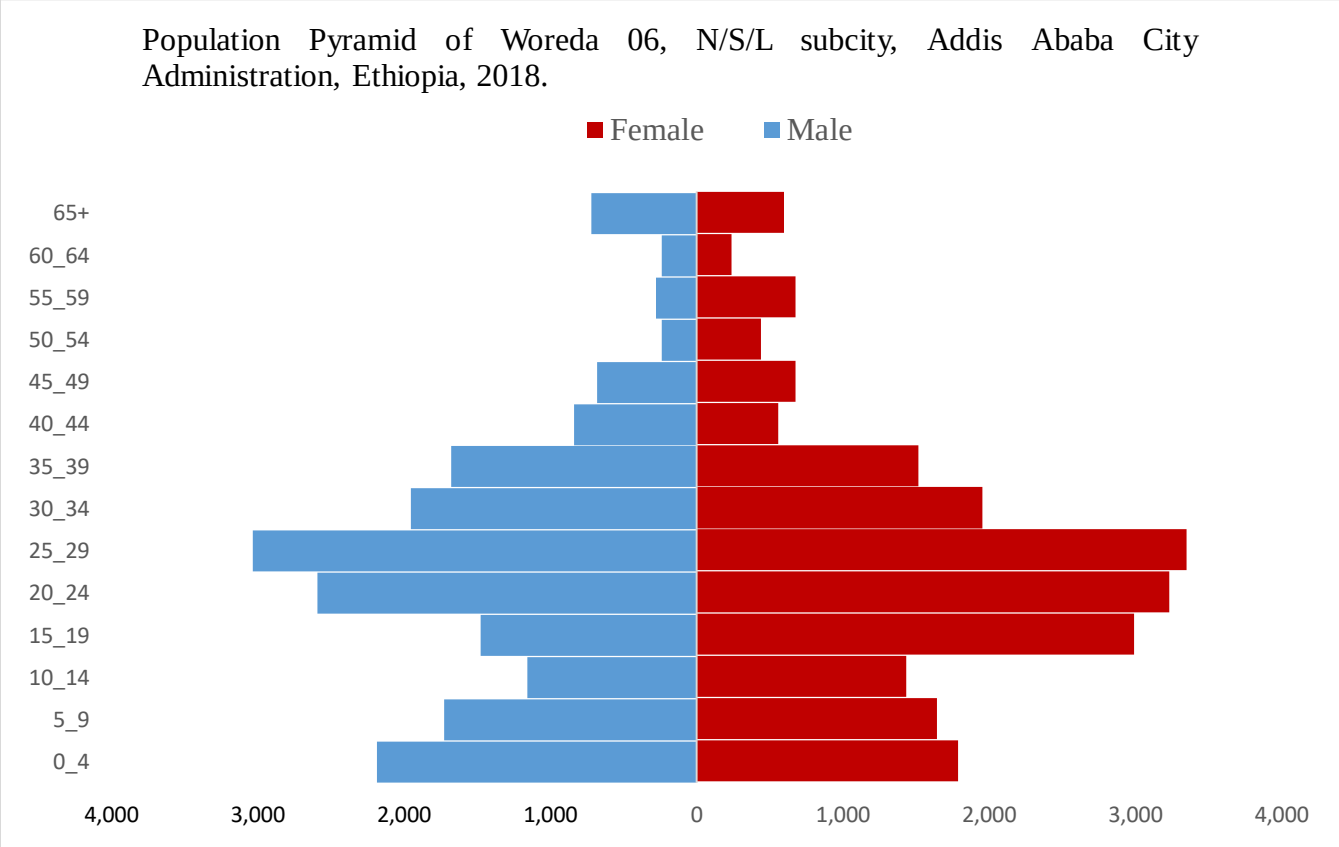


Figure 34: Population pyramid of Woreda 06, N/S/L sub city, Addis Ababa city Administration, Ethiopia, 2018

Administrative set up.

According to the latest Addis Ababa city administration, woreda is the lowest administration level but the woreda has its own localities called *ketene*. These *ketenes* are designed for the purpose of health extension workers' activity. Woreda 06 comprises of 5 *ketenes* and a total of 8490 households.

Facilities and Infrastructures

Woreda 06 had 24 hour electric power supply, mobile and cable based telephone services, postal service and 9 banks 7 insurance companies. There were two community policing centers, three recreation centers; five factories and two market places (Soffi Mall and Lilac super market) were providing service. All ketenes were accessible to transport in all seasons. The district has wireless telecommunication systems and is accessed by mobile telephone network. There was only one health center (Woreda 06 HC) with safe water supply. There was one public library, Fuel station and hotel.

Literacy Status

The intimate linkage between health and education has been firmly established in a number of studies, which taken collectively, offer some ideas about how education and health could potentially reinforce each other towards the rapid socio-economic development of the country. Epidemiological and health service research in Ethiopia has shown that illiteracy is usually associated with high health risks and low health seeking behavior. In addition to a wide range of diseases and child mortality associated with illiteracy or under-education, HIV/AIDS infection is also disproportionately high in out of school youth. Despite major progress in education, national literacy levels are still low. The total adult literacy rate (persons above 15 years who can read and write) is 36% (62% for male and 39% for female). The District had 19 KGs, three first cycles (Grades 1-4), 11 primary (Grades 1-8), 03 secondary (Grades 9-10) and 01 preparatory school. The district has 01 TVT and 01 Private college. There is no university in the District. The private educational institutions 30(76.9%) of the Woreda are greater in number than governmental institutions. Especially Kgs 3(15.8%) of government are very small in number when compared to the number of children of the community.

Table 14: Distribution of educational institutions in Woreda 06, N/S/ L Sub City, Addis Ababa city Administration, Ethiopia, 2018.

Institution	kg	1-4 grade	1-8 Grade	9-10 grade	11-12 grade	TVT	College	University	Total
Government	3	1	3	1	0	1	0	0	9
Private	16	2	8	2	1	0	1	0	30
Total	**19**	**3**	**11**	**3**	**1**	**1**	**1**	**0**	**39**

TVT:–technical and vocational training, KG:-Kinder Garden.
Source: Nifas Silk Lafto sub city finance and economic development annual magazine & woreda 06 educational office.

A total of 7030 students and 266 teachers (with 2.4 school dropout) were living in the district. Among this KG has a total 760 students with 367 (48.2%) females. First cycle (grade 1-4) has 1903 students with 970 (52%) female students. Elementary schools (grades1-8) had a total of 3895 students, of which 2002 (51.4%) were females. In high schools had a total of 472 students of which 413 (53%) were females. In first cycle, there were a total of 28 teachers of which 17 (60.7 %%) were females. In elementary schools (1-8) there were 117 teachers of which 58 (49.6%) were females. School dropout rate for grade 1-4 students was 3.2% and total school dropout rate of the district was 2.4%. Education coverage for the District was 100%, but the literacy rate was not known.

Table 15: Number of students and teachers by school type in woreda 06, N/S/L sub city, Addis Ababa city Administration, Ethiopia, 2018

Type of School	**# Teachers**			**# Students**			**student school drop out**
	Male	Female	Total	Male	Female	Total	
KG	23	34	57	393	367	760	12
1_4	11	17	28	933	970	1903	60
1_8	59	58	117	1893	2002	3,895	97
9_10	41	23	64	222	250	472	12
11_12	19	13	32	170	190	360	3
College	6	4	10	111	132	243	0
TVT	4	2	6	34	16	50	1
Total	134	132	266	3441	3589	7030	169

Woreda Health System

The currently reviewed woreda 6 health office structure was organized in to six technical team and three supportive teams. These technical teams were curative core process, health promotion & disease prevention core process, human resources core process, plan and budgeting, financial core process, network administrative & computer maintenance.

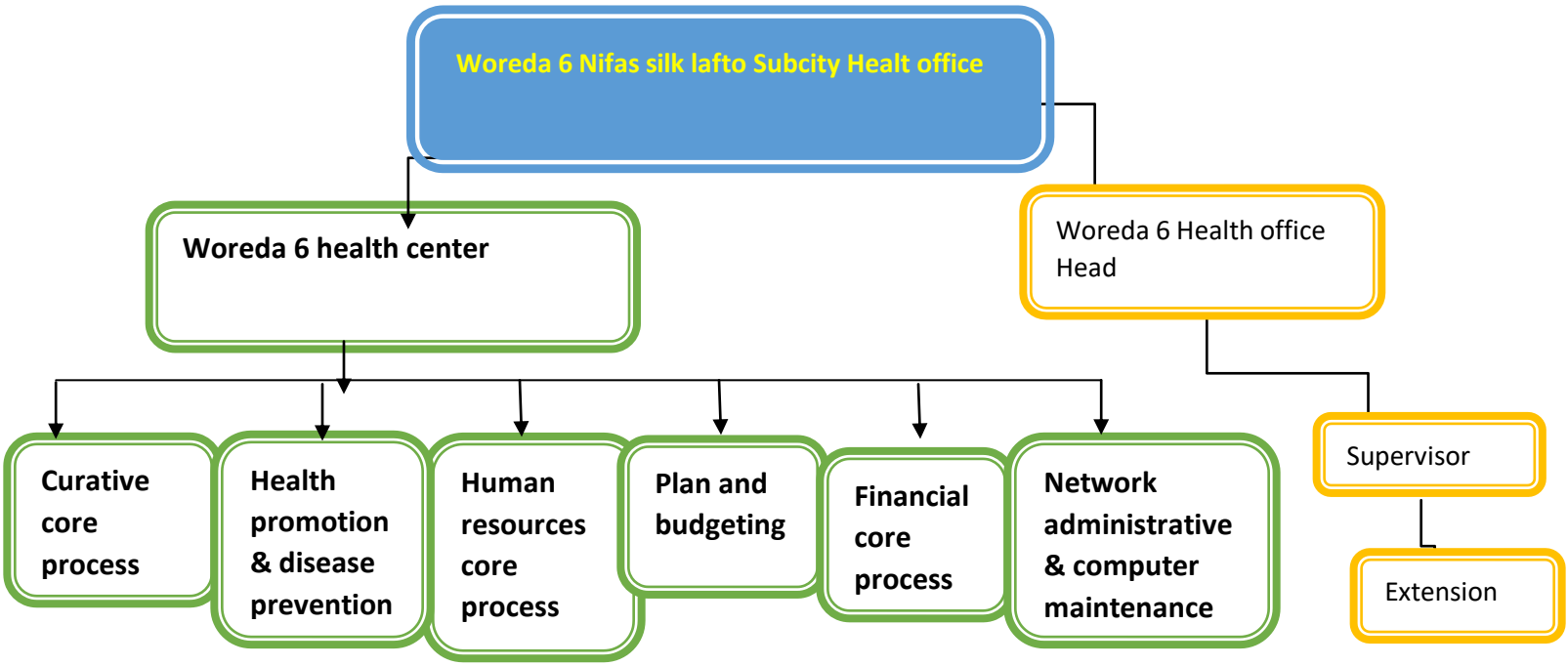


Figure 27 Organo gram of Nifas silk lafto sub-city Woreda 06 Health Office, AA City Administration, Ethiopia, 2018.

Health Status

Health Facility

The district had one health center and 13 private clinics provide service. Among these 8 medium clinics, 4 specialty clinics and 1 primary clinic were serving the community. The district had no government hospital. Four pharmacies and nine drug stores are available in the woreda 06, Nifas silk Lafto sub city.

Table 16: Health Facility to population ratio Woreda 06, Nifas Silk Lafto Sub city, Addis Ababa, Ethiopia, 2018

Type of Health facility	No of Health facility	Health facility to population ratio
Hospital	0	0
Health Center	1	1: 39902
Private clinic	13	1:3069
Pharmacy	4	1:9976
Drug stores	9	1:4434

According to the Addis Ababa city administration health sector plan, the Woreda 06 administration's health service coverage was beyond the plan (>100%) which intend one health center is designed to serve 40, 000 populations.

Health professional to Population Ratio

Health professionals to population ratio, 1: 5700 physicians to peoples, one nurse to 540 peoples and one HEW to 2217 peoples. All of the specialists and GPs were from private clinics.

Table 17: Health professional to population Ratio, woreda 6, Nifas silk lafto sub-city, Addis Ababa, Ethiopia, 2018

Profession	Number		Ratio to Population
	Government	Private	
Physician	0	7	1:5700
Health officer	10	9	1:2100
Laboratory technician/technologist	08	22	1:1330
Specialist	0	05	1:7981
Nurses	36	38	1:540
Midwife	8	9	1:2347
X-Ray technician	0	2	1:19951
HEWs	18	0	1:2217

Health service institutions and infrastructures:

The district had one health center with pipe water supply, telephone service and sustainable 24hr electric power; and 13 private clinics (Eight medium clinics and four specialty clinics and one primary clinic) provide service but had no government hospital there.

Vital statistics and Health Indicators

Females in the reproductive age group (15-49 years) were estimated to be about 13822 (23.97%) and pregnant women were estimated to be 930 (2.33%) of the total population in the District. Children <1 year of age constituted about 894 (2.24%) and children <5 years of age constituted about 2857 (7.16%) of the total population. Vital statistics like total death, total births, under one and under five deaths were not recorded in the District and indices for each specific indicator mentioned in the table 5 were from the national estimates, projected from the 2007 national census.

Table 18: Vital statistic data of Woreda 06, N/S/L Sub City, Addis Ababa city administration, 2018

No	Demographic Parameters	Number	Proportion from Total population
1	Total Population	39902	100%
2	Male	19552	49%
3	Female	20,350	51%
5	Population under 1yrs	894	2.24%
6	Population under five yrs.	2857	7.16%
7	Population < 15 yrs.	9565	23.97%
8	Women 15_49 yrs. of age	13,822	34.64%
9	Estimated pregnancy	930	2.33%
10	Average Household	8490	4.7
11	Estimated live birth	930	2.33%
12	Non pregnant women	12,876	32.27%
13	Dependency ratio		39.3%

Maternal Health Service

Contraceptive Utilization

One of the targets of the Ministry of Health, with respect to improving maternal and child health was to improve the contraceptive acceptance rate. Among 13822 of the reproductive age group (15-49) women in Woreda 06 administration, 2,450(17.7%) used contraceptive methods, the most used contraceptive method was Implant 1614 (65.9%), followed by IUCD 677(27.6%) and the least used contraceptive method was Pill. This show contraceptive acceptance rate in the district was low. And among contraceptive user long term contraceptive methods were utilized better than short term contraceptive methods.

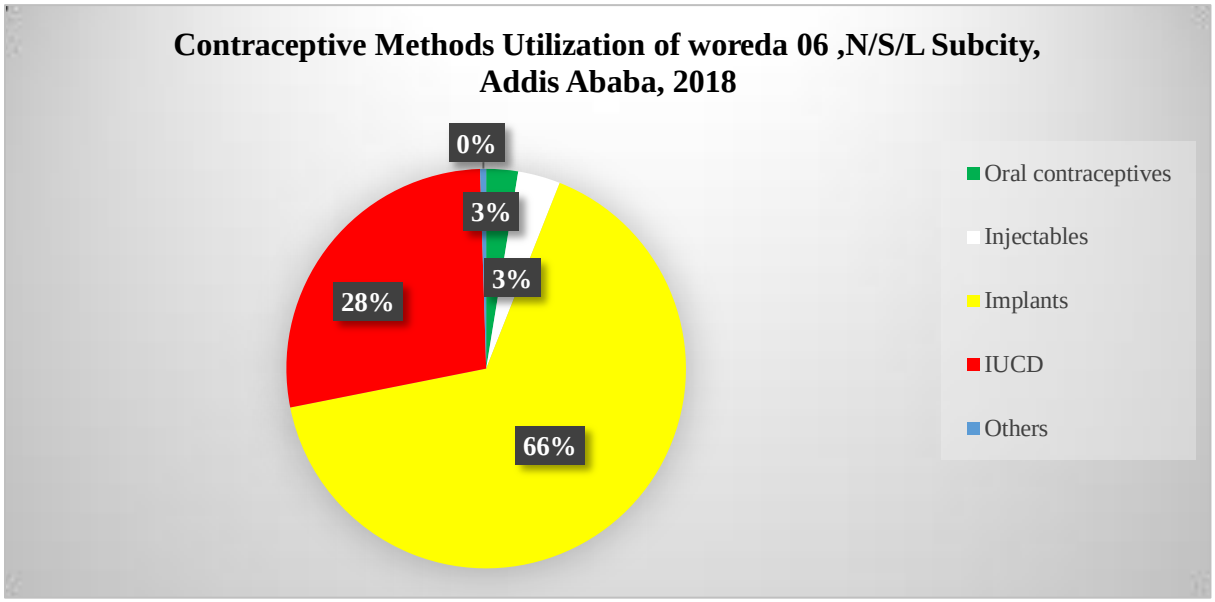


Figure 35: Contraceptive methods utilization of Woreda 06, N/S/L sub city, Addis Ababa, 2018.

Antenatal care, postnatal care and Deliveries

In Woreda 06 of Nifas Silk Lafto sub city 930 pregnant women were expected in 2017/2018. From the expected pregnant women 82.6% received first antenatal care service in the year. All (100%) Pregnant women were delivered by skilled birth attendants and 46.6% women received postnatal care service. No maternal death was reported in the district. Post-natal care seeking behavior of the women after delivery is not as high as antenatal care which is not good for enhanced MCH.

Table 19: Percentage of Antenatal care, attended by skilled birth personnel, in Woreda 06 Administration, N/S/L Sub City, A.A, Ethiopia 2018.

S.No	Description	Plan	Achievement	Percentage
1	ANC 1 coverage	930	768	82.6
2	ANC 4 coverage	930	424	45.6
3	Institutional delivery coverage	930	932	100%
4	Live Birth	930	287	30.9
5	PNC coverage	930	433	46.6
6	PMTCT	930	731	78.9

Source: NSL sub city health office and Woreda 06 health center 2017/18 HMIS report.

EPI coverage for children

From eligible for immunization 98% of children were protected at birth (PAB). Among these 71%, 69.5% and 82.3% of child received BCG, pentavalent 1 and 2 respectively. Children received measles vaccine 94.5% of at the age of 9 month and above in 2017. The dropout rate for measles and penta3 was 5.5%% and 17.7% respectively.

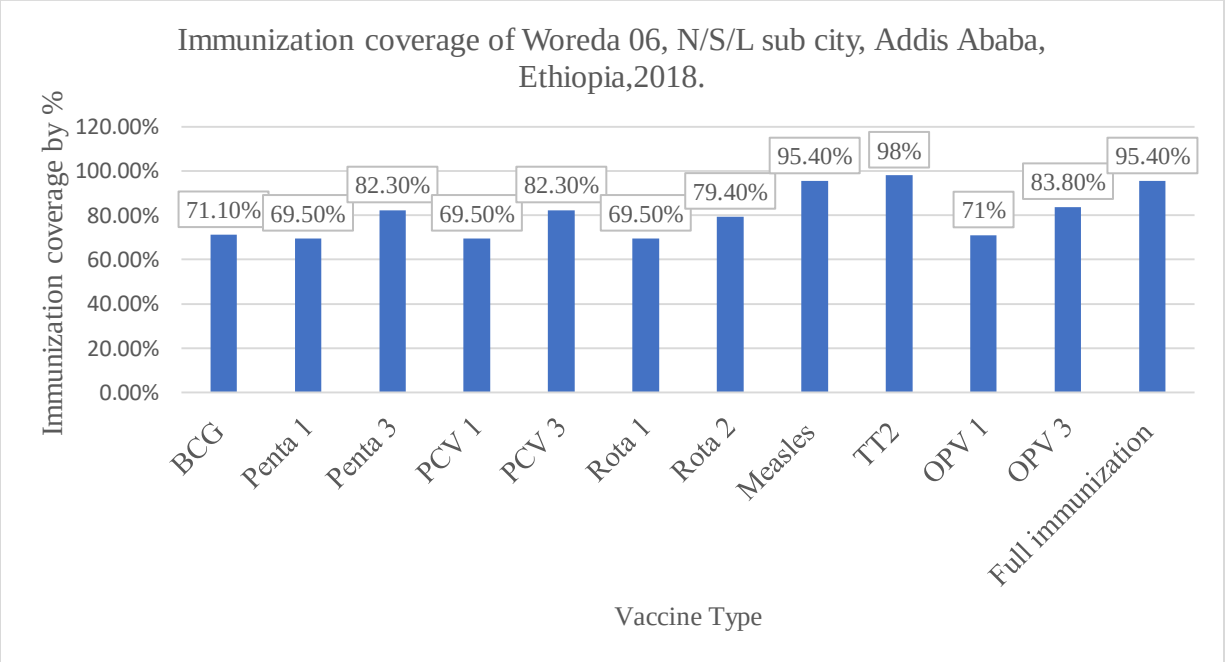


Figure 36: Immunization coverage of Woreda 06, N/S/L sub city, Addis Ababa, Ethiopia, 2018.

Hygiene and Environmental Health services

Source of water in the district was pipe and deep wells, with safe water coverage of 87.1%. The sub city was getting water through pipe from four sites as the main source of water supply to the

community. However, the Woreda has high demand of protected water for all sorts of consumptions but the community did not get as they preferred. Three ketenes (gots) of Woreda 06 complain the quality of their pipe water change in color and bad odor. They also had no water treatment chemicals.

Top causes of morbidity and mortality

Acute Upper Respiratory Tract Infection (35.86%) and non-bloody diarrhea (10.5%) were the leading of cause morbidity among top ten outpatient visit of Woreda 06, N/S/L sub city, Addis Ababa city administration.

Table 20: Top Ten Leading Cause of Morbidity in the Woreda 06, N/S/L Sub City, A.A, Ethiopia, 2018.

S.NO	Top leading cause of Morbidity in Adult	Number of Cases	Percentage (%)
1	Acute upper Respiratory Tract Infection	6993	35.86%
2	Non-bloody diarrhea	2053	10.53%
3	UTI	1754	8.99%
4	Other unspecified disease of skin & subcutaneous	1712	8.78%
5	Other unspecified disease	1387	7.11%
6	Dyspepsia	1256	6.44%
7	Disease of musculoskeletal system & connective tissue	1238	6.35%
8	Other unspecified infection & Parasitic disease	1151	5.90%
9	Trauma	1089	5.58%
10	Other unspecified disease of dysentery	868	4.45%

Among the top Ten Leading Cause of under Five Morbidity, Acute upper respiratory infection (54.58%), Non-bloody diarrhea (16.14%) and Other unspecified diseases of the skin & subcutaneous tissue (9.03%) were the top 3 diseases in the year 2017.

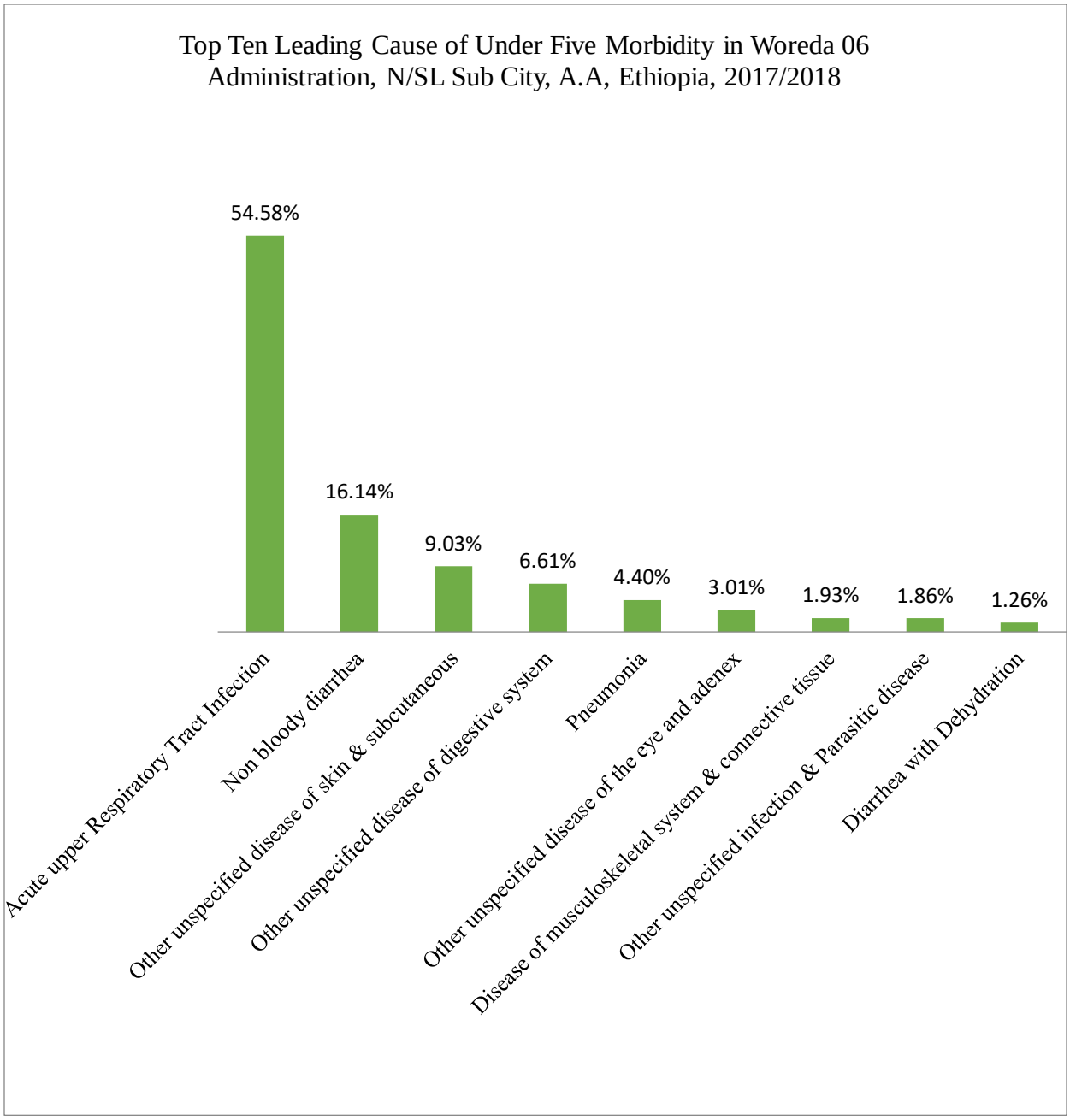


Figure 30: Top leading cause of less than Five Morbidity Woreda 06 Administration, N/SL Sub City, A.A, Ethiopia, 2018

Endemic Diseases

Tuberculosis

A total of 114 tuberculosis cases were reported to the district in 2017/18. Among these, 46 cases were pulmonary tuberculosis (PTB) negative and 34 cases were PTB positive. Among 44 TB patients screened for HIV, 8(18.2%) of them were turned positive.34 (29.8%) of TB cases were attributed to Extra PTB in the year. The cure rate was 99(87%).

Table 21: Prevalence of TB/Leprosy, in Woreda 06, N/S/L Sub City, A.A, Ethiopia 2018.

Sr. No	Description		Number	percentage
1	Prevalence of TB		114	0.3%
2	Pulmonary TB	Smear positive	34	29.8%
		Smear negative	46	40.3%
3	Extra PTB		34	29.8%
	Retreatment		4	3.5%
4	TB detection rate All form		114	100%
5	TB Rx completion rate		102	89.5%
6	TB cure rate		99	86.8%
7	TB Rx success rate		102	90%
8	TB defaulter rate		2	1.8%
9	Death on TB Rx		1	0.9%
10	Total TB patients screened for HIV		44	38.6%
11	HIV prevalence rate among TB cases		8	18.2%
12	Prevalence of Leprosy		0	0%

HIV/AIDS

In N/S/L sub city woreda 06, a total of 1648 people were screened for HIV (1435 individuals by PICT and 213 people by VCT) in 2017/2018. 670 clients were screened for HIV in PMTCT departments, of these 10(1.5%) of them were PLWHIV. Currently 7 PLWHIV are receiving anti-retroviral therapy. Three of pregnant mothers living with HIV were on pre ART phase. The prevalence rate of HIV in the district was 2.5/10000 populations in 2018.

Table 22: HIV/AIDS prevalence during pregnancy, Woreda 06, N/S/L Sub-city, Addis Ababa, 2018

S.N	Activities	M	F	total
1	Total people screened for HIV	218	1430	1648
2	VCT	101	112	213
3	PICT	117	1318	1435
4	PMTCT		670	670
5	Total PLWHIV		10	10
6	On ART (ever started)		4	4
7	Currently on ART		3	3
8	No. of pregnant mothers on ART		7	7
9	No. of pregnant mothers on Pre ART		3	3

Nutrition intervention

Regarding nutritional interventions during 2017/2018, woreda 06 health center has given severe acute malnutrition therapeutic feeding for a total of 215 adults and under 5 children.

Disaster and outbreak Situation in the woreda

Flooding

In Nifas silk lafto sub city woreda 06, flooding was occurred in September 10, 2017 following heavy rain and affected a total of 65 House in three ketenes; Ketene 2/46, Ketene 3/52 and ketene 4/53. In general, the flooding damages approximately half million Property but there was no death due to flooding.

Outbreak situation

Regarding public health emergency occurred in Nifas Silk Lafto woreda 06, there was Measles outbreak in the Woreda; with a total of 30 cases and no death among the cases. Three of the cases are confirmed by laboratory.

Health budget allocation

Based on the information from the Woreda 06 Finance & Economic Development Office, the annual budget allocated from the Sub city in the year 2017/2018 for the Woreda was 18,687,614 ETB. The amount budgeted to the Woreda Health Office was 131,169 (0.7%), ETB. The budget

allocated for the health sector decreased by 4.5 % from the previous year, because of 18 Health extension workers budget was excluding from the Health office.

Problem Identification and Prioritization

Table 23: Prioritized problems from identified Problems in N/S/L sub city woreda 06 in AA city Administration, 2018.

Problems	Seriousness of Problem	Size of the problem	Importance	Feasibility	Total points
High burden of URTI and diarrheal disease	4	5	5	4	18
Shortage of safe water supply	3	3	5	5	16
Low PNC Coverage	3	3	4	5	15
Low Contraceptive acceptance rate	3	3	4	4	14

The criteria used to prioritize the problems are as follows:

A. Size of the problem

Definition: Number or percentage of people affected by a health condition in a particular area. Rating for size of the problem 1= relatively few people affected 2= Moderate people affected in particular subgroup 3= Moderate number affected across the entire population 4= Large number affected in particular subgroup 5= Large number affected across entire population

B. Seriousness of Problem

Definition: Potential of a health problem to result in severe disability or death Rating for seriousness of problems 1= Not life threatening or disabling 2= Not life threatening bus sometimes disabling 3= moderately life threatening or disabling 4= Moderately life threatening, with a strong likelihood of disabling 5= High likelihood of death or disability

C. Feasibility (Availability of current intervention)

Definition: Are there evidence-based interventions or promising practices to prevent or control this health problem? Can these interventions be implemented easily?

Rating for availability of current interventions 1= No evidence-based intervention or promising practices available 2= No evidence-based intervention available but promising practices are available. 3= No evidence-based intervention available but difficult to implement 4= Evidence-

based intervention available and can be implemented with moderate effort 5= Evidence-based intervention available and can be implemented easily

D. Importance (Economic and social impact)

Definition: Monetary and societal costs Rating for economic and social impacts 1= Economic or societal costs are minimal 2= There is some potential increased cost 3= There is likely to be moderate costs 4= There is likely to be substantial costs 5= There are great economic and social costs

According to the district health officials, the main problems of the district are upper respiratory tract infection and diarrheal diseases, shortage of safe water supply, poor contraceptive acceptance rate and low post-natal coverage.

Discussion

Based on the data collected from Nifas Silk Lafto sub city woreda 06 health profiles, acute upper respiratory tract infection, followed by diseases of the non-bloody diarrhea, is the leading cause of outpatient visit in the woreda. It accounts for 35.86% of the outpatient visits in 2017/18. It is lower than study conducted in south Gondar to a health facility-based study on acute respiratory infections which was 63%, The difference might be due to the study done in south Gondar was based on both lower and upper respiratory infections (2).

Vaccination coverage for fully vaccinated children of less than 1 year of age was 95.4 %. This is much better than the national coverage (69%) according to a survey conducted to assess the immunization coverage in selected health facilities (3).

Forty six percent of pregnant women had at least four ANC visits. This shows a better coverage comparative to 42% of mothers received same number of ANC visits according to the national baseline survey conducted for routine immunization improvement initiative in 2015.

TB cure rate and treatment success rate in woreda 06, N/S/L sub city in 2017/18 was 86.6% and 90% respectively. This better than the national cure and treatment success rates are 67% and 84%, The target set for the prevention and control of TB have been to achieve 85% treatment success rate and a detection rate of 70% of new sputum +ve TB cases(4). The difference might be due to the study population are all urban and have good access to health care service.

The HIV prevalence of the woreda 06 based on the health facility data such as from VCT, PMTCT, and PITC was 1.5% which high than compared to the national projected prevalence that is 1.2%(5).

A total of 7030 students and 266 teachers (with 2.4 school dropout) were living in the district.

Education coverage for the District was 100%, but the literacy rate was not known.

Limitations

Sectors lacking/missing appropriate data/health and health related indicators, for example, mortality records. Average income per capital, Language, Religion and Occupational characteristics were not clearly documented.

Conclusion and Recommendation

Acute upper respiratory tract infection and diarrheal disease were the first and second leading cause of morbidity in the district both in adult and under five outpatient departments respectively. This may due to lack of clean drinking water, poor sanitation and low public awareness of environmental health and personal hygiene practices. Therefore, prevention and control measures should be strengthened to reduce the morbidity due to acute upper respiratory tract infection, diarrheal diseases and other priority diseases. There should be strong water quality monitoring and regular chlorination as per the standard by district Water office. Contraceptive prevalence rate and Post-natal care seeking behavior of the women after delivery is low. Health related indicators like, death/mortality, total fertility rates, crude rates were not recorded appropriately. Therefore, the Woreda Health Office should give emphasis for community awareness about contraceptive utilization and Post-natal care seeking behavior and should have proper records on births and deaths. Average income per capital, Language, Religion and Occupational characteristics were not clearly documented. The district sectors should keep their respective data in appropriate and easily accessible manner.

Reference

1. Yirdaw Emiru- Final compiled body of works-1.
2. Kidane T, Yigzaw A, Sahilemariam Y, Bulto T, Mengistu H, Belay T. National EPI coverage survey report in Ethiopia , 2006. 2006;
3. MoH F. Extended Program on Immunization (EPI) coverage in selected Ethiopian zones : A baseline survey for L10K ' s Routine Immunization Improvement Initiative. 2015;(June).
4. MoH F. Federal Democratic Republic of Ethiopia Ministry of Health Health Sector Development Program IV October 2010 Contents. 2014;(October 2010).
5. MoH F, Plan T. Health Sector Transformation Plan.

CHAPTER-V

5. Scientific Manuscript for Peer Reviewed Journals

5.1. Reemergence of Chikungunya fever in Ethiopia after 3 years, 2019: epidemiological and entomological investigations

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Abstract

Background: Chikungunya (CHIK) is an alphaviridae that causes febrile illness in humans. It was first isolated in Tanzania in 1953. It has a cyclical trend of reemergence 4-30 year's interval once it is identified in a particular place. In Ethiopia, the first outbreak was reported in 2016 in Somali region. A number of cases with unknown febrile illness reported from Adaar district Afar region starting from 8th March 2019. This investigation was conducted to identify the causative agent, source of the outbreak and recommend appropriate interventions.

Methods: Cross sectional study design was conducted. Medical records were reviewed and Patients and clinicians involved in managing the case were interviewed. Descriptive data analysis was done by time, person and place. Serum samples were collected and confirmatory tests were done using Real Time Polymerase Chain Reaction (RT-PCR) techniques in a national arbovirus laboratory. Breteau and container indices were used for the entomological investigation to determine the risk of epidemic.

Results: A total of 1181 Chikungunya cases (AR = 18.9%) were reported from March 2019 to May 24, 2019 from Eliwuha town, Adaar district. All age groups were affected (mean 26, Range 1–90 Years). In week 12, 30% of cases were recorded. Of the total cases, 98.6% cases had fever, 97.9% cases had arthralgia and 96.3% cases had headache. Fourteen (74%) of the 19 samples were positive for Chikungunya virus nucleic acid. Aedes mosquitoes (56) were identified as responsible vectors of Chikungunya in affected area. The Breteau indices of Eliwuha kebele was 22.5%, whereas the container indices was 45%. Indoor residual spray was conducted to control the outbreak in the district.

Conclusion: The investigation revealed that Chikungunya outbreak was reemerged after 3 years in Ethiopia. Aedes mosquito found the area responsible for the outbreak. We recommended to vector control and public awareness campaigns.

Keywords: Chikungunya fever, Mosquito, Outbreak, Adaar, Ethiopia.

Introduction

Chikungunya is a vector borne virus in alphaviridae family passed to humans by Aedes mosquito bite[1]. It was isolated in Tanzania where a massive outbreak with unusual illness characterized by crippling joint pain and severe fever in 1953[2]. The name Chikungunya was derived from *Makonde* (a language spoken by Makonde, an ethnic group who live in southeast Tanzania and northern Mozambique) root verb kungunyala meaning ''that which bends up'', '' to become contorted'', or ''to walk bent over''[3].

Chikungunya is believed to have originated from Africa and spread to islands off the eastern coast of Africa[4]. The first emergence of Chikungunya was confirmed in April 2005 in southwestern Indian region, Comoros Islands which are near to the eastern coast of Mozambique[2]. The virus was spread to Mayotte, Mauritius, and the French island of La Reunion. The attack rates for this outbreak in 2005 ranges from 35% to 75%. In 2006, after an apparent gap of about 32 years during which CHIKV was not detected, CHIKV disease has attacked many people in India in numerous states, suspected number of cases ultimately reaching more than 1.3 million[2][4]. The CHIKV outbreak has spread causing large out- breaks in many other countries in Southeast Asia. CHIKV was introduced into countries where it is not endemic by viremic travelers, including Italy, France, New Caledonia, Papua New Guinea, Bhutan, and Yemen[5][4].

CHIKV was also introduced to the Americas by end of 2013. WHO reported the first local transmission of Chikungunya virus in Saint Martin, a Caribbean island[6]. The rapid and explosive spread of CHIKV had caused a morbidity of about 440,000 people in more than 20 American countries, including USA's Florida. In general, CHIKV has spread from the coast of Kenya throughout the Indian Ocean, Pacific, and Caribbean regions, causing millions of cases of disease in over 50 countries. In general, Chikungunya virus epidemics have shown cyclical trends, with inter-epidemic periods ranging from 4 to 30 years[2][7].

Three genotypes of CHIKV, called West African, East/Central/South African (ECSA), and Asian have been defined, of which the latter two caused large outbreaks. ECSA genotype virus, which had originated from Kenya, was responsible for the epidemics on islands in the Indian Ocean.

Thus, it was quite unexpected when the ongoing outbreaks in the Caribbean region were found to be due to an Asian genotype virus. Chikungunya virus has been transmitted by Aedes aegypti and Aedes albopictus mosquitoes. There is evidence that ECSA strains have been adapted to Ae. Albopictus whereas Ae. Aegyptus have greater competence for Asian strains over ECSA strains[8][4][2].

Laboratory confirmation can be done via detection of CHIKV in blood samples using enzyme linked immune-sorbent assay(ELISA), reverse transcriptase real time polymerase chain reaction (RT-PCR) , real time RT-PCR , indirect immunofluorescence assay, viral culture(virus isolation), neutralization assays, and/or hemagglutinin inhibition assays. Chikungunya virus, as it is a risk group 3 pathogen, is containment in biosafety Level 3 facilities, equipment, and operational practices for work involving infectious or potentially infectious material[9][10].

The Chikungunya outbreak occurred in Ethiopia in Somali region dolo ado woreda from June 4-27, 2016. The outbreak affects the two Kebeles (kebele 01 and kebele 02) of suftu town. A total of 864 Chikungunya fever cases with no death was reported. Among the cases 439 (50.81%) were females and the rest 425 (49.19%) were males. The attack rate of the outbreak was 4.5%, separately it was 4.4% for males and 4.6% for females[11].

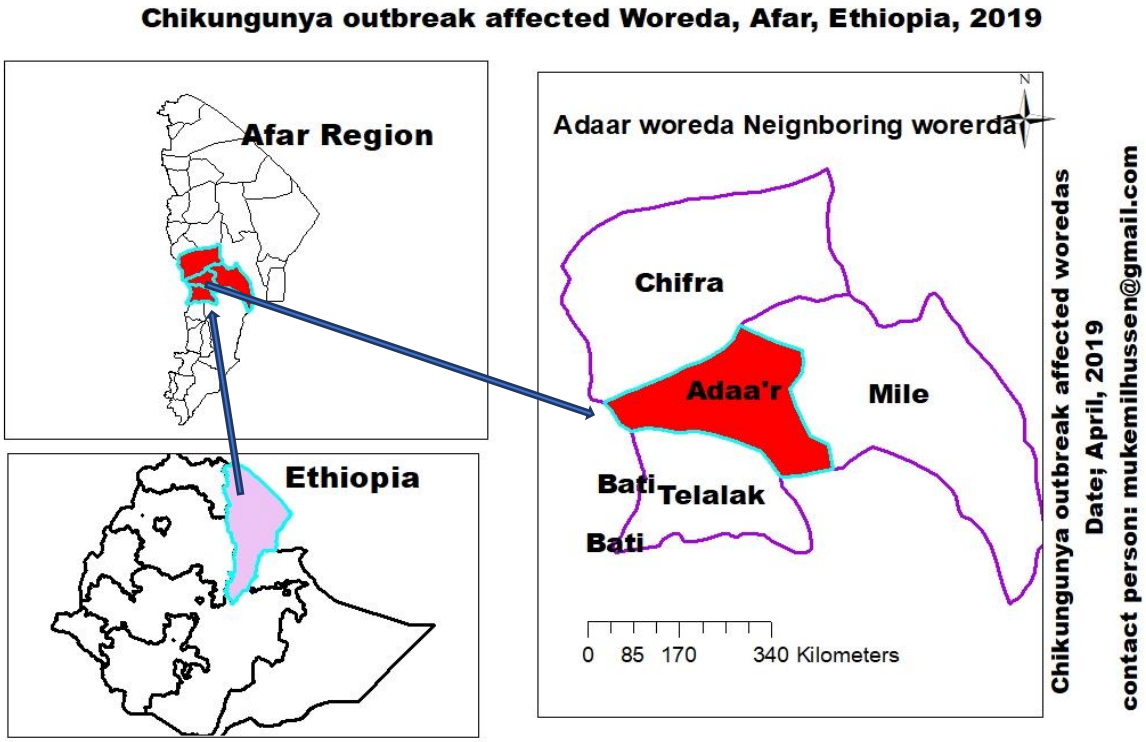
A number of cases with unknown febrile illness reported from Adaar district Afar region starting from 8th March 2019. National and regional RRT deployed for outbreak investigation and response activities in Adaar woreda Afar region. This investigation was conducted to identify the causative agent, source of the outbreak and recommend appropriate interventions.

Methods and Materials

Study Area: This investigation was conducted in Adaar Woreda, Afar region. Adar woreda is located 122 km far from Samara, which is a capital city of Afar region. The Adaar woreda neighboring for Chifra Woreda to north, mile Woreda to the northeast, Adaytu (Isa special Kebele) to the east-south, Telalak woreda to south, Bati Woreda (Oromia special Zone), Amhara region to west(Map 1). The total population of Adaar woreda is 64556, from 2018/19 population projection. Male to female population are 36409 and 28146 respectively. Adaar district has a total of 12 Kebeles (11rural and 1 urban Kebele). Eliwuha is urban kebele with a total

population of 6227. Adaar woreda has three Health Centers and eight health post(Source: Adaar Woreda Health Office).

Adaar is one of 32 woreda of Afar, is characterized by an arid and semi-arid climate with low and erratic rainfall. The temperature of the region varies from 25°C during the rainy season (September-March) to 48°C during the dry season (March-September).



Map 7: Map of Adaar Woreda and Neighboring woreda, Afar region April, 2019

Study Design and period: Cross sectional study design was conducted from March to April, 2019

Data Collection: Medical records were reviewed and Medical records were reviewed and daily line lists were collected from March 8 to April 14 2019 from Eliwuha health center, house to house visit and Adaar woreda health office. Line lists contain variables such as date of onset of illness, age, sex, district and Kebele (village) name, disease outcome. Patients and clinicians involved in managing the case were interviewed. Case definition from WHO Regional Office for South-East Asia guidelines for prevention and control of

Chikungunya fever[12] was used to identify cases.

Case definition: Clinical criteria: acute onset of fever >38.5°C and severe arthralgia/arthritis not explained by other medical conditions

Epidemiological criteria: residing or having visited epidemic areas, having reported transmission within 15 days prior to the onset of symptoms

Data Collection: Medical records were reviewed and daily line lists were collected from March 8 to April 14 2019 from Eliwuha health center, house to house visit and Adaar woreda health office. Line lists contain variables such as date of onset of illness, age, sex, district and Kebele (village) name, disease outcome. Discussion was held with some of the patients at house hold level and at Eliwuha health center to inform them of the method of investigation and enable them to understand their clinical pictures during the investigation time. Case definition from WHO Regional Office for South-East Asia guidelines for prevention and control of Chikungunya fever[12] was used to identify cases.

Specimen Collection and Laboratory Investigation: Serum samples were collected and transported according to the recommended cold chain to identify the cause of the unusual febrile illness.

Entomological Investigation: Entomological investigation was conducted. Container holding water was searched in each of the households in indoor and outdoor environment. Larval sampling would cover the domestic and peri-domestic environments in order to estimate risk indices. The entomologist was accompanied by health extension workers for each of the HHs and possible larval breeding sites during the survey period. The health extension workers explained the purpose of the visit to the owner of the houses visited. Informed oral consent was obtained from the head of the households for larval and adult mosquito collection. As result, different techniques have been applied to identify mosquito breeding sites, immature (larval and pupa) and adult collection have been tried.

Data quality and analysis: Data was checked and cleaned. Description of the line list was performed by time, person and place using Microsoft Excel 2016. Attack rate was calculated by dividing the number of cases to the population (Source: Adaar Woreda Health Office)and multiplied by 100.

Ethical Issues: Support letter was written to those concerned so as the national investigation team, as a public health emergency response body, can responsibly and accountably undertake the response activity at the site of the outbreak. Serum samples were collected only aiming to investigate the causative agent of the unusual febrile illness and to guide appropriate outbreak control interventions. The direction was given from EPHI, the government organization which has a full mandate to conduct epidemiological and laboratory investigation, and respond to any public health emergencies.

Result

Laboratory Investigation result.

Laboratory tests were performed for Dengue fever Virus and Chikungunya viruses for a total of19 serum samples by Real Time Reverse Transcriptase Polymerase Chain Reaction (rRT-PCR) technique to identify the etiology of the existing febrile illness. The test was done at Ethiopian Public Health Institute (EPHI), arbo virus laboratory. Twelve 14(73.7%) samples were positive for Chikungunya virus. The remaining 5(26.3%) cases were negative for Chikungunya fever virus by rRT-PCR.

Entomological Findings: Different artificial water holding containers have been identified and Larval and pupa were collected three times and grown at room temperature. The adults grown were initially seen only *Culex* (120) and *Anopheles* (65) mosquitoes. However, after frequent investigation of almost all areas both day and night, significant numbers of Aedes species (56), mosquitoes have been identified.

The artificial water holding usable containers investigated were mostly metal barrels and plastic rottos found in local flour mill grinder fabrics. Almost all (8) existing flour mills were seen to be observed with larvae and adult mosquitoes.

Table 24: Entomological investigation findings in Eliwuha town Afar region, Ethiopia, April, 2019

Woreda	Kebele	Type of vector found	Vector Indices				
			Breteau Index	House Index	Container Index	Adult collection (Yes / No)	Vector RT-PCR
Adaar	Eliwuha	Culex, Anopheles and Aedes	22.5 %	11.25 %	45%	Yes	Pending

High larval index = House Index ≥5% and/or Breteau Index ≥ 20;Low larval index = House Index ≤5% and/or Breteau Index ≤ 20;Breteau index = (Number of positive containers / Number of houses inspected) X 100
House index = (Number of infested houses / Number of houses inspected) X 100
Container index = (Number of positive containers / Number of containers inspected) X 100 RT - PCR = Real time polymerase chain reaction

Adult Mosquito Collection

Adult mosquito collection was conducted using WHO standard hand aspirators from around artificial water holding containers from both indoor and outdoor during late night and early morning and transferred to prepared paper cups then preserved in cryogenic tubes for further identification.

Figure 37: Aedes aegypti mosquito Causing Chikungunya outbreak in Adaar district, Afar, Ethiopia, 2019.

Descriptive Epidemiology

Chikungunya fever confirmed outbreak began in 01 Kebele, Adaar Woreda (district), Zone 1, Afar region. The main signs or symptoms associated with this outbreak due to Chikungunya infection were fever (99.2 %%), joint pain (98.6 %%) and headache (96.9%) of all patients.

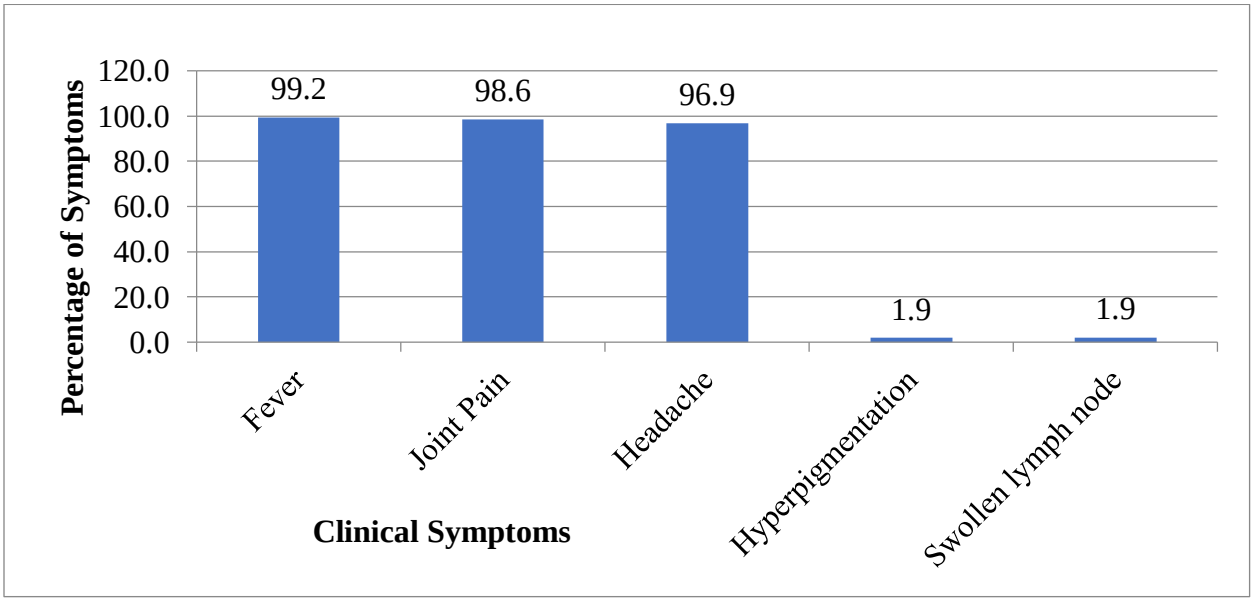


Figure 38: Clinical symptoms of Chikungunya outbreak in Adaar District Afar, Ethiopia, 2019

A total of 1181(AR=18.9%) Chikungunya fever cases with no death related to this outbreak. The outbreak hits almost all village of Eliwuha town 01 Kebeles(1102(93.3%)) and only thirty eight (79(6.7%) cases from other Kebeles (Adaar town, Jeldi, Abaco, Ledi, Woranso, Woanto, and Furso).

Among the cases, 687 (58%) of Males were affected by the outbreak. Separately sex specific attack rate in the district was 17.5% for females 14.5% for Males.

The age of cases ranges from 1 year to 90 years with a median of 22 years old. Almost all age groups were affected. Among age group the highest number of cases recorded on age group 20-29 years old. The outbreak mainly affected age group10-29(55.4%) years old was most affected age group.

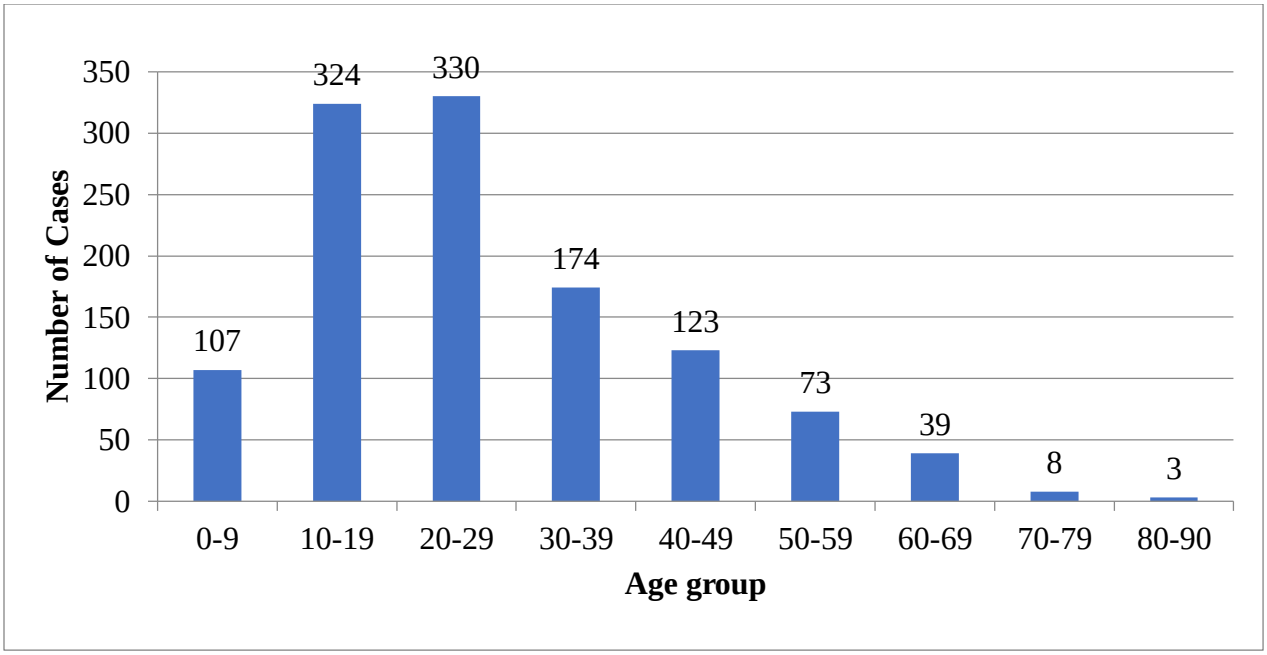


Figure 39Distribution of Chikungunya Cases by age groupin Adaar woreda Afar region, 2019

Three suspected index cases from one family have a travel history to Eritrea-Asab before 25 days ago and developed symptom of joint pain and fever treated at Eliwuha in Health centerwas reported in March 8, 2019.Mrs. Zahara Oumer is homemaker of the family. She, her young son and her husband have travel history to Asab in Eritrea. They were in Asab for 4 days. She told us that an outbreak with the same sign and symptom happened. As she told us, most of the people in Asab affected by the disease.

The Chikungunya outbreak began in Adaar district in March 8 and notified to regional health Bureau and Ethiopian public health institute, Public emergency management (EPHI/PHEM) in March 8, 2019. Immediately outbreak investigation began and response interventions were conducted and the outbreak was controlled in May 22, 2019.

Chikungunya outbreak began in week 8 and reaches its pick in week 12(the highest number of cases recorded), then start to decline after vector control campaign conducted. After week 13, finally the outbreak was controlled in week 20, 2019.

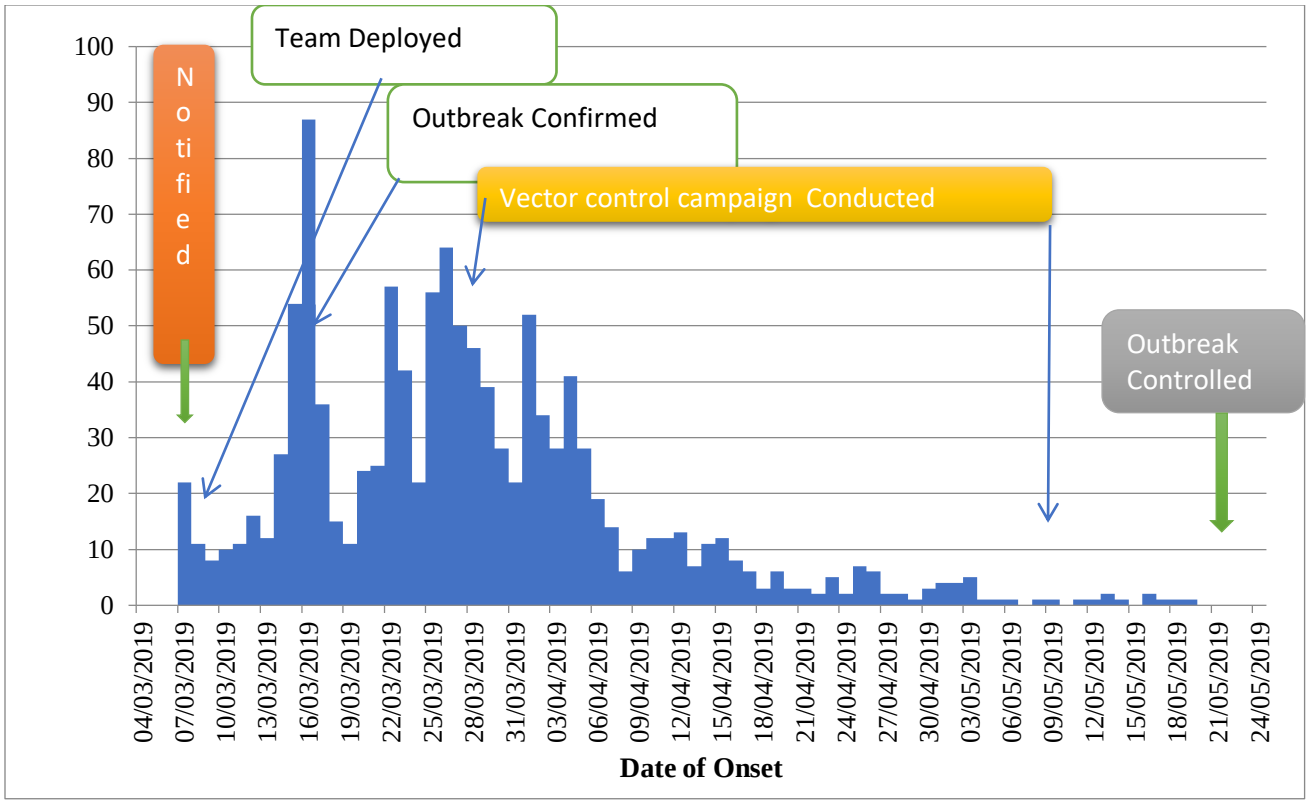


Figure 40: Epi curve of Chikungunya Fever outbreak, Adaar woreda, Afar region, April, 2019

Outbreak Interventions: Coordination of the outbreak response in the district and case management at Eliwuha Health center, active cases search using case definition, epidemiological, entomological and laboratory investigations, Social mobilization, health education on ITN utilization and Vector control (indoor residual spray-IRS) campaign was conducted at community and house hold level to control the outbreak.

Discussion

Chikungunya is endemic in Africa, south-east Asia and on the Indian subcontinent with outbreaks occurring beyond the well-known endemic areas from 2005[13]. Compared to this historical occurrence, this is the second documented Chikungunya outbreak occurred after three years in the Ethiopia. It might have been introduced by travellers from Eritrea where outbreaks were suspected.

CHIKV is transmitted by the bite of Aedes mosquitoes mainly A. aegypti[14]. In entomological investigation have been identified significant numbers of Aedes species (56), mosquitoes causing Chikungunya outbreak in Ethiopia.

Typical clinical signs of the disease include fever and severe arthralgia, which may

persist for weeks, months, or years[13]. The main signs or symptoms associated with this outbreak due to Chikungunya infection were fever (99.2 %%) and sever arthralgia -joint pain (98.6 %) of all patients.

The attack rate (AR=18.9%) of this Chikungunya virus outbreak was much higher than that of previously documented outbreak in Ethiopia (AR=4.5%)[11]. And also higher than Chikungunya virus outbreak in Sint Maarten, 2013–2014(AR=1.76%)[15]. The difference may due high number of susceptible population in Adaar district Eliwuha town and the presence disease transmitting vector in the area.This may be the conduciveness of the environment for the spread of *Aedes* mosquito as a result of the global climate change.

In this outbreak, More reported cases among females (AR=17.5%) than males affected by the outbreak. As reported in other CHIKV out-breaks, there were more reported cases among females than males. This may be due to greater health-seeking behavior, differing levels of exposed skin, and greater exposure due to peri-domestic activities among women versus men.

The largest proportion of CHIKV cases (28%) were in the 20–29 year age group, and 80.5% of those occurred within patients 10–59 years old, suggesting both short- and long-term economic effects from the disease, including a drop in workplace productivity due to absenteeism, as a result of disease sequelae. Another possible effect, given that symptoms may persist for weeks, months, or years, is an increased burden on health and social services.

In response to the outbreak, case management, active cases search, vector control campaign was conducted, Health education on ITN utilization, risk communication messages were disseminated via print and audio media. Vector control for A. aegypti is routinely per- formed in the district and consists of the removal of breeding sites, application of larvacides.

The number of reported cases associated to this outbreak 1181cases is higher than previous outbreak(864 cases) occurred in Ethiopia[11]. But much lower than what neighboring Kenya had experienced for the first time in 2004 that attached 13,500 people in Lamu county which represents 70 per cent of the population[16].

An outbreak of Chikungunya in Comoros in 2005 was once the cause of morbidity to 450 case per week in May 2005 and peak at the end of January 2006 (45,000 cases / week),

which resulted in cumulated cases of 266.000 end of June 2006(About 1/3 of the population has been infected)[17].in our case, all the cases were report in the month March to May, 2019, which resulted in a maximum number of victims of 355 cases per week at epidemiological week 12.This may be due to the smaller number of population living in and limited movements into and out of this Kebele, or prompt response in environmental management to interrupt Chikungunya transmission.

The massive outbreak of Chikungunya virus which started in 2013 in the Americas has resulted in nearly 1 million cases and 71 deaths by the end of 2015[8]. Although the genotyping was not done for this outbreak in Ethiopia, having no reported death due to Chikungunya is fortunate unlike could have been deaths attributed to Chikungunya outbreak in Americas by the Asian type.

Limitations: The association of possible risk factors with the cases was not evaluated in this description as it needs analytical approach

Conclusion

The investigation revealed that Chikungunya outbreak was reemerged after 3 years in Ethiopia. Aedes mosquito found the area responsible for the outbreak. Hence the outbreak may be spread to neighboring regions and woreda. We recommended to vector control and public awareness campaigns. Health professionals should be equipped with training regarding detection, response and case management of acute febrile illness due to Chikungunya. Preparing Chikungunya guideline should be an immediate task to facilitate detection and management.

Acknowledgment

My deepest gratitude goes to academic mentors Dr. Abiy Girma and Mr. Sefonias Getachew for their guidance. I would like to thank EPHI/ PHEM center, Afar region Health Beauro and Adaar district health office. I also acknowledge Mr. Getaneh Abraha for his cordial guidance and coordination in my field base.

Reference

[1] S. C. Weaver And M. Lecuit, "Chikungunya Virus And The Global Spread Of A Mosquito-Borne Disease," N. Engl. J. Med., 2015.

[2] T. E. Morrison, "Reemergence Of Chikungunya Virus," Jvi,Asm, Vol. 88, No. 20, Pp. 11644–11645, 2014.

[3] B. N. Seppa, L. America, And E. Africa, "Chikungunya Is On The Move," Sci. News, Pp. 1–2, 2016.

[4] I. Sam, Y. Chan, P. Roques, And S. A. M. E. T. Al, "Updates On Chikungunya Epidemiology, Clinical

Disease, And Diagnostics 1 1," Vol. 15, No. 4, Pp. 223–226, 2015.

[5] J. E. Staples, R. F. Breiman, And A. M. Powers, "Chikungunya Fever : An Epidemiological Review Of A Re-Emerging Infectious Disease," Vol. 49, No. Figure 1, P. 943, 2009.

[6] S. Martin Et Al., "2013–14 Chikungunya Outbreak," Wikipedia, Free Encycl., No. December 2013, Pp. 1–3, 2016.

[7] Cdc, Preparedness And Response Plan For Chikungunya Virus Introduction In The Caribbean Sub-Region. 2012.

[8] R. Faria Et Al., "Epidemiology Of Chikungunya Virus In Bahia ," No. May 2015, Pp. 2–5, 2016.

[9] P. H. A. Of Canada, "Chikungunya Virus Pathogen Safety Data Sheet - Infectious Substances Section I - Infectious Agent," In Pathogen Safety Data Sheet,Infectious Substances, 2010, Pp. 1–5.

[10] N. Sahadeo Et Al., "Molecular Characterisation Of Chikungunya Virus Infections In Trinidad And Comparison Of Clinical And Laboratory Features With Dengue And Other Acute Febrile Cases," Plos Negl. Trop. Dis., Pp. 6–11, 2015.

[11] D. J. Desalegn Belay Takele1, 2, Diriba Sufa1, 2 , Mesfin Mengesha1, Adamu Tayachew1, Abyot Bekele1, Solomon Abebe2, Mohammed Wali3 , Berhane Beyene1, "Chikungunya Final-Descriptive." P. 18, 2016.

[12] S. Who, Guidelines For Prevention & Control Of Chikungunya Fever. .

[13] W. Van Bortel Et Al., "Chikungunya Outbreak In The Caribbean Region, December 2013 To March 2014, And The Significance For Europe," Eurosurveillance, 2014.

[14] D. M. Vu, D. Jungkind, And A. D. Labeaud, "Chikungunya Virus," Clinics In Laboratory Medicine. 2017.

[15] M. Henry, L. Francis, V. Asin, K. Polson-Edwards, And B. Olowokure, "Chikungunya Virus Outbreak In Sint Maarten, 2013-2014.," Rev. Panam. Salud Publica, Vol. 41, P. E61, 2017.

[16] M. D. Dahir, "540 Admitted In Mandera Following Chikungunya Outbreak," 2016.

[17] R. Charrel, "Chikungunya Outbreaks," P. 14.

5.2. Dysentery Surveillance data analysis of Afar region, Ethiopia, 2018.

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Abstract

Background: Dysentery is an intestinal inflammation that can lead to severe diarrhea with mucus or blood in the feces. In March 2018**,** we conducted a Dysentery surveillance data analysis to describe the trend, incidence, and prevalence of dysentery in the, Afar region.

Methods: We conducted descriptive cross sectional study on dysentery surveillance data ofthe years from (2013-2017). We reviewed Integrated Disease Surveillance and Response system database and HMIS report of the Afar regional health Bureau trend analysis, incidence, and prevalence rates were calculated. Data was analyzed using Excel-2013.

Results: A total of 88751 dysentery cases and 11 deaths were recorded during the study period (CFR=0.012%). Of which 46216(52.1%) were males. Higher dysentery cases 36589(41.2%) were reported among age group greater than 15 years old. There were 25736(29%) dysentery cases in Zone one followed by 20590(23.2%) Zone three. The Prevalence was 4.9% and the highest (1754 per 100000 populations) incidence rate was reported in 2015. Dysentery cases were begun to increase in summer season (from June to September. Almost half (49.9%) of dysentery cases were not reported by Surveillance system compared to HMIS report.

Conclusion: Dysentery is common in Adult age group greater than 15 years old. The disease is widely distributed throughout the region and it is common all zones. Peak of dysentery cases observed from June to September. Half of HMIS reported dysentery cases were not reported in surveillance system. Hence, the region should strengthen surveillance system and implement proper public health intervention such as health education regarding personal hygiene and proper case management so as to alleviate the problem from the community

Key word: Dysentery, Afar, surveillance

Introduction

Dysentery is an intestinal inflammation, especially in the colon, that can lead to severe diarrhea with mucus or blood in the feces. The micro-organisms that can cause bloody diarrhea include *Shigella, Escherichia coli (E. coli), non-typhoidal salmonella, Campylobacter jejuni and E.hytolytica*. Shigella is the most common causes of outbreak of bloody diarrhea and can lead to severe bloody diarrhea [1]. *Shigella* can mainly spread among people through contaminated food and water as well as poor sanitation [2]. After an incubation period of one to four days, patients typically present with diarrhea, characterized by the frequent passage of small liquid stools that contain visible blood, with or without mucus [3].Globally, dysentery is wide spread and can occurred as outbreak. It affected 164.7 million people yearly with 1.1 million deaths worldwide. Annually, Shigella is responsible for 160 million infections in developing countries with an estimated 1.1 million deaths [4].

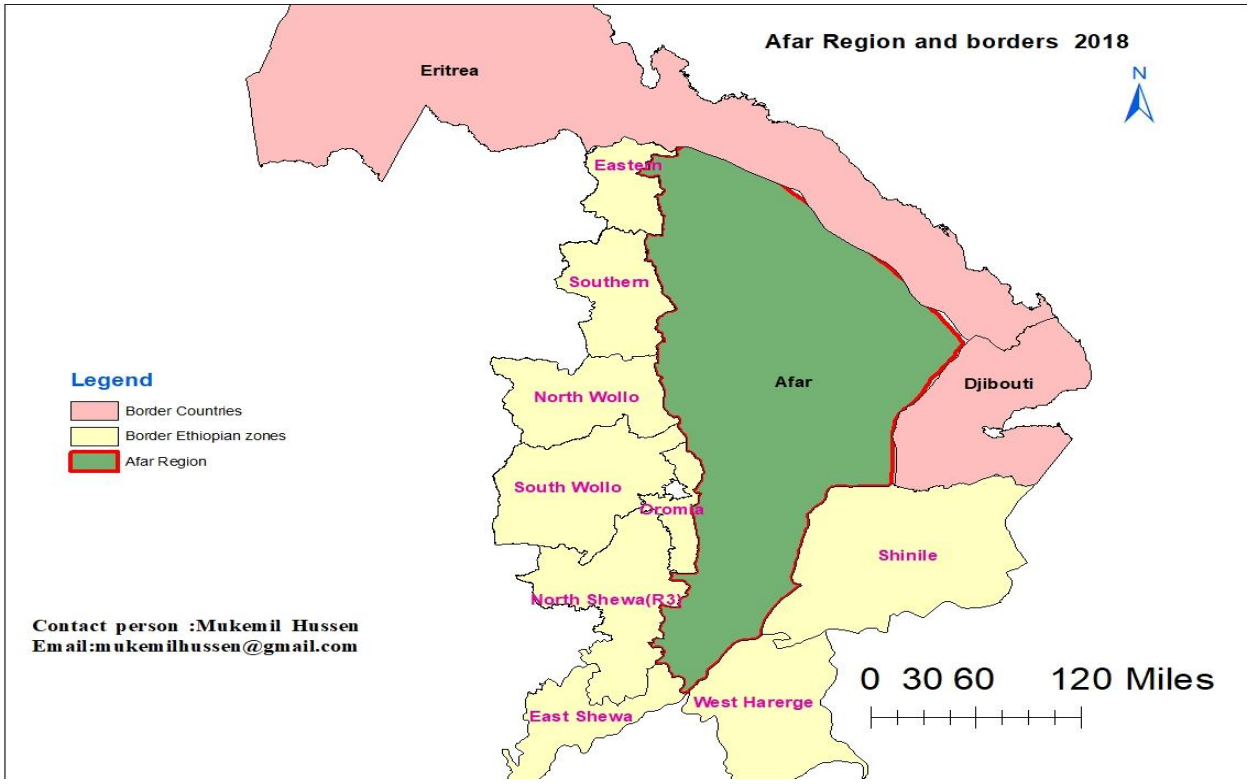
In Africa, the outbreak of dysentery caused by shigellosis had reported in different times in different part of the continent [5]. In 2016 first week only, there were 263,457 suspected dysentery cases with case fatality rate 0.01% reported in Africa [6]. In Ethiopia, the first massive dysentery outbreak was occurred in 1979 with approximately 5000 dysentery cases reported in one month interval and the overall attack rate was 7.3% percent [7]. According to DHSA 2010 stated that the prevalence of bloody diarrhea in Afar is 3% [8]. Annual IDSR 2017 report of Afar indicated there were 1602 dysentery cases annual. But HMIS 2017 report of the region indicates there were 16,858dysentery cases no death [9].

Analysis of dysentery surveillance data analyses is useful for public health authority because is used for guiding immediate public health action, program planning and evaluation and monitor trends in the burden of disease in order to have proper planning in the future outbreak. The objective of the analysis is to describe dysentery cases in terms of person, time and place; to look for case trends by time; to give recommendation based on analysis result.

Methods

Study Area:

Afar is located in the eastern part of Ethiopia. The region has common boundaries with the State of Eritrea in the north-east, with Tigray in the north-west, with Amhara in the south-west, with Oromia in the south, with the State of Somalia in the south-east and with the Republic of Djibouti in the east. Based on the 2017 projections by the Central Statistical Agency of Ethiopia (CSA), the Afar Regional State has a population of 1,812,002, consisting of 991,000 men and 821,002 women; urban inhabitants number 346,000 of the population, a further 1,466,000 were pastoralists. With an estimated area of 96,707 square kilometers, this region has an estimated density of 14.38 people per square kilometer. For the entire region 247,255 households were counted, which results in an average for the Region of 5.6 persons to a household, with urban households having on average 4 and rural households 6 people.



Map 8: Map of Afar region, Easter Ethiopia, March 2018

Study design and Study period

We conducted retrospective secondary data review of surveillance data from Afar region. Five consecutive years (2013-2017) dysentery surveillance weekly report data from Afar PHEM weekly report and HMIS report was obtained in March 2018, analyzed and interpreted from 5-15, March, 2018.

Source population

Population of Afar Regional State

Data collection procedure

We collected secondary data on dysentery for the last consecutive five years using checklist from Afar regional health Bureau PHEM and HMIS unit.

Case definitions

Suspected: Any person with a diarrhea with visible blood in stool diagnosed clinically as dysentery.

Confirmed: A suspected case with stool culture positive for *Shigella dysenteriae*

Data Analysis Procedures

Data analysis was carried out by using Microsoft office excel 2013 and Epi info version 7.2.

Dissemination of Results

Analysis result of this dysentery surveillance data was submitted timely to AAU/School of public health/Department of EFETP, EPHI/FMOH and Afar Regional Health Beauro by hard copy and electronic soft copy.

Result

Descriptive epidemiology of HMIS reported dysentery cases distribution by Person

A total dysentery 88751 cases and 11 deaths (CFR=0.012%) were reported from 2013 to 2017 in in Afar regional state. Among these cases, 46216(52.1%) were male patients.

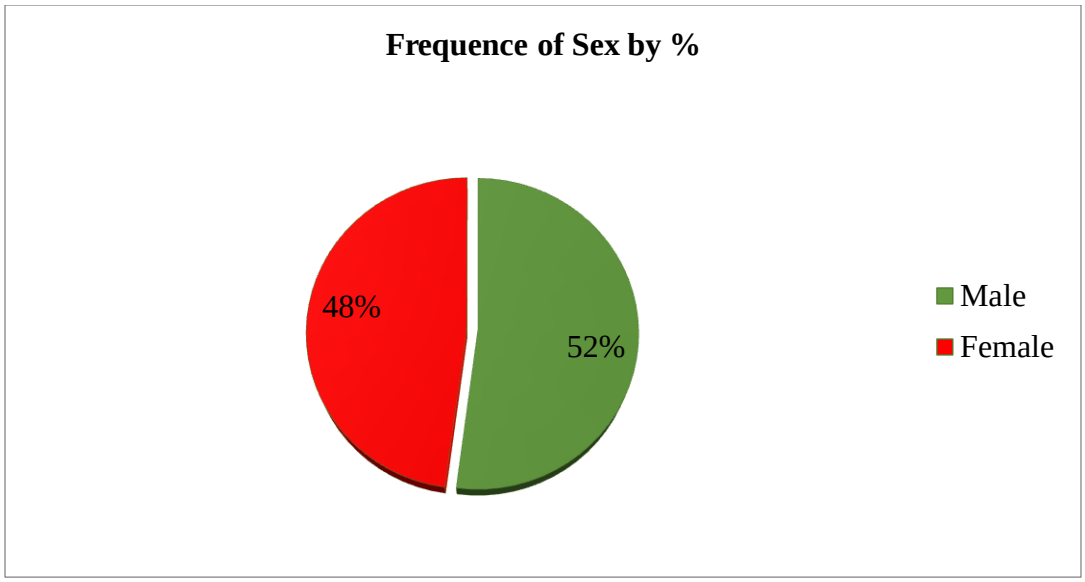


Figure 41: The distribution of dysentery cases by sex reported by HMIS from 2013-2017, Afar region Ethiopia, 2018

The most affected age group were adults >=15 years 36589(41.2%) followed by age group 5 to 14 years 26859 (30.3%) cases (Table 1).

Table 25: The distribution of dysentery cases by age reported by HMIS from 2013 to 2017, Afar region, Ethiopia, 2018

S.N	Age of reported cases	Frequency	percentage
1	0-4yrs	25303	28.5%
2	5-14yrs	26859	30.3%
3	>=15yrs	36589	41.2%
Total		88751	100%

The highest dysentery cases were reported from Zone 01 (25736 cases (29%)), followed by Zone 03(20590 cases (23.2%)) and least report was from Zone 04 (13135 cases (14.8%)) of the region (Figure 2).

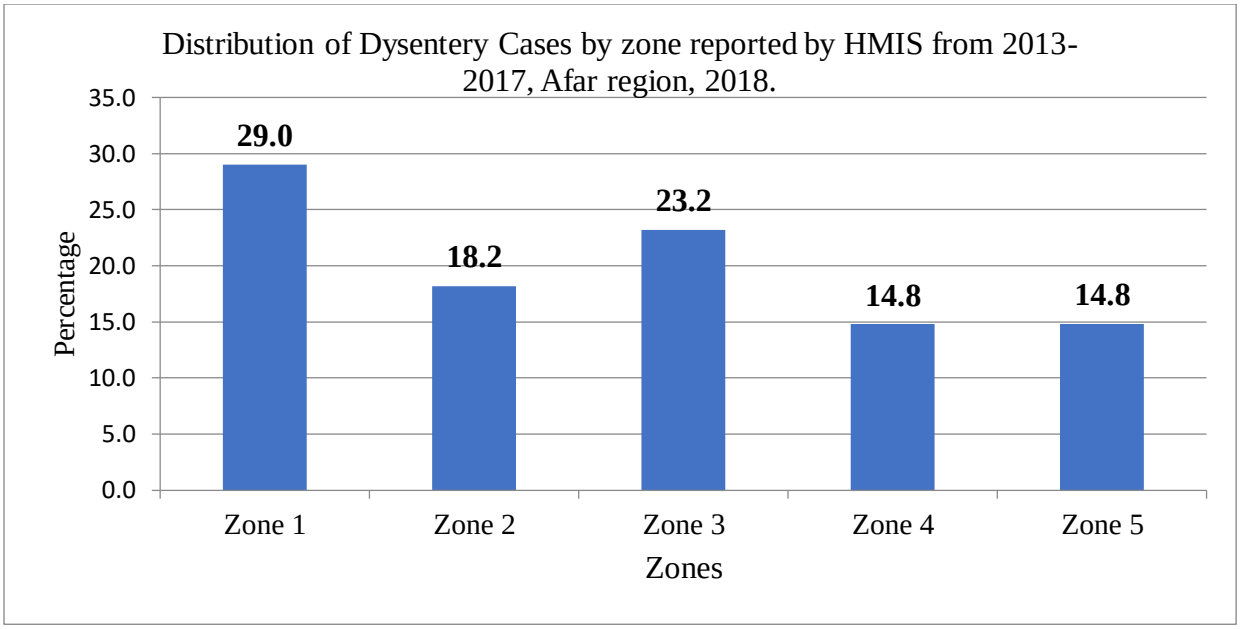


Figure 42: Distribution of dysentery cases by zone reported by HMIS from 2013-2017, Afar region, 2018

The prevalence of dysentery in Afar region was 49 cases per 1000 population. The prevalence rate recorded was similar in zone 2,3 & 4.

Table 26: Prevalence of Dysentery in each zone from 2013-2017, reported by HMIS, Afar region, 2018

Zone	Total number of dysentery cases	Midyear population in Zones	Prevalence per 1000 Population
Zone 1	25736	521,649	49
Zone 2	16153	322,519	50
Zone 3	20590	411,106	50
Zone 4	13135	261,079	50
Zone 5	13138	291,567	45
Total	88752	1,807,920	49

Number of dysentery cases exceeds in 2015(28824 cases (32.5%) of the total cases).

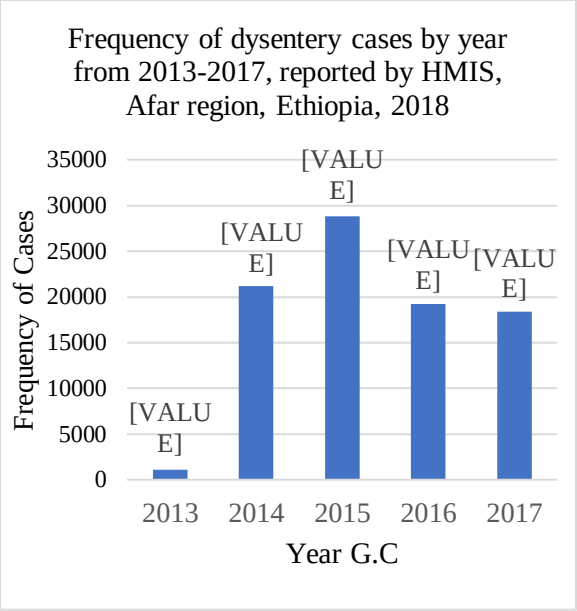


Figure 43: Total number of dysentery cases by year reported by HMIS from 2013-2017, Afar region, Ethiopia, 2018

Incidence rate of dysentery per year shows highest incidence rate (1754 cases per 100000 populations) was recorded in 2015 G.C.

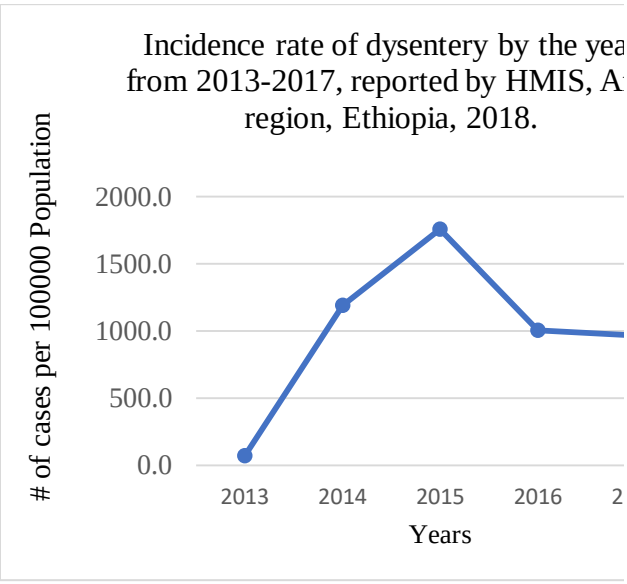


Figure 44: Trend of dysentery by the year from 2013-2017 reported by HMIS, Afar region, Ethiopia, 2018.

Regarding seasonal Changes, HMIS report indicate that dysentery cases were begun to increase in summer season of the year (from June to September. In November 2015 the highest numbers dysentery of cases were reported by HMIS.

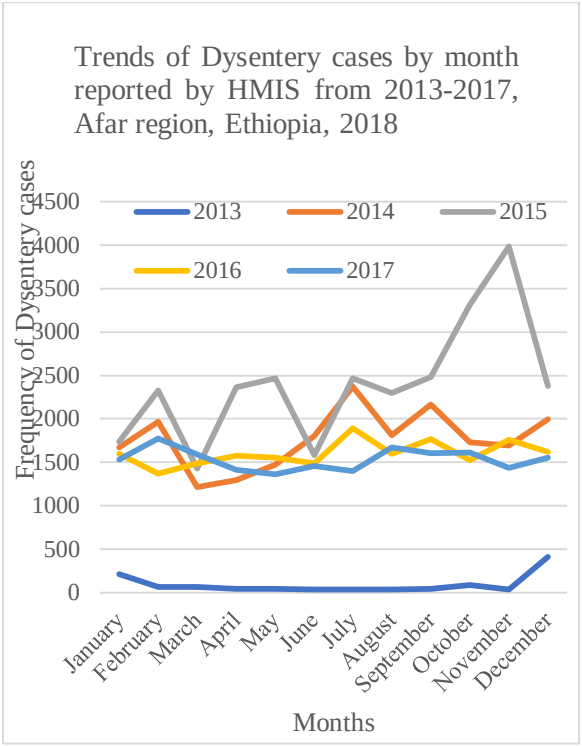


Figure 45: Frequency of dysentery cases by month reported by HMIS from 2013-2017, Afar region, Ethiopia, 2018

Descriptive Epidemiology of PHEM Report of Dysentery cases 2013-2017 in Afar region

A total 44487 dysentery cases were reported to EPHI/PHEM from 2013 to 2017 from Afar region. Among reported cases 44161(99.3%) were out patients cases and 326(0.7%) inpatients cases. Almost half (49.9%) of dysentery cases were not

reported to Surveillance system (EPHI/PHEM) compared to HMIS report.

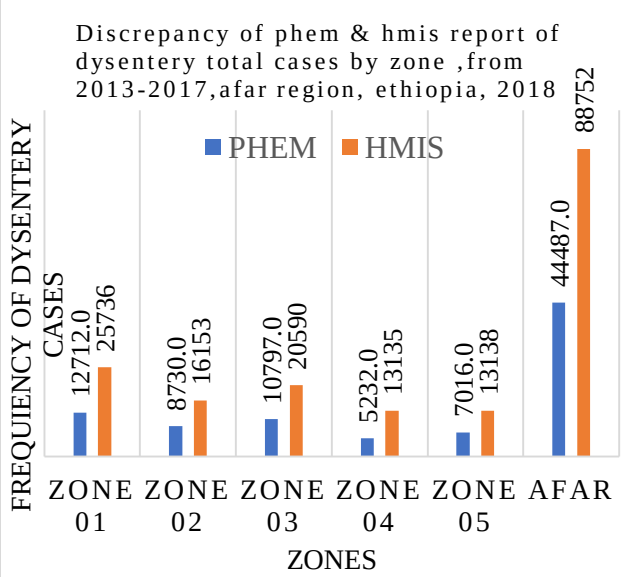


Figure 46: Discrepancy of PHEM & HMIS report of dysentery by zone, from 2013-2017, Afar region, Ethiopia, 2018

The highest number of dysentery cases were reported from Zone 01 (28.6%), followed by Zone 03(24.3%) and least report was from Zone 04 (11.8%) of the region.

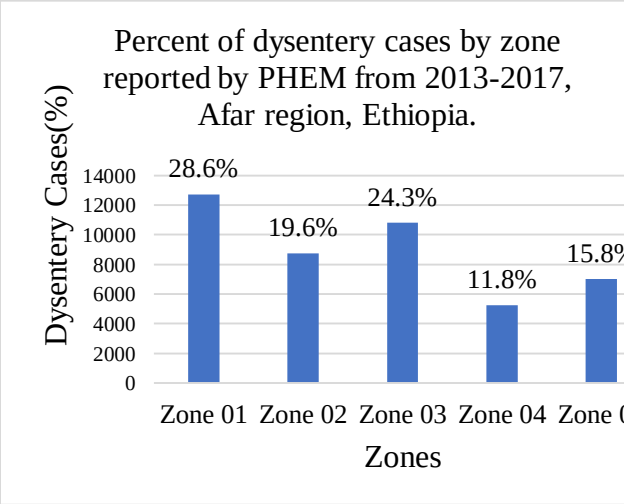


Figure 47: Total number of dysentery cases by zone reported by PHEM from 2013-2017, Afar region, Ethiopia.

The prevalence of dysentery in Afar region from 2013-2017 reported by PHEM was 25 cases per 1000 population. However in HMIS report Prevalence rate was 49 cases per 1000 population. The highest prevalence rate was in zone 02(27 cases per 1000 population.

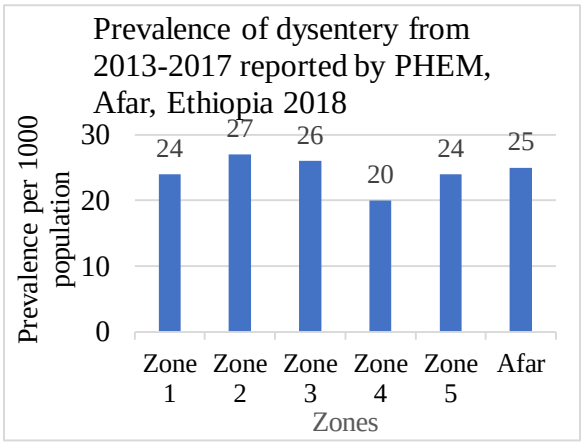


Figure 48: Prevalence rate of dysentery reported by PHEM from 2013-2017, Afar region, Ethiopia, 2018.

The highest incidence rate (654 per 100000 population) was in 2015 and lowest incidence rate (331/100000 populations) was in 2014 G.C (Fig38).

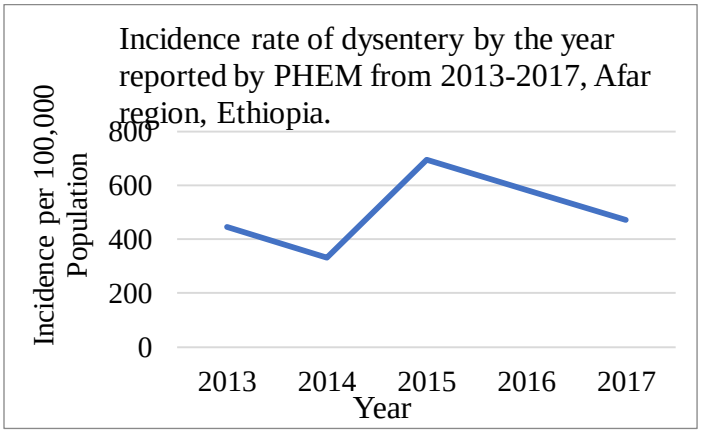


Figure 49: Trend of dysentery by year reported PHEM from 2013-2017, Afar region, Ethiopia, 2018

Incidence dysentery was highest in 2015 in all zones and remains increased in Zone 3.

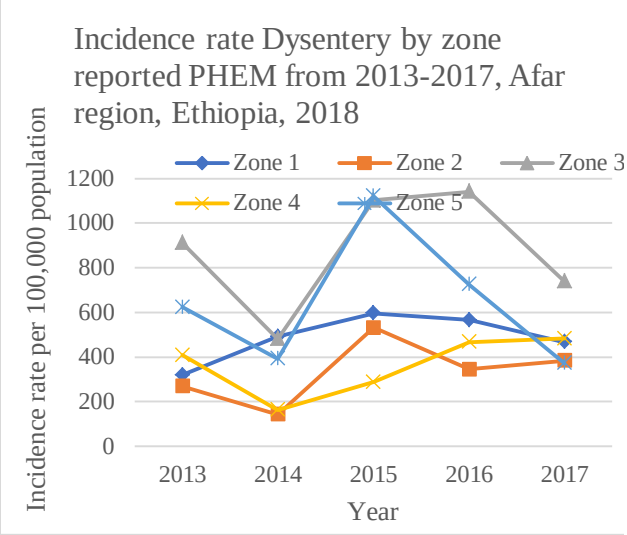


Figure 50: Trends of dysentery cases by zone reported by PHEM from 2013-2017, Afar region, Ethiopia, 2018

Discussion

The result of this study revealed that 52.1% of dysentery cases were males. It is similar with the study conducted in Jimma 77% [8] and Addis Ababa 81% [9]. In this analysis, adult population was more affected by dysentery than other age group. It contrast to the study conducted in Tigray [12] in which the highest incidence rate of dysentery among young age group. The difference might be due to adults were more active in outdoor activities than other age group.

The majority of cases (29%) were in Zone one. The reason for increase of dysentery cases in this Zones might be related to firstly, the presence more population density and health institution than other Zones. So there might be increased report from this zone. Secondly, more investment choices like Tendaho Sugar Corporation, Elidar salt mining process increase high population movement to these zones may increase disease transmission.

The dysentery cases were highest in summer season (from June to September) and lowest in dry season of from February to March. It is similar with the study conducted in Mazandra province of Iran (highest in August and September, lowest in February and March) [11] and Changsha city of china most of the cases occurred from June to September. In Afar region increased dysentery cases in summer season might be due to most of population in the region used running and pond Ella water for drinking. In the summer season floods take dirty materials to ponds and running water. These things might increase the numerous infectious diseases including dysentery.

The result of this study revealed that during the five years, a fluctuating trend of occurrence of dysentery cases was observed in Afar region. A reduction in dysentery cases occurrence from 2013-2014 and an increase of cases from 2014-2015 with peak cases occurring in 2015 was observed.

The increase in 2015 might be EL-NINO impact in Ethiopia including Afar region. In 2015, El-Niño caused irregular climatic changes characterizing increased warm of the air and drought in World. Majority of African countries including Ethiopia, were highly affected by impact of the El-Niño in 2015 [10]. As any region of Ethiopia, Afar region was also highly affected by Elnino induced drought which increased infectious disease like dysentery due to shortage of water.

The result of this study revealed that almost half (49.9%) of dysentery cases were not reported to EPHI/PHEM Surveillance system compared to HMIS report. The reason for discrepancy for PHEM report might be due to under reporting and absence of continuous reporting of surveillance weekly report through PHEM.

Conclusion

Dysentery is common in Adult age group greater than 15 years old. The disease is widely distributed throughout the region and it is common in both rural areas than urban areas. Peak of dysentery cases observed from June to September. Half of HMIS reported dysentery cases were not reported in surveillance system. Hence, the region should strengthen surveillance system and implement proper public health intervention such as health education regarding personal hygiene and proper case management so as to alleviate the problem from the community

Acknowledgment

My deepest gratitude goes to academic mentors Dr. Abiy Girma and Mr. Sefonias Getachew for their guidance. I would like to thank EPHI/ PHEM center, Afar region Health Beauro for provision of Dysentery Surveillance data and HMIS data for analysis respectively. I also acknowledge my field supervisor Mr. Getaneh Abraha for his cordial guidance and coordination in my field base.

References

1. *L., H.D., Shigellosis, Control of Communicable Diseases Manual 19th edition, American Public Health Association, 2008.*
2. *FMOH, Guideline for the prevention and control of selected epidemic diseases in Ethiopia. Department of Disease Prevention and Control, 2010.*
3. *Du Pont Herbert L. Mandell GL, B.J., Dolin R Principles and Practice of Infectious Diseases: Shigella Species (Bacillary Dysentery). 7th Ed, 2009.**8**: p. 556-560.*
4. *KotloffKf. Winickoff JP. Ivannff B, C.J.S.D.S.P., Global burden of Shigella infections: Implications for vaccine development and implementation of control strategies. Bulletin of the World Health Organization, 1999. **77**(8).*
5. *Claudine C, D.A.S., J Control of Epidemic dysentery in Africa. Johns Hopking University, 1996.*
6. *WHO Region office for Africa, Integrated Disease Surveillance. Quarterly Bulletin,, June 2016.*
7. *C., G.A.a.B., Trimethoprim-sulphamethoxazole resistant: Shigella dysentery serotype 1(Shigasbacillus) in Gimira, South west Ethiopia, .1983.*
8. *FMOH, Demographic and Health survey. 2010.*

9. *FMOH, Health and Health related indicators. 2013G.C.*
10. *Mer'AwiAragaw, M., MPH, TilahunTafese, BSc, MPH, ZayedaBeyene, BSc, MPH, Zegeye Hailemariam, DVM, MPH, AkliluAzaze, MD , Richard Luce, DVM, MPhil, Adamu Addissie, MD, MPH, MA , Shigellosis outbreak at Addis Ababa University March - April. 2010.*
11. *Fessehaye A, A.Y., Wondwossen B, Zewdineh S, Kenate W,. Investigation of dysentery outbreak and its causes, Jimma city, Southwest Ethiopia, .2008.*
12. *UNICEF, El Niño's impact on children. UNICEF Briefing notes, 2016.*

CHAPTER-VI

6. Abstracts for Scientific Presentations

6.1. Measles Outbreak Investigation in in two neighboring hard to reach districts of Afar Region, Ethiopia, November 2018: Case control study.

Authors: Mukemil H Mohammed[1, 3], A.Girmay[2], S. Getachew[2] G. Abraha[3]

Affiliations: [1]Ethiopia Field Epidemiology Training Program,[2]Addis Ababa University School of Public Health, [3]Ethiopia Public Health Institute

Abstract

Introduction: Suspected measles outbreak was notified from Afar region to national public health emergency management/PHEM/ in 10th November 2018. We investigated the outbreaks occurred in hard to reach Woredas of Afar region, to identify the contributing factors for measles outbreak.

Methods: 1:2 unmatched case control study design was conducted with 60 cases and 120 controls. We collected 5 blood samples from each woreda patients for Lab confirmation. Data entry and analysis was performed using EPI-Info version 7.2 and SPSS Version 20.

Results: a total of 66 cases and two deaths were reported from 2 two neighboring woredas affected by a measles outbreak in Afar region. All samples (10/10) became reactive for Measles IgM at national Laboratory. The cumulative attack rate of 6/10,000 population and case fatality ratio of 3.03% was recorded. High AR (29.2/10000population) was reported from age 1-4 years and 62 (93.9%) cases were unvaccinated for measles vaccine. The mean age for cases was 6.6(SD +/- 6.1) years while for controls were 5.2(+/- 6.3) years old. Being vaccinated (OR=0.51; CI: 0.002-0.12), Absence of measles cases in the family (OR=0.081; CI: 0.039-0.169) and mothers literacy (OR=0.32; CI: 0.012-0.85) was associated with protecting from measles. Intervention, immunization campaign was conducted from 4th week of the epidemic, for 6 months to 15 years old and the immunization coverage was 98 %. Active case search, and health education was some of the activities carried out to curb the outbreak.

Conclusion: Lack of vaccination, mother's illiteracy and presence of sick person in the family were contributing factor for Measles outbreak in neighboring hard to reach woreda of Afar region. We recommend Afar regional health bureau establishing reaching every child (REC) strategy for hard to reach areas and strengthen supplemental immunization activities and to improve mother's awareness on Vaccination.

Keywords: Measles outbreak, Adaar, Telalak, Afar region

6.2. **Descriptive epidemiology of a cholera outbreak in Amibara district, Afar, Eastern Ethiopia, 2019.**

Authors: Mukemil H Mohammed[1, 3], A.Girmay[2], S. Getachew[2] G. Abraha[3]
Affiliations: [1]Ethiopia Field Epidemiology Training Program, [2]Addis Ababa University School of Public Health, [3]Ethiopia Public Health Institute

Abstract

Introduction: Cholera is an acute gastrointestinal infection caused by Vibrio cholera. Cases with acute watery diarrhea were notified from Amibara district in 27th November 2018. We investigated to identify the causative agent, source of the outbreak.

Methods: Descriptive cross sectional study was conducted from December, 2018 to January 12, 2019. We reviewed medical records of suspected cases; we interviewed the Health care workers, visited investor camps, affected household and interviewed patients. We used line list for describing Cholera cases in terms of time, place and person. We collected nine stool and four water samples from drinking water for Lab confirmation. Data was analyzed using Epi-info 7.

Result: A total of 99 cases with an attack rate of 1.2/1000 population were recorded. The median age was 22 years with an age range of 1 – 70 years. Age specific attack rate is highest (26.3%) among 25–34 years age group. Seven (36.8%) out of 19 kebele were affected by outbreak. The highest attack rate was reported from Badahamo Kebele (6.9/1000). All of affected kebele fetch drinking water from broken pipe line connected with contaminated canal water. In investor camps, latrine coverage (12%) and utilization was very low. The outbreak started from the 40th week and notified in 48th week of 2018.Vibrio cholera 01 serotype Ogawa were isolated from stool and water samples. Case management, active cases search, contact tracing, water treatment chemical distribution and maintaining broken pipeline were intervention to control the outbreak.

Conclusion: Cholera outbreak occurred in the district due to contaminated canal water used for domestic purpose. Untreated water, lack of latrine and delay in notification of the outbreak could be contributing factor for the outbreak. We recommended district to notify outbreak early to higher level. Investor should provide safe drinking water and prepared latrine for their daily laborer.

Key Words: Cholera, Outbreak, Amibara, Afar, Ethiopia.

6.3. Reemergence of Chikungunya fever in Ethiopia after 3 years, 2019: epidemiological and entomological investigations

Authors: Mukemil H Mohammed[1, 3], A.Girmay[2], S. Getachew[2] G. Abraha[3]

Affiliations: [1]Ethiopia Field Epidemiology Training Program,[2]Addis Ababa University Schoolof Public Health, [3]Ethiopia Public Health Institute

Abstract

Background: Chikungunya (CHIK) is an alphaviridae that causes febrile illness in humans. It was first isolated in Tanzania in 1953. It has a cyclical trend of reemergence 4-30 year's interval once it is identified in a particular place. In Ethiopia, the first outbreak was reported in 2016 in Somali region. A number of cases with unknown febrile illness reported from Adaar district Afar region starting from 8th March 2019. This investigation was conducted to identify the causative agent, source of the outbreak and recommend appropriate interventions.

Methods: Cross sectional study design was conducted. Medical records were reviewed and Patients and clinicians involved in managing the case were interviewed. Descriptive data analysis was done by time, person and place. Serum samples were collected and confirmatory tests were done using Real Time Polymerase Chain Reaction (RT-PCR) techniques in a national arbovirus laboratory. Breteau and container indices were used for the entomological investigation to determine the risk of epidemic.

Results: A total of 1181 Chikungunya cases (AR = 18.9%) were reported from March 2019 to May 24, 2019 from Eliwuha town, Adaar district. All age groups were affected (mean 26, Range 1–90 Years). In week 12, 30% of cases were recorded. Of the total cases, 98.6% cases had fever, 97.9% cases had arthralgia and 96.3% cases had headache. Fourteen of the 19 samples were positive for Chikungunya virus nucleic acid. Aedes mosquitoes (56) were identified as responsible vectors of Chikungunya in affected area. The Breteau indices of Eliwuha kebele was 22.5%, whereas the container indices was 45%. Indoor residual spray was conducted to control the outbreak in the district.

Conclusion: The investigation revealed that Chikungunya outbreak was reemerged after 3 years in Ethiopia. Aedes mosquito found the area responsible for the outbreak. We recommended to vector control and public awareness campaigns.

Keywords: Chikungunya fever, Mosquito, Outbreak, Adaar, Ethiopia.

6.4. Dysentery Surveillance Data Analysis report in Afar region, Eastern Ethiopia 2013-2017 GC.

Authors: Mukemil H Mohammed[1, 3], A.Girmay[2], S. Getachew[2] G. Abraha[3]

Affiliations: [1]Ethiopia Field Epidemiology Training Program, [2]Addis Ababa University School of Public Health, [3]Ethiopia Public Health Institute

Abstract

Background: Dysentery is an intestinal inflammation that can lead to severe diarrhea with mucus or blood in the feces. In March 2018**,** we conducted a Dysentery surveillance data analysis to describe the trend, incidence, and prevalence of dysentery in the, Afar region.

Methods: We conducted descriptive cross sectional study on dysentery surveillance data of the years from (2013-2017). We defined a suspected case of dysentery any person with diarrhea with visible blood in stool. We reviewed Integrated Disease Surveillance and Response system database and HMIS report of the Afar regional health Bureau trend analysis, incidence, and prevalence rates were calculated. Data was analyzed using Excel-2016.

Results: A total of 88751 dysentery cases and 11 deaths were recorded during the study period (CFR=0.012%). Of which 46216(52.1%) were males. Higher dysentery cases 36589(41.2%) were reported among age group greater than 15 years old. There were 25736(29%) dysentery cases in Zone one followed by 20590(23.2%) Zone three. The Prevalence was 4.9% and the highest (1754 per 100000 populations) incidence rate was reported in 2015. Dysentery cases were begun to increase in summer season from June to September. Almost half (49.9%) of dysentery cases were not reported by Surveillance system compared to HMIS report.

Conclusion: Dysentery is common in Adult age group greater than 15 years old. The disease is widely distributed throughout the region and it is common in both rural areas than urban areas. Peak of dysentery cases observed from June to September. Half of dysentery cases were not reported through surveillance system. Hence, the region should strengthen surveillance system and implement proper public health intervention such as health education regarding personal hygiene and proper case management so as to alleviate the problem from the community

Key word: Dysentery, Incidence, Afar, Ethiopia

CHAPTER-VII

7. Narrative Summary of Disaster Situation

7.1. Health risk assessment and response among internally displaced population in Fafan Zone, Somali region, August 2018

Executive summary

Introduction; Fafan zone is one of nine zones in the vast Somali region of Ethiopia. Currently, the zone has 179 health post, 28 health centers and one referral hospital found in Fafan Zone. Fafan Zone severely affected with conflict induced displacement than ever existed displacement in the Zone from conflict between Oromia and Somali Region in 2018. The aim of the assessment is to identify health and health related risks and respond accordingly among internally displaced population in Fafan Zone, Somali region

Methods; A community based descriptive cross-sectional study design was implemented to assess health and health related needs of the displaced community. The data were collected from key informants from each IDPs collective center and concerned government officials and site visit/ observations. The data was analyzed using micro soft excel 2016 and summarized in the form of narrations, tables, graphs and maps.

Result; A total of 35,619 households (HHs), 179,395 individuals, were displaced by Oromo-Somali conflict settled in different woreda of Fafan Zone of Somali region. Two temporary clinics, additionally two mobile health and nutrition teams were deployed to give health service for IDPs. A total of 34,967 cases of IDPs were treated. Among the treated cases from IDPs, diarrheal disease (12,230 (35%) was the leading cause of morbidity followed by pneumonia (9,320 (27%) cases) and Intestinal parasite (7,230 (21%) cases). A total of 32,420 IDPs children aged from six month to five years and 7,805 IDPs pregnant and lactating mothers were screened for under nutrition.

The ratio of latrine to the number of displaced population was one sit of latrine for 194 households and also the ratio of water supply per day per person was less than one litter.

Conclusion: The major causes of morbidity among displaced population were diarrheal diseases and which might be related to hygiene and sanitation situations among the IDPs. The coverage of latrine and safe water supply for displaced populations were also bellow from what is expected in IDPs settings/ standard. Construction of latrines and Provision of safe water supply are indispensable for hygiene and sanitation of displaced population.

Introduction

Fafan zone (formerly known as Jijiga zone) is one of nine zones in the vast Somali region of Ethiopia. Administratively it consists of 11 woredas and three city administrations (Jijiga, Kebri Beyah and Wujale) with an estimated total population of 1,249,146.(1) The zone is located in the western part of the region and 446km far from Addis Ababa, the capital city of Ethiopia. Fafan is bordered by Jarar the south, on the southwest by Nogob, on the west by the Oromia Region, on the north by Siti, and on the east by Somalia. The area is a lowland with predominately agro-pastoralist livelihood zone/ inhabitants, which sits within the Somali region of Ethiopia. The majority of the population is Muslim and from Somali origin, with other ethnic groups including Amhara, Oromo, foreign-born Somalis and Gurage.(2) There are 179 health post, 28 health centers and one referral hospital found in all woredas of Fafan Zone.

The Zone is highly vulnerable to drought and conflict, both of which contribute to a history of displacement. Drought related displacement is both internal as well as cross-border with Somali land (3). In the last three years, a number of small-scale conflicts and displacement situations resulted in the region.

During the assessment period, Fafan Zone was severely affected with conflict induced displacement than ever existed displacement in the Zone. The IDPs are from Oromia Region. According to information from zonal health office and disaster and risk management report the conflict was underway three month back and The conflict was happing in on off pattern .One week back the conflict was began again and six Somali peoples were died and 4 peoples were severely injured by border conflict between Oromia and Somali regions. Areas bordering Oromia Region especially Tuligulide, Gursum, and Babile woreda were affected with conflict induced displacements. A total of 35619 HH (179,395 population) of internally displaced peoples were settled in Fafan zone. Of which 20,819 HH settled in Tuligulide woreda, 14,000 HH settled in Babile woreda and 800 HH settled in Gursum woreda. Among these 32,420 (18%) and 7805 (4.35%) were children and PLW respectively. (6) The displaced peoples are left without food and other basic needs. Currently many of displaced population have been gone to their relatives from their previous residence, but have no any means of livelihood because they lost all their assets'/ resources by the conflict. This assessment is to identify health and health related risks and respond accordingly among internally displaced population found in Fafan Zone, Somali region.

Objectives

General objective

To identify health and health related risks and respond accordingly among internally displaced population in Fafan Zone, Somali region, July – August 2018

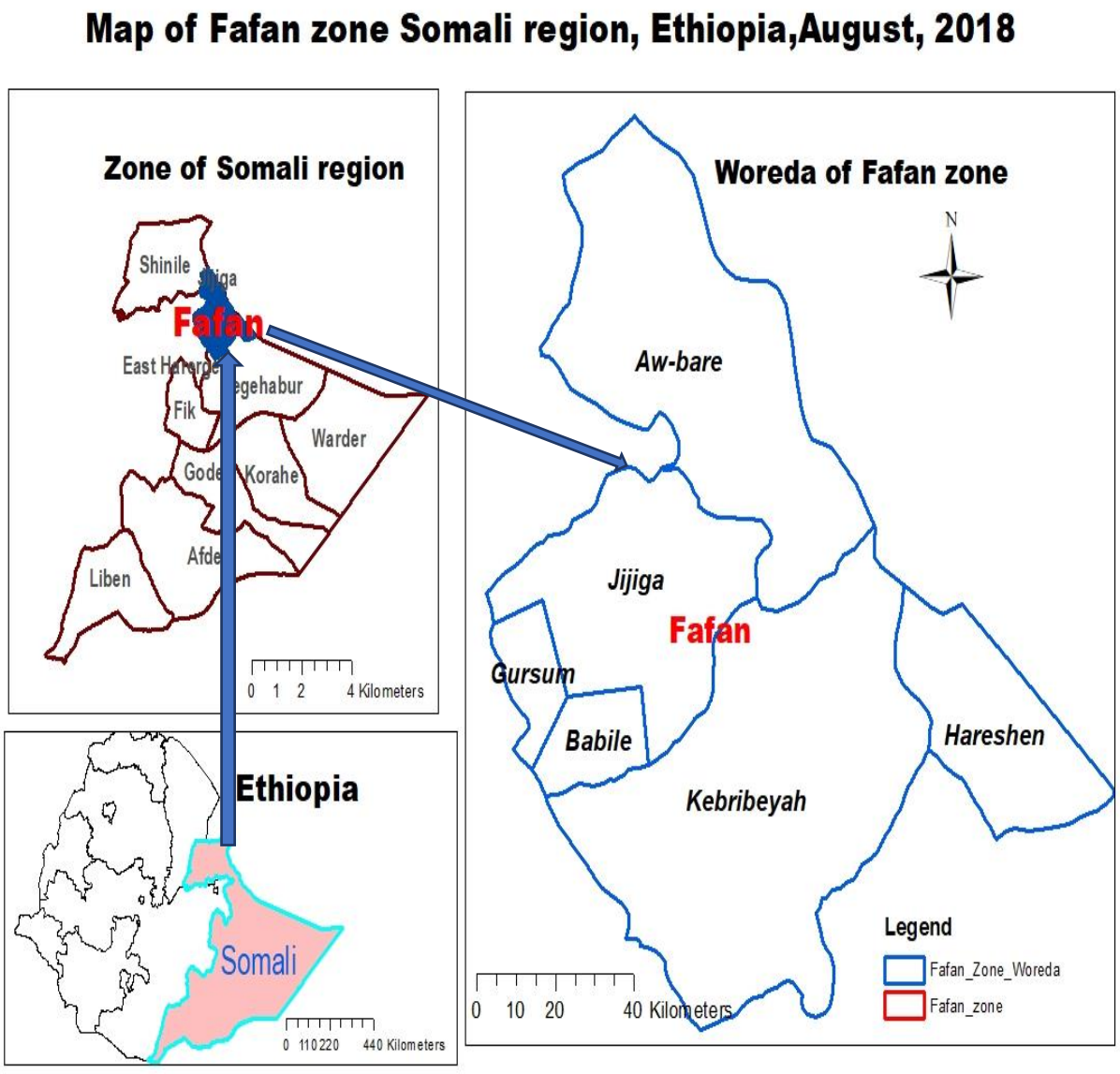
Specific objectives

- To identify the health and health related risks of displaced population
- To predict the possible disease outbreak and prepare for it based on the situational analysis
- To ensure provision of appropriate health care for displaced community

Methods

Study area and period

The IDPs risk assessment and response activities were performed in Fafan zone, Somali region. This assessment and response was conducted from July to August 2018. Fafan zone one of nine zones in the Somali region. Administratively it consists of 11 woredas and three city administrations (Jijiga, Kebri Beyah and Wujale) with an estimated total population of 1,249,146(1). The zone is located in the western part of the region and 446km far from Addis Ababa, the capital city of Ethiopia. Fafan is bordered by Jarar the south, on the southwest by Nogob, on the west by the Oromia region, on the north by Siti, and on the east by Somalia.



Map 9: Map of Fafan zone woreda, Somali region, Ethiopia, August, 2018

Study design

A community based descriptive cross-sectional study design was used/followed to assess health and health related risk of the displaced community.

Data collection procedure

The data were collected from key informants from each IDPs collective center and concerned government officials including woreda health office and zonal health department through unstructured questionnaire.

Site visit/ observation was also one of the data collection method used to determine the environmental condition of the collective centers and to ensure the existence of health care delivery in the IDPs collective centers.

Data analysis, presentation and dissemination of report

The data collected from IDPs were entered to and analyzed using micro soft excel 2013 and presented by narrations, tables, graphs and maps. This final assessment and response report was disseminated /submitted to AAU, CHS, SPH, EFETP, EPHI/PHEM, FMoH, Somali RHB PHEM, Fafan Zone health department, and to affected woreda through email.

Result

General IDP situation

A total of 35,619 households (HHs), 179,395 individuals were displaced by Oromo-Somali conflict and settled in different woreda of Fafan Zone of Somali region. Of those internally displaced population (IDPs) 93,148 (52%) were females. The displaced populations were found in six IDP sites as well as in the host community of 3 woredas. Gursum Woreda is the only woreda which has no any IDP sites; all the IDPs in Gursum Woreda were living in the host community.

A total of 179 395 population from 35,619 households were internally displaced. Among these 52% of displaced population were female. The highest numbers of displaced population were settled in Qoloji, Babile woreda.

Table 27: Distribution of IDPs by woreda Fafan Zone of Somali region, August 2018

Woreda	Name of IDP sites	#of HH	# of IDPs	Male IDPs (%)	Female IDPs (%)
Tuligulide	Tuligulide	9,880	49,400	22921(46.4)	26479(53.6)
	Gebegebo	10,623	53,115	26026(49)	27089(51)
	Gebegebo School	120	840	400(47.6)	440(52.4)
	Masnie	196	1,040	483(46.4)	557(53.6)
Gursum	Gursum	800	4,000	1911(47.8)	2089(52.2)
Babile	Qoloji	14,000	71,000	34506(48.6)	36496(51.4)
Total		**35,619**	**179,395**	**86247(48)**	**93148(52)**

Health facility in IDP sits

There are 179 health post, 28 health centers and one referral hospital found in Fafan Zone. None of health facility was destroyed due to conflict. Five existing Health center and two temporary constructed clinics were providing health service in Qoloji IDP site in Babile woreda. One Mobile health and nutrition team (MHNT) was deployed to give health service for IDPs in Tuligulide woreda. And two existing health centers and one MHNT were providing health service for IDPs site in Gursum woreda.

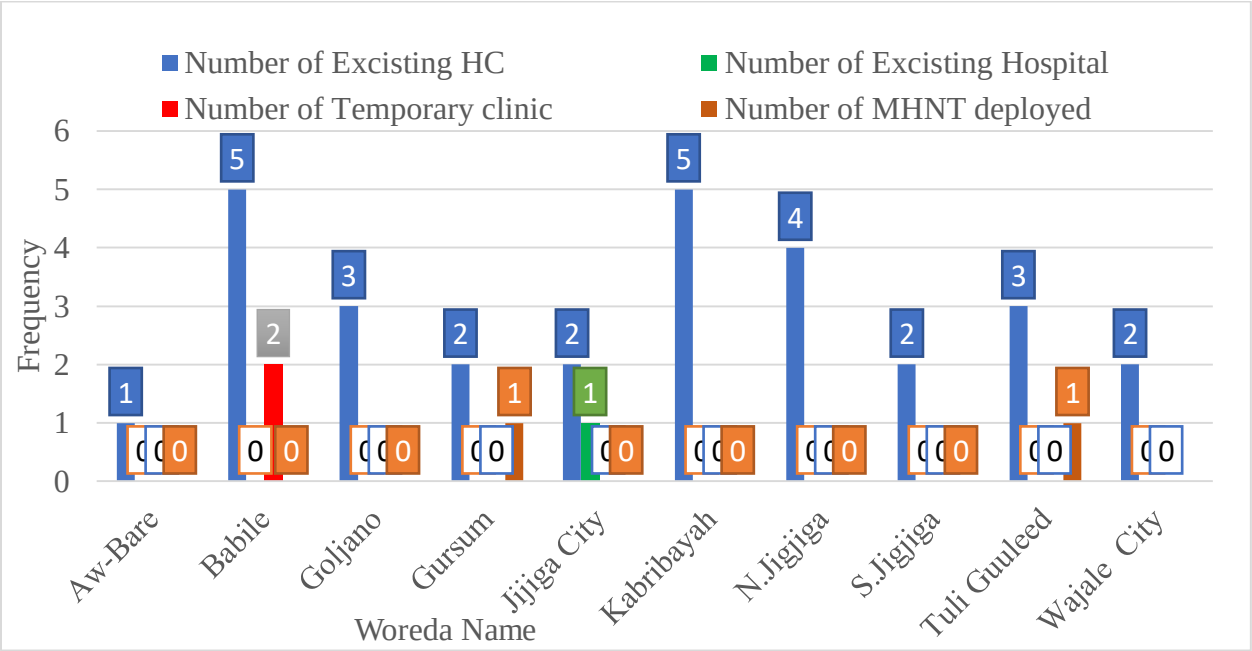


Figure 51: Distribution of existing health facility, Temporary clinics and MNHT for IDPs response in Fafan Zone of Somali, August 2018

Case management

A total of 34,967 patients were treated from the IDPs. Among all cases treated in IDPs, diarrheal disease (12,230 (35%) cases) is the leading cause of morbidity followed by pneumonia (9,320 (27%) cases) and intestinal parasite (7,230 (21%) cases).

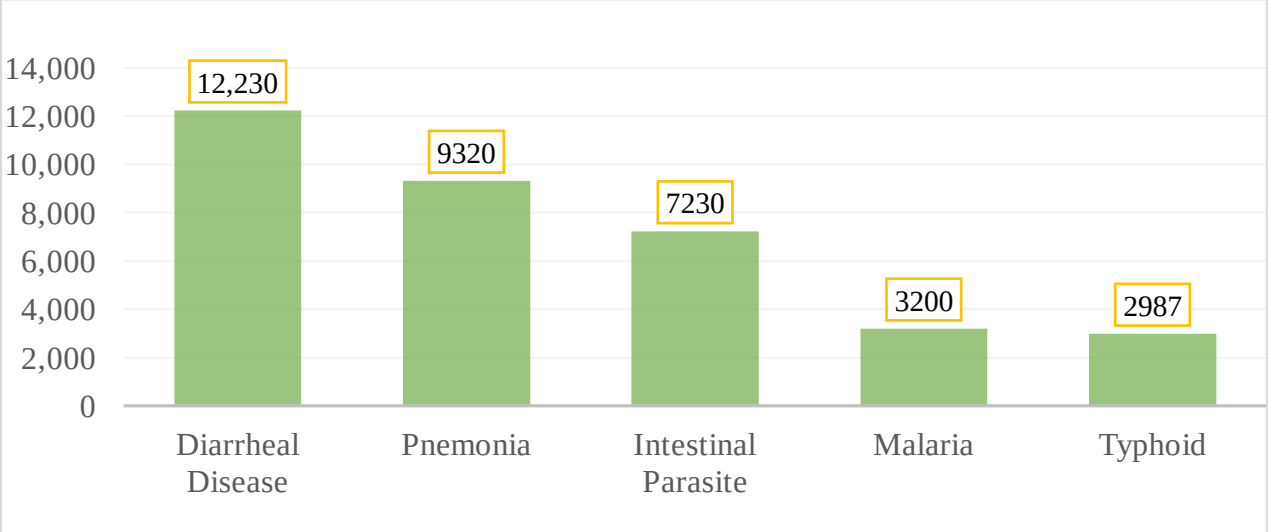


Figure 52: Top five diseases causing morbidity in IDPs in Fafan zone, Somali region, August 2018

Surveillance

Routine surveillance system like weekly report of weekly reportable disease/events and immediately notification of immediately Notifiable diseases/events were in place. A total of 183 Scabies cases (138 Children U5 and 45 Adult cases) were detected and reported from an IDP site in Tuligulide woreda.

Figure 53: Scabies cases typical sign in Gebegebo School in Tuligulid Woreda as July 31st, 2018

The overall coordination and communication of internally displaced population information and response activities follow up was illustrated in the diagram below. Data were collected from each IDP sites by assigned IDP surveillance focal person together with rapid response team to collect the situation of IDPs on daily basis. And he/she report it to the Woreda ,then woreda collect and analyzed the data share report to the zonal Health department, Regional and National PHEM.

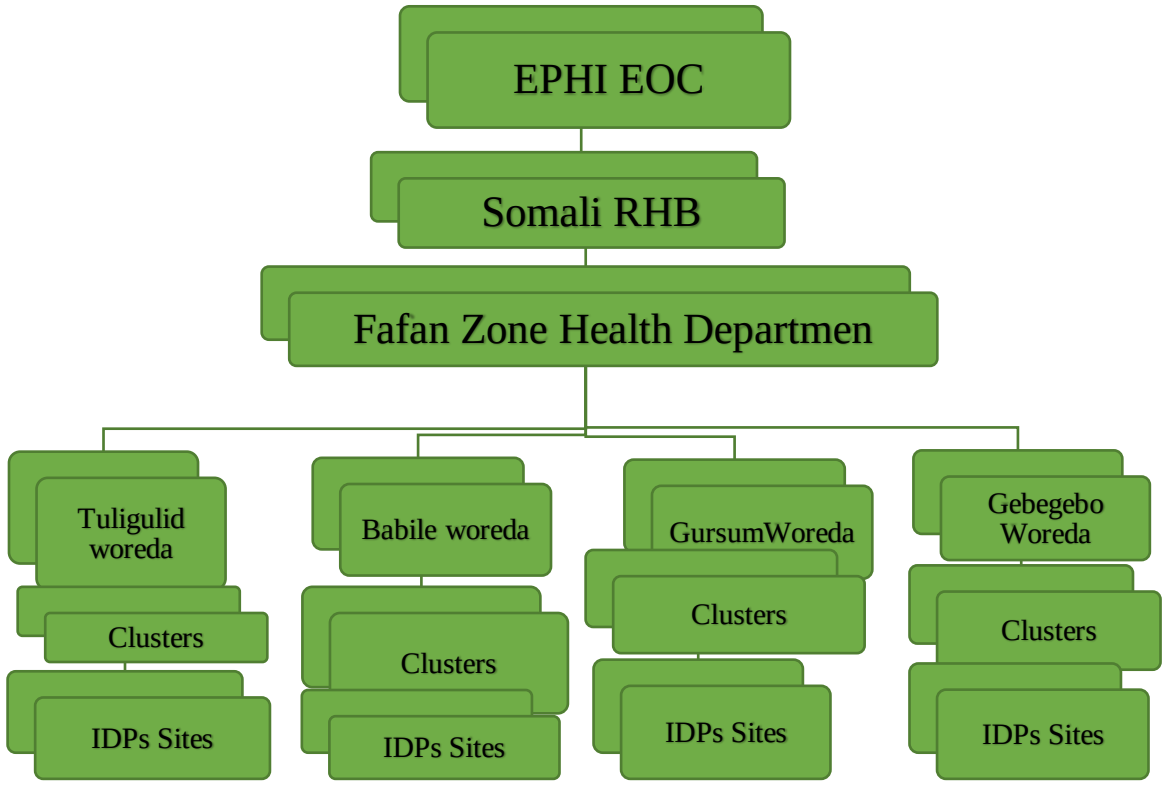


Figure 54: Information management system (IMS) structure of Fafan Zone, Somali region IDPs response, August 2018

Emergency relief and Nutrition

General food distribution

Food distribution was done by national disaster risk management commission in collaboration with world vision and world food program (WFP). The distribution includes oil, maize flour and wheat flour.

Nutritional screening

Nutritional screening was done across all IDPs in Fafan Zone. Among the IDPs, A total of 32,420 children aged six month to five years and 7,805 IDPs pregnant and lactating mothers were screened for under nutrition.

Table 28: Nutritional screening result for children under five years of age and PLW by woreda among IDPs of Fafan Zone of Somali region, August 2018

Woreda	IDP sites	# U5 Children	# Children with MAM	# Children with SAM	# PLW	# PLW with MUAC <23
Tuligulide	Tuligulide	4040	331(8.2%)	32(0.8%)	1721	112(6.5%)
	Gebegebo	10612	2122(20%)	21(0.2%)	2303	196(8.5%)
	Gebegebo School	252	76(30%)	7(2.8%)	115	30(26%)
	Masnie	207	41(19.9%)	2(1.2%)	87	14(15.6%)
Gursum	Gursum	624	97(15.6%)	8(1.3%)	221	23(10.6%)
Babile	Qoloji	16685	584(23.5%)	25(0.15%)	3358	309(9.2%)
Total		32420	3251(10%)	95(0.3%)	7805	684(8.8%)

Selective food distribution (Targeted supplementary feeding, TSFP)

Targeted supplementary feeding was provided to children six month to five years of age, pregnant and lactating women (PLW) and peoples with chronic disease based on the screening result. This program was run by NDRMC and Fafan Zonal health Department with the support of world food program (WFP).

Water supply, hygiene and sanitation (WaSH)

Mass chlorination of all water schemes found in IDP sites of Fafan Zone was performed. Water tracking for IDPs collective centers was done using seven water trackers. The ratio of one sit of latrine to displaced population was one sit of latrine for 194 house hold and also the ratio of water supply per day per person was less than one litter of water per person per day.

Table 29: Distribution of WaSH supplies and facilities distributed for IDPs response in Fafan Zone of Somali region, August 2018

Woreda Name	Existing Latrine	# latrines constructed	# existing Rotos/tankers	# water trucks	# soaps distributed	# water chemicals distributed
Tuligulide	8(16 sit)	4(8 sit)	2	1	37867	12140
Gebegebo	12(48 sit)	0	0	1	1113	4,537
Gebegebo School	2 (6sit)	2(4 sit)	0	0	599	324
Masnie	4(8 sit)	0	0	0	507	626
Gursum	5(10 sit)	0	1	1	2,514	4,532
Qoloji	15(60 sit)	12(24 sit)	2	2	4442	15,860
Total	44(148 sit)	18(36 sit)	**5**	**7**	47,042	38,019

Social mobilization and health education

Social mobilization and health education were the basic part of IDPs response. FMoH, UNICEF, USAID, ZHD and other partners were the main actors of these response activities across the IDPs. A total of 1300 posters, 600 on scabies and 700 on AWD, and 8000 broachers of which 6,000 on scabies and 2000 on AWD were distributed to IDPs(as depicted in fig below).

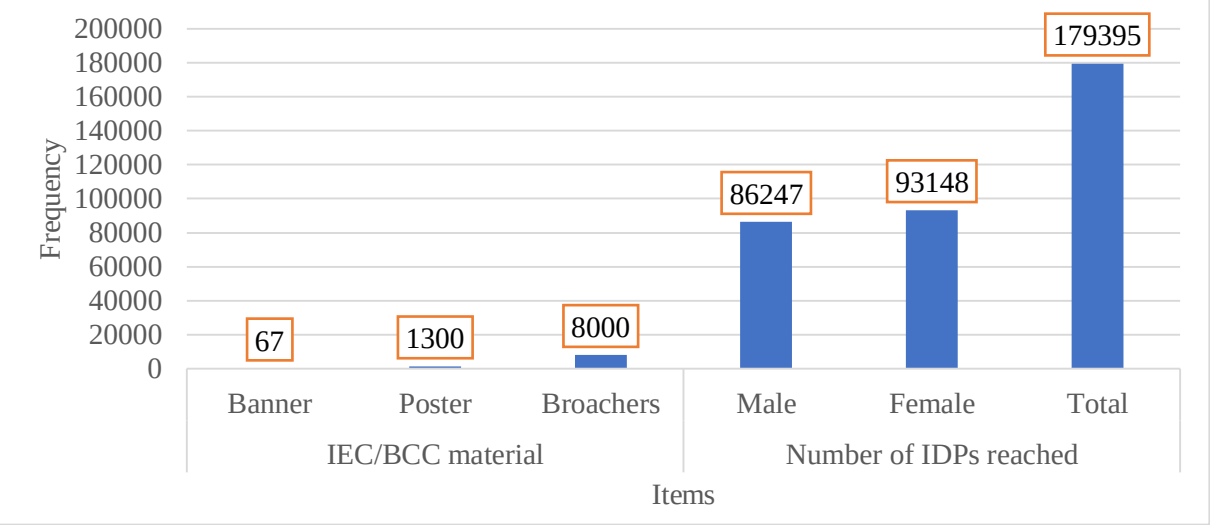


Figure 55: Distribution of IEC/BCC materials distributed to IDPs and number of individuals addressed by social mobilization in Fafan Zone IDPs of Somali region, August 2018.

Discussion

There were a total of 28 health centers, including two temporary clinics and one hospital which were served for both host community and IDPs. When computing the ratio of health facility to the total population,, it was 28 health centers for 1,249,146 people (1 health center to 44,612 individuals) and one Primary hospitals to 1,249,146 people; but national health service strategy and WHO recommends that 1 health center can serve for 25,000 to 40,000 individuals and 1 primary hospital can serve for 60,000 individuals in order to maintain the quality of health care. (4)

Among all patients treated from the IDPs, diarrheal disease (12,230 (35%) cases) is the leading cause of morbidity followed by pneumonia (9,320 (27%) cases) and intestinal parasite (7,230 (21%) cases). which may indicate deterioration of hygiene and sanitation practice in IDPs as well as either shortage of WaSH supplies including water supply or poor knowledge and practice of hygiene and sanitation.

The ratio of one sit of latrine to displaced population was one sit of latrine for 194 house hold and also the ratio of water supply per day per person was less than one litter of water per person per day, which were less than WHO as well as FMoH standard of one sit of latrine for 20 individuals and 20 to 30 litters of safe water supply per person per day. (5)

Challenges

- Lack of logistics and supplies.
- Lack of sustainable food, Shelter and Water supply to IDPs.
- Security/ instability to conduct day to day or emergency tasks.
- Lack of HF and health personnel in IDP sites
- Lack of Vaccination for Under five children's and no ANC for pregnant mothers

Conclusion

IDP settled in Fafan Zone prone to disease outbreak due overcrowding in IDP site, lack of safe water supply and lack of vaccination for children. Hence internally displaced people live in below the minimum standard for displaced population as well as host community.

The major causes of morbidity among displaced population were diarrheal diseases and which were related to hygiene and sanitation. The coverage of latrine and safe water supply for displace populations were also bellow the standard. The overall coordination and communication of internally displaced population situation and response activities on humanitarian support provided for IDPs by different stake holder together with government. Daily communication with rapid response team deployed at IDP sites to identify the health and health related risk in displaced population and share information for attack holders timely. Displacement of population debilitates the health of displaced people. Solving conflict by discussion between two regions is indispensable.

Recommendations

- Somali region together with Federal government should reach a consensus on the border issues between Somali and Oromia region to resolve conflict and displacement.
- The health facilities found in Fafan Zone are not sufficient to provide quality health service, establish additional health facilities and deploy health work force is necessary and also availing of essential medical services like laboratory service in the temporary established clinics will improve the quality of service.
- Fafan zone, woreda and health facilities found at IDP site should provide Vaccination for under five children's and ANC follow up for pregnant mothers.
- The coverage of latrine and safe water supply for displaced population were below the standard and also the major causes of morbidity among IDPs were related to hygiene and sanitation, therefore Fafan zone and stake holders should improve and monitor regularly latrine and safe water supply coverage for their consistent availability and accessibility.
- Active surveillance should be maintained in a consistent way in all IDPs collective centers to identify any disease outbreak or any other public health emergencies as early as possible.
- Fafan zone together with the region returnees should be developed Rehabilitation plan for as early as possible and should be shared for the stakeholders.
- Regional Water office should provide safe and clean water supply for displaced peoples by water trucking.
- National and regional DRMC should Availing basic needs like temporary shelter, mattress, blanket and food
- Fafan health office should Availing basic and emergency drugs and supplies to established IDP sites.

Reference

1. CSA, 2007. Central statistical authority housing and census report. Addis Ababa. Ethiopia. Devereux, Stephen, 2006.
2. Livelihoods and vulnerability in Somali region. IDS Research Report 57. https://www.ids.ac.uk/files/Rr57.pdf
3. DPPB, 2017. Ethiopian Somali Regional State Disaster Prevention and Preparedness Bureau (DPPB) - Deyr 2017 Assessment Findings: Health and Nutrition Sectors. 18 December 2017.
4. Health Sector Development Programme IV. Addis Ababa: Federal Democratic Republic of Ethiopia, Ministry of Health; 2015.
5. Health and health-related indicators. Addis Ababa: Federal Democratic Republic of Ethiopia, Ministry of Health; 2015.
6. Displacement Tracking Matrix (DTM) Somali Region, Ethiopia, Round 11:May/June2018.

CHAPTER-VIII

Protocol/Proposal for Epidemiologic Research Project

8.1. Assessment of immunization status and factors affecting its among children aged 12-23 months old in Adaar Woreda, Zone 01, Afar regional state, Eastern Ethiopia, 2019

Executive Summary

Introduction: Worldwide about 29,000 children under the age of five die every day, mainly from preventable causes. Every year around 8 million children in developing countries die before they reach their fifth birthday; many during the first year of life. An Ethiopian child is 30 times more likely to die by his or her fifth birthday than a child in Western Europe. In 1980, the Ministry of Health of Ethiopia initiated the Expanded Program on Immunization (EPI). The aim is to assess immunization status and factors affecting childhood vaccination status in Adaar District Zone 1, Afar region, Ethiopia.

Methods and Materials: Community based cross-sectional study with stratified cluster sampling and simple random sampling method will be used to select Kebeles and households. A total of 402 children age 12-23 months and the mothers/caretakers will be study participants. Structured questionnaire will be used and the questionnaire included sections on: socio-demographic characteristics of mothers and child, utilization of ANC, TT immunization and health institution delivery by mothers, child characteristics, and knowledge of mother on vaccination and vaccine preventable diseases, and immunization history of the child. Data will be entered and analyzed using Epi Info version 7.1.3.0. Logistic regression will be undertaken to determine the odds ratio for both multivariate and bivariate analysis.

Work Plan: The study will be conducted from June-August-2019

Budget: The required cost for the study is estimated US $=5,191.065

Introduction

Background

Immunization is a proven tool for controlling and even eradicating communicable diseases. Worldwide about 29,000 children under the age of five die every day, mainly from preventable causes. Every year around 8 million children in developing countries die before they reach their fifth birthday; many during the first year of life. An Ethiopian child is 30 times more likely to die by his or her fifth birthday than a child in Western Europe (1). The Expanded Programme for Immunization (EPI) in Ethiopia, launched in 1980, has been one of the core priorities in the past Health Sector Development Programme (HSDPs) and the current Health Sector Transformation Plan (HSTP). The country has mobilized women development armies or volunteers, health extension workers, and health facilities to deliver its immunization services. Improved district planning and management were initiated in 2011 with a goal of reaching every district. Stationary, outreach, and mobile are the three important service delivery platforms for vaccination services. In addition, several campaigns provided polio, measles and other antigens to children (2).

Statement of the problem

Vaccination has been shown to be one of the most effective public health interventions worldwide, through which a number of serious childhood diseases have been successfully eradicated. Small pox was eradicated by the immunization campaign carried out by WHO from 1967 to 1977 (3).The WHO recommends vaccination against a number of serious infectious diseases, including diphtheria, tetanus, pertussis, HepB, invasive Hib disease, PCV, Rota and measles for all children, and against yellow fever for children in some areas as part of their EPI. However, many infants and children still die every year from these diseases. It has been shown that in 2007 approximately 27 million infants are not vaccinated against common childhood diseases, such as measles or tetanus. As a result, 2–3 million children are dying annually from easily preventable diseases, and many more fall ill (4). But in the same year, 24 million children are not being reached with vaccines and over 10% of children under one year old in developing countries were not receiving even one dose of DTP vaccine, compared with 2% in industrialized countries (2).An estimated 2.1 million people around the world died in 2002 of diseases which can be prevented by widely used vaccines. This toll included 1.4 million children under the age of five years. Among these childhood deaths, over 500 000 were caused by measles; nearly 400, 000 by Hib; nearly 300, 000 by pertussis; and 180, 000 by neonatal tetanus (1). It has been also recognized that vaccine preventable diseases are responsible for 16% of under-five mortality in Ethiopia (5). Although estimated global routine vaccination coverage with the first dose of measles containing vaccine (MCV) reached 82% in 2007, nearly 23.2 million of children missed the vaccine of which 15.3 million (65%) resides in eight countries of Africa and south Asia. From these 1 million of them live in Ethiopia (6).Despite the increased report immunization coverage of measles in Ethiopia, the

disease has continued to be the main childhood health problem in the country. It attributed to 4% of child and infant deaths in 2004 which was highest of the world (4). Immunization is one of the national child survival strategies in Ethiopia to reach DPT3/measles vaccination coverage of 90% in 2010, which planned to decrease mortality under five ages of year by 2% (7)

In Ethiopia, the vaccination coverage among children age 12-23 months is highest for the first dose of polio vaccine (81%) followed by first dose of DPT-HepB-Hib vaccine (73%). More than half (53%) of children in Ethiopia have received three doses of DPT-HepB-Hib vaccine and 54% received the measles vaccination. There is a 20 percentage-point dropout rate at the national level from the first to the third dose of DPT-HepB-Hib vaccine and a 25 percentage-point dropout rate from the first to the third dose of polio vaccine (2).

Measles is endemic in Ethiopia with outbreaks reported annually. Improved outbreak preparedness and response efforts from the Government, as well as measles supplementary immunization activities (SIAs) the most recent of which was in 2017, have helped to significantly reduce measles cases over the years. Despite the reduced incidence, outbreaks at the sub-national level continue to occur. Measles incidence in Ethiopia is still high above 50 cases/1,000,000 population per year, which is above the national set targets for measles accelerated control by 2012 (<5 cases/1,000,000 population per year) and measles elimination by 2020 (<1 cases/1,000,000 population per year (10)

The routine immunization is most critical part of the challenge especially in measles outbreak. In the most recent coverage survey conducted in 2017; significant regional disparities were observed in Afar region (15%) low utilization as compared to other region (2). Among woreda in Afar region, Adaar woreda has low immunization coverage and frequently affected by outbreak. To address these gaps assessment of immunization status and factors affecting it among children aged 12-23 months old in Adaar Woreda Afar Regional State, Eastern Ethiopia

Rational of the study

Routine immunization particular Adaar Woreda is not functioning as expected. The district in 2018 reported that only 48% of children between 12 and 23 month are vaccinated for penta3 and 64% for measles in routine EPI, More than 60% of district population is geographically in accessible for give health service. It is one of measles outbreak occurred in Afar region in 2018, high-risk woreda, primarily has hard to reach Kebele.

Objective

General Objective

To assess immunization status and factors affecting it's among children aged 12-23 months old in Adaar Woreda of Zone 01 Afar Regional State, Eastern Ethiopia

Specific objective

- To determine the immunization coverage among children of aged 12-23 months old towards the vaccine preventable disease
- To assess demographic, socio economic and health service factors affecting immunization status among children aged 12-23 months
- To assess the knowledge of the mother/caretakers on immunization and vaccine preventable disease
- To come up with effective and affordable intervention in this woredas

Methods

Study area

The study will be conduct in Afar regional state, Adaar Woreda. The capital city of Adaar district is 122 km to the south west of Samara, the capital city of Afar Region. The Adaar woreda neighboring for Chifra Woreda to north, Mille Woreda to the northeast, Adaytu (Isa special Kebele) to the east-south, Telalak woreda to south, Bati Woreda (Oromia special Zone), Amhara region to west. The Adar Woreda have 12 Kebeles. Eleven Kebeles are rural and one Kebele is urban.

The total population of Adar woreda is 64556, from 2011 E C population projections. Male to female population are 36409 and 28146 respectively. Under 5-year population is 7359. The Adaar woreda have three, Health Centers and eight health posts.

Study design and period

Community based cross-sectional study will be used on 12-23 months children June-August, 2019

Source population

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

Study population

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

Sampling technique: -

The total (11 rural and 1 urban) Kebeles in the District initially be stratified into rural and urban areas. Then, 5 rural and 1 urban Kebeles will be selected by lottery from the total Kebeles in the district. The modified 2005 WHO EPI cluster sampling method (7) will be used to select study households. Each kebele will be considered as one cluster. The lists and number of households could not be found for all selected rural Kebeles. So, equal number of household with at least one child between 12–23 months of age will be selected from each of rural Kebeles. In each kebele the first household will be selected by randomly chosen from the central location of kebele, then counting the households along the directional line to the edge of kebele area and selecting randomly one. The subsequent households will be selected, according to the inclusion criteria, based on the principle of the next nearest household. Households in the kebele will be visited until the allocated sample size for the kebele becomes fulfilled.

Sample Size:-The sample size is calculated by using the standard sample size calculation formula using one

Sample proportion:-

The following assumption will be considered: the proportion of vaccination 12-23 months of children will be 39 %(p=0.39), the proportion of vaccination coverage in the study area was obtained from EDHS,2016, the confidence interval will be 95% (α=0.05), the marginal error of the study will be 5 %(e=.05) and10%

non-response rate will be added. Based on the above assumptions the minimum sample size required for the study will be)

$$n = \frac{(Z\alpha/2)^2 * p * q}{e^2} \Longrightarrow n = \frac{(1.96)^2 * 0.39 * .61}{0.05 * 0.05} = 365$$

By adding 10% non-response rate, the final sample size will be 365+ (365x0.1) = 402 house holds

Data collection:

A structure questionnaire will be used for the purpose of data collection. Eighteen health extension worker and 6 supervisors will be recruiting for data collection. Training will be given for data collectors and supervisors prior to study period for 1 day. Interviews using structure questionnaires will be conduct with household wife from the select households in the study Kebeles. The questions focus on various sub-themes like, knowledge of mother/caretaker, movement, Kebeles leaders/religious leaders, socioeconomic characteristic, focus group discussion with the community leaders on why children is not immunized or partially immunity . Pre-test will be conduct in a non-study village to identify the potential problems encountering during data collection and interview. Confidentiality of information will maintained during the whole study.

Ethical Consideration:

The ethical approval and clearance will be obtained from Medical Faculty of Addis Ababa University ethical committee. Permission will be also obtained from the concerned bodies of Afar Regional State Health Bureau and Adaar District Health Office. The data collectors will be oriented during the training so that they would provide proper advice for the respondents regarding any malpractice they have come across. Interview will be carried out only with full consent of the person being interviewed. Before each interview, clear explanation will be given about the aim of the study will not neither to evaluate the performance of the individual nor to blame anyone for weakness but to gather information and opinions that may lead to eventual enhancement of immunization. Each respondent will assured that the information provided by them would be confidential and used only for the purpose of research.

Dependent variable

Immunization status of children aged between 12-23 months

Independent variable

Knowledge, attitude of mothers/caretakers for vaccination, Socio economic characteristic

Expected out come

To provide suggests the gab and to take public health intervention

To provide suggested factors that contributes the low immunization coverage at the district

Dissemination of results

After completion of the study the document will submit to AAU, School of Public Health and EPHI/FMOH. The finding of the study will present to the school community, EPHI/FMOH and responsible sectors and organizations. The report will disseminate to journals for publication.

Expected outcomes

The factors that may influence children against vaccination will be clearly identified and documented.

Budget and implementation time

A total of 5,191.065 USD will be needed to conduct the study. The project will take about three months including data collection and preparation of final report. Details of budget break down and implementation time is annexed below.

Implementations Time

Phases of Project	Major Activities	March 2019	June 2019	July 2019	August 2019
Phase- I. Writing Proposal	Writing the research proposal				
	Submitting the finalized proposal				
	Review the Scientific merit of proposal				
	Approval of the project				
Phase- II.	Collecting letter of clearance & other supportive letters from research and publication committee				
	Training of the data collector Pretesting of the and questionnaire				
	Data collection, entry, clearance and analysis				
	Write-up of the research draft Amending of the research paper as per the comments of the advisor				
Phase- III.	Compile final report Submission of Final Version of report				
	Defense and dissemination of findings				

Budget Breakdown

S.N	Item	cost (US $)	total cost
1	Translation and back retranslation of questionnaire from English to local from local to English language.10pagesX2times translation	5	100
Training of data collectors and supervisor for 2 days			
2	Ten data collectors *2days	9	180
3	Six supervisors *2 days	14	168
4	One Evaluator *2days	20	40
5	one trainer *2days	20	40
6	Training hall rent * 2 days	10	20
7	Twenty one pens	0.25	5.25
8	Twenty one pencils	0.015	0.315
9	Data collection from 40 non targeted households to pretest the quality of the questionnaire developed (four days activity)	48	480
Data Collection for 10 days			
10	10data collectors *10 days	10	1000
11	6 supervisors *10 days	16	960
13	1Evaluator **10days	20	200
14	2 Car rent for 10 days service	40	800
15	Fuel to the car 2 x 10days	50	1000
Stationeries, printings and photo copies			
16	Flash diskette 1 GB	25	25
17	Photo copy paper (210 x 297 mm) x 24packet	5	120
18	21 pcs of writing pads for data Notes collection 21	0.5	10.5
19	Printing of translated questionnaires 10pages X 2	0.2	4
20	Photo copying 10 pages questionnaires for 500 household survey	0.05	25
21	Final report Writing and printing	8	8
22	Photo copying the final report	3	3
24	Binding the final documents 7copies	0.3	2
Grand total			**5,191.065**

Reference

1. UNICEF: Millennium Development Goal report. UNICEF; 2005.
2. Central Statistical Agency (CSA) [Ethiopia] and ORC Macro: Ethiopia Demographic and Health survey 2016. Addis Ababa, Ethiopia and Calverton, Maryland, USA: CSA and ORC Macro; 2017.
3. Federal Ministry of Health (MOH), Ethiopia: Health service extension package implementation guideline. Addis Ababa, Ethiopia; 2009.
4. UNICEF: Immunization Remains Vital to Child Survival, a report card on immunization number 3. 2005.
5. M. B. Kassahun, G. A. Biks, and A. S. Teferra, "Level of immunization coverage and associated factors among children aged 12-23 months in Lay Armachiho District, North Gondar Zone, Northwest Ethiopia: a community based cross sectional study," *BMC Res. Notes*, 2015.
6. Gore P, Madhavan S, Curry D, et al.: Predictors of childhood immunization completion in a rural population. Social Science and Medicine 1999, 48:1011-27.
7. WHO: World health report 2005. WHO, Geneva, Switzerland; 2005.
8. Berhane Y, Masresha F, Zerfu M, Kebede S, Shashikant S: Status of expanded program on immunization in a rural town, south Ethiopia. Ethiop Med J 1995, 33(2):83-93.
9. Centers for Disease Control and Prevention: Ten great public health achievements United States, 1900–1999. MMWR Morb Mortal Wkly Rep 1999, 48:241-243.
10. Ethiopia Launches Measles Vaccine Second Dose (MCV2) Introduction, 2019, Available on, https://reliefweb.int/report/ethiopia/ethiopia-launches-measles-vaccine-second-dose-mcv2-introduction-over-33-million.

CHAPTER-IX

9. Other Additional Outputs

9.1. Ethiopian Weekly Epidemiological Bulletin

Ethiopia Weekly Epi Bulletin/Vol. 4/No.13 Epidemiological Week 13 Week Ending 1st of April/2018

Highlights of the week

Surveillance Completeness Rate: Nationally, the proportion of health facilities that reported surveillance data was 92.8% which is above the minimum requirement (80%).

Surveillance Timeliness Rate: Nationwide, the proportion of health facilities that reported the surveillance data timely was above the minimum requirement i.e. 87.1%.

Malaria: A total of 110,805 febrile cases were suspected for malaria and tested either by microscopy or RDT in the week. Of these cases, 12.8% (14,176) were treated for malaria. As compared to last week, there was 1.6% (228 cases) decrement.

Severe Acute Malnutrition: A total of 4,916 cases with eight deaths were reported with increment of 2.5% (604 cases) as compared to last week.

Measles: A total of 106 cases were reported and measles suspected outbreak threshold was surpassed in twenty five woredas as of the week.

Meningitis: A total of 47 suspected meningitis cases with three deaths were reported.

Anthrax: A total of 22 suspected anthrax cases without death were reported during the week.

Rabies Exposure: A total of 89 exposure cases without death were reported which was 21.9% (26 exposure cases) lower than the last week.

Maternal Death: A total of 30 maternal deaths were reported from 28 reporting sites.

Zero Reports: Zero suspected cases of avian human influenza, drancunculiasis, NNT, pandemic influenza, small pox, hemorrhagic fever, SARS and yellow fever were reported during the week.

Acute Watery Diarrhea Outbreak: Acute watery diarrhea outbreak is ongoing in some woredas of Somali and Tigray Regions and no case was reported during the week.

Strengthening Public Health Emergency Management: As part of strengthening public health emergency management vaccine preventable diseases surveillance and response and climate sensitive diseases surveillance sentinel sites supportive supervision and acute water diarrhea outbreak post epidemic assessment is started in Oromia Region.

I. Introduction

This Epidemiological Weekly Bulletin serves to provide key information on public health emergency management activities, and summarizes surveillance data and performance on epidemic prone diseases and other public health emergencies. The bulletin mainly includes surveillance data of week 13 of 2018 and daily phone communication, line list reports of outbreaks for week 14 of 2018. It highlights the surveillance completeness and timeliness across the regions, trends of diseases under surveillance, cluster of cases and events, ongoing outbreaks and responses undertaken at all levels in Ethiopia. The numbers of disease specific cases indicated in this issue of bulletin are subject to change due to on-going receiving late weekly surveillance data and retrospective verification of data from outbreak areas.

II. National Public Health Surveillance Data Summary

Table 30: Comparison of surveillance data by week, week 12 and 13, 2018, Ethiopia

Indicators/diseases/conditions	2018		
	Week 12	Week 13	% Change
Percent of Health Facility reported	92.0%	92.8%	0.8
Percent of Health Facility reported timely	86.9%	87.1%	0.2
Total Malaria Confirmed and Clinical	14,404	14,176	-1.6
Typhoid fever	24,094	24,698	2.5
Epidemic Typhus	10,545	10,595	0.5
Dysentery	6,541	6,339	-3.1
Severe Acute Malnutrition	4517	4916	8.8
Suspected Measles	151	106	-29.8
Rabies exposure	114	89	-21.9
Suspected Meningitis	43	47	9.3
Relapsing Fever	23	42	82.6
Suspected Anthrax	24	22	-8.3
Maternal Death	19	30	57.9
Acute Flaccid Paralysis	15	14	-6.7
Acute Watery Diarrhea	0	0	0.0
Neonatal Tetanus	2	0	-100.0
Avian Human Influenza	0	0	0.0

Polio	0	0	0.0
Drancunculiasis/Guinea worm	0	0	0.0
Pandemic Influenza	0	0	0.0
SARS	0	0	0.0
Small pox	0	0	0.0
Yellow Fever	0	0	0.0
Viral hemorrhagic fever	0	0	0.0

III. Public Health Surveillance Reporting Completeness and Timeliness Rates

A. Public Health Surveillance Reporting Completeness Rate

The national surveillance completeness rate was 92.8% in the week which is above the minimum requirement (80%) and all regions had achieved above the minimum requirement except Harare (0.0%) Region.

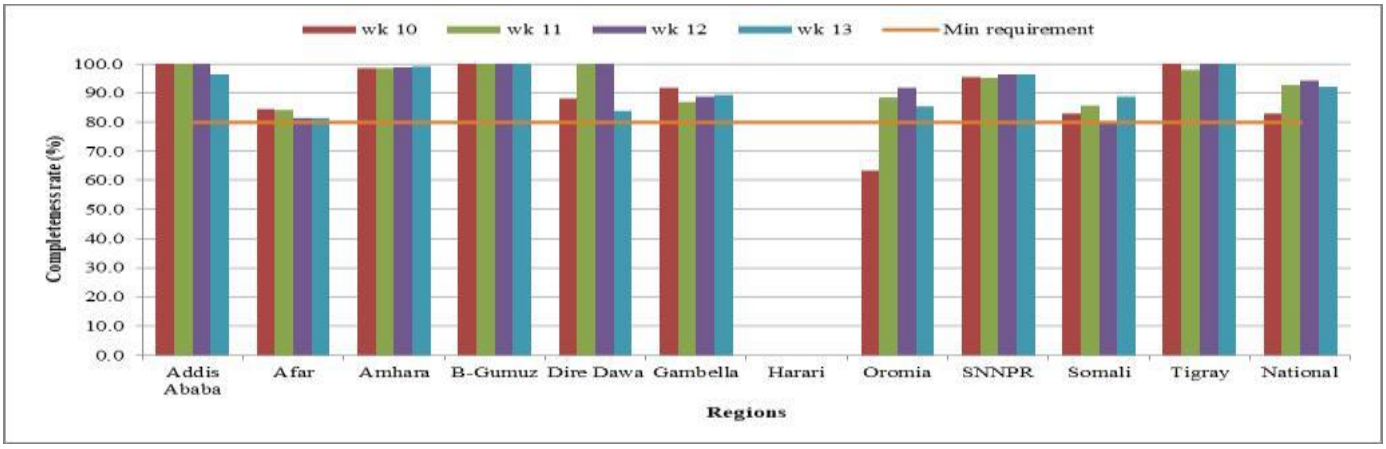


Figure 56: Surveillance data completeness rate by regions, week 10-13, 2018, Ethiopia.

B. Public Health Surveillance Reporting Timeliness Rate

During the week the national surveillance data reporting timeliness rate was 87.1% which is above the minimum requirement and all regions except Harari (0.0%), Dire dawa (0.0%) and Oromia (74.9%) had achieved above the minimum requirement, 80%.

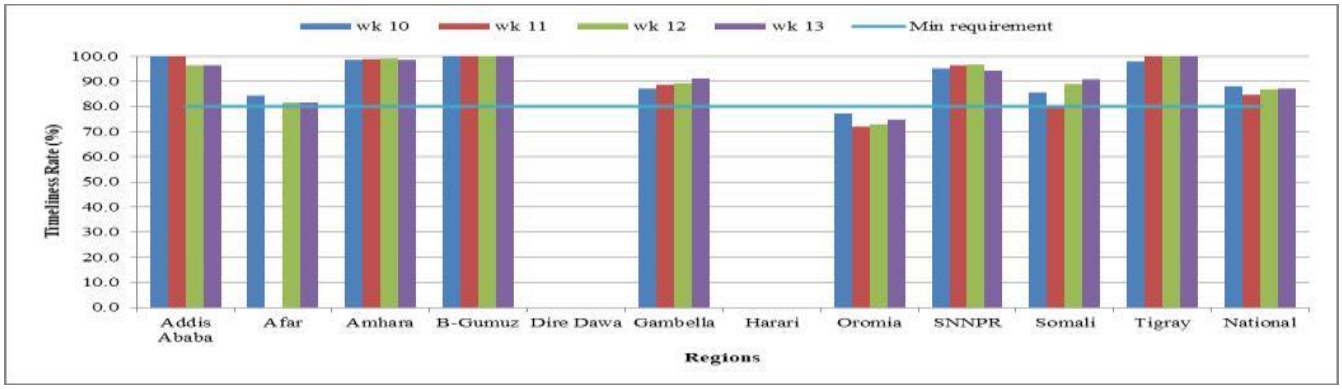


Figure 57: Surveillance data completeness rate by regions, week 10-13, 2018, Ethiopia.

IV. Diseases/Conditions under Surveillance Updates

1. Malaria

During the week a total of 110,805 health facilities visitors were suspected and examined for malaria of which 12.8% (14,176) cases were treated as malaria which was 1.6% (228 cases) lower than the last week. Plasmodium falciparum contributes the highest portion of the cases reported during the week, 71.5% (9,518 cases) of the cases nationally and 96.4%, 92.4% and 87.5% in Somali, Gambella and Afar Regions respectively. The number of cases reported in 2018 is still lower than the number of cases reported in the last two years. Cascading the malaria cases to regions, 23.7% (3,356 cases), 17.80 (2,410 cases) and 10.6% (1,501 cases) were reported from SNNP, Amhara and B-Gumuz Regions respectively during the week.

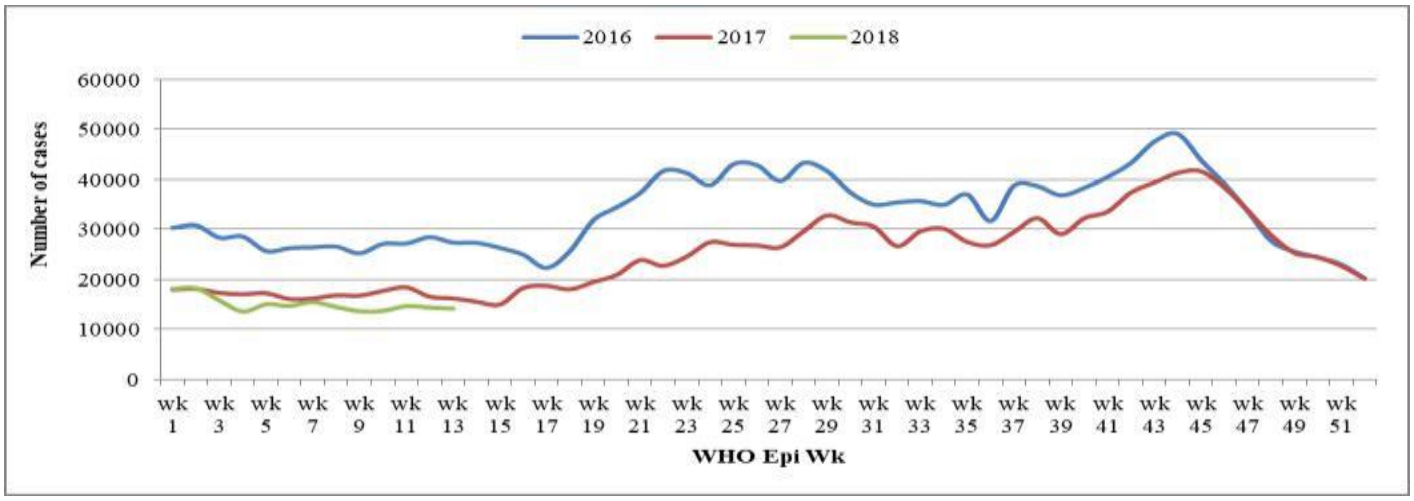


Figure 59: National malaria (clinical and laboratory confirmed) trend by week from 2016-2018, Ethiopia.

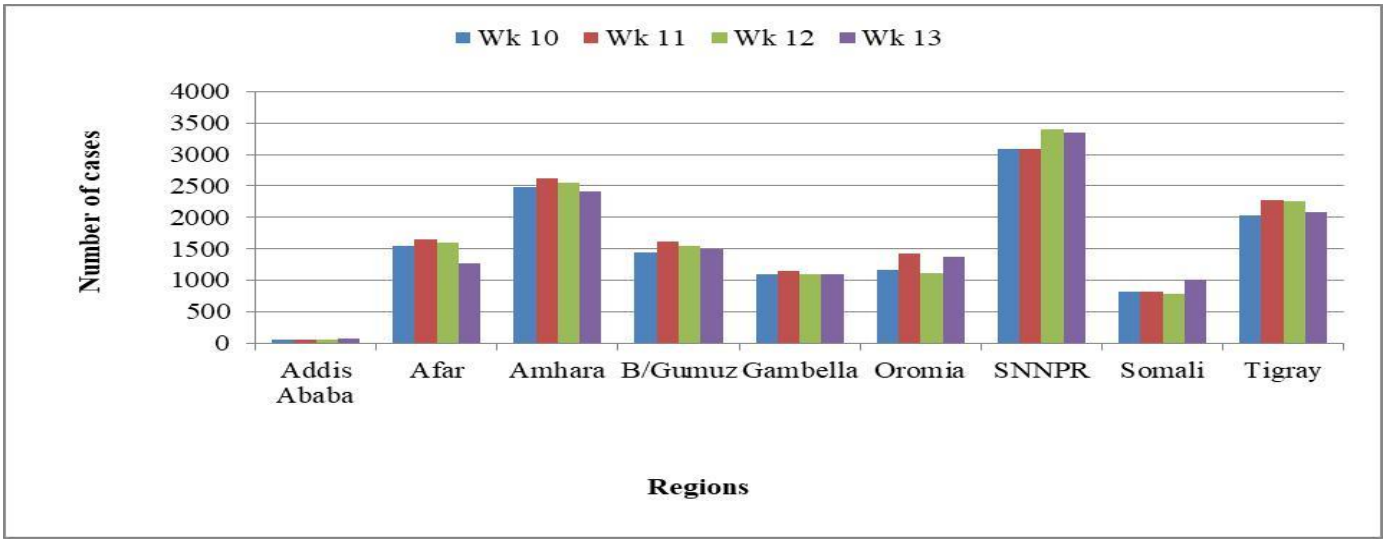


Figure 58: Regional malaria cases distribution, week 10-13, 2018, Ethiopia.

A total of 861 cases (6.1%) of malaria were treated clinically nationwide while 67.2% and 6.8% were treated clinically in Somali and Gambella Regions respectively. The clinically treated malaria cases during the week are slightly above the national recommendation at national level and in Somali and Gambella Regions. The nationwide malaria slide positivity rate during the week is 12.0% while 41.4%, 37.9% and 32.7% in Gambella, Somali and Afar Regions respectively.

2. Suspected Meningitis

During the week, a total of 47 suspected meningitis cases with three deaths were reported from Oromia (22 cases), SNNP (8 cases), Addis Ababa (8 cases), Amhara (5 cases), B-Gumuz (2 cases) and Tigray (2 cases). The suspected cases reported during the week were higher than the suspected cases during the same week of the last two years cases.

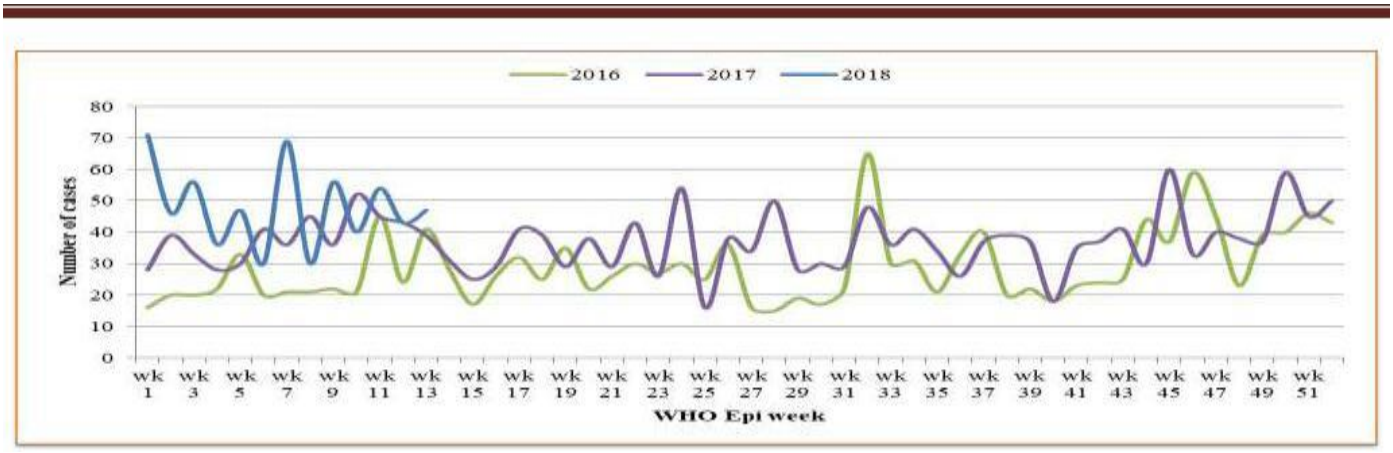


Figure 60: Trend of suspected meningitis cases over week, 2016-2018, Ethiopia.

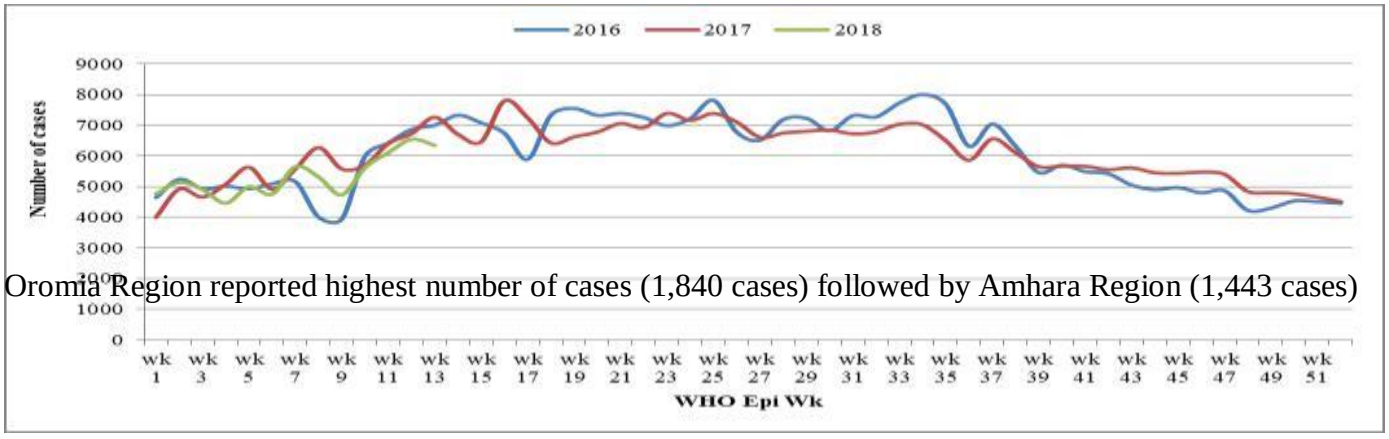
Table 31: Suspected meningitis cases and deaths distribution by reporting sites, week 13, 2018, Ethiopia.

Region	Zone	Reporting sites	Suspected cases	Death
Oromia	West Hararge	Chiro Hospital	4	0
Oromia	Jimma	Agaro	3	0
Addis Ababa	Yeka	Dagmawi Menelik Hospital	3	0
Oromia	West Shewa	Gojo Hospital	3	0
SNNPR	Halaba	Halaba Hospital	3	0
Addis Ababa	Gulele	St. Paulos Hospital	3	0
Amhara	Oromiya	Kemise General Hospital	3	0

Oromia	Bale	Goba Town	2	0
Oromia	Arsi	Merti	2	0
Benishangul-Gumuz	Metekel	Pawe Hospital	2	2
Amhara	East Gojjam	Baso Liben	1	0
SNNPR	Halaba	Besheno HSP	1	0
SNNPR	Segen	Gedola Hospital	1	0
Oromia	West Hararge	Gelemso Hospital	1	0
Oromia	East Wellega	Gida Ayana	1	0
Oromia	West Shewa	Gindeberet Hospital	1	0
SNNPR	Hawassa Town	Hawassa Referal Hospital	1	0
Tigray	Western Tigray	Humera Town	1	0
SNNPR	South Omo	Jinka Zonal Hospital	1	1
Tigray	South Tigray	Korem Town	1	0
Addis Ababa	Lideta	Tikur Anbesa	1	0
SNNPR	Siliti	Werabie Hospital	1	0
Oromia	Horo Gudru Wellega	Shambu Hospital	1	0
Addis Ababa	Lideta	Lideta Woreda09	1	0
Amhara	West Gojjam	North Mecha	1	0
	Grand Total		**47**	**3**

3. Dysentery

During the week, a total of 6,339 dysentery cases without death were reported showing 3.1% (202 cases) decrement as compared to last week. The number of cases reported during the week is lower than the same weeks of the last two years cases with a tendency to decrease.



Oromia Region reported highest number of cases (1,840 cases) followed by Amhara Region (1,443 cases)

Figure 61: Dysentery cases trend by week, 2016-2018, Ethiopia.

4. Typhoid Fever

During the week, a total of 24,698 cases of typhoid fever without death were reported which was 2.5% (604 cases) higher than the last week. The typhoid fever cases reported during the week is higher than the same weeks of the last two years.

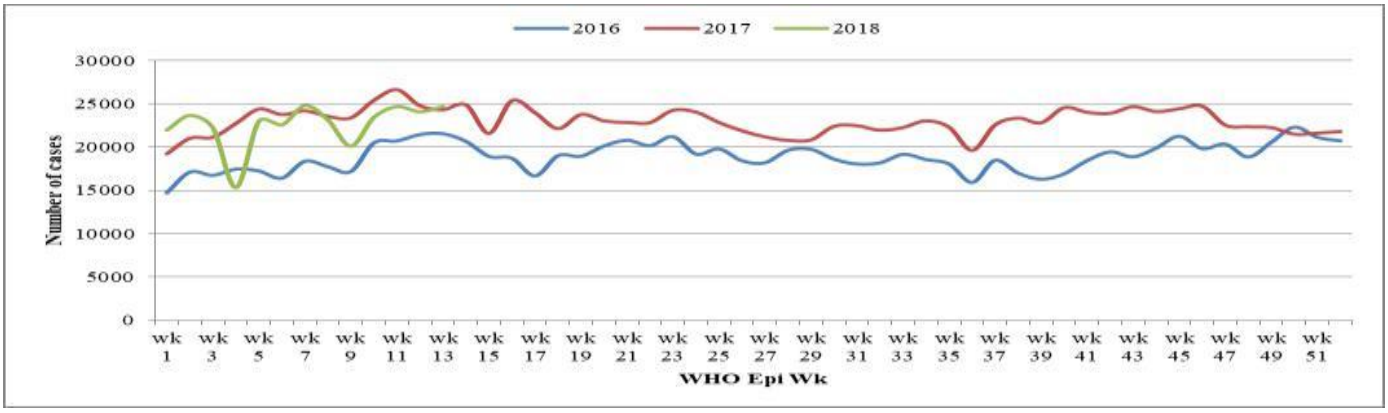


Figure 62: Typhoid fever cases trend by week, 2016-2018, Ethiopia.

SNNP Region reported highest number of cases (9,792 cases) followed by Oromia Region (6,181 cases) and Addis Ababa City Administration (3,584 cases) during the week.

5. Relapsing Fever

A total of 42 cases of relapsing fever without death were reported during the week which was 82.6% (19 cases) higher than the last week. The number of cases reported during the week is lower than the number of cases reported during the same week of the last two years.

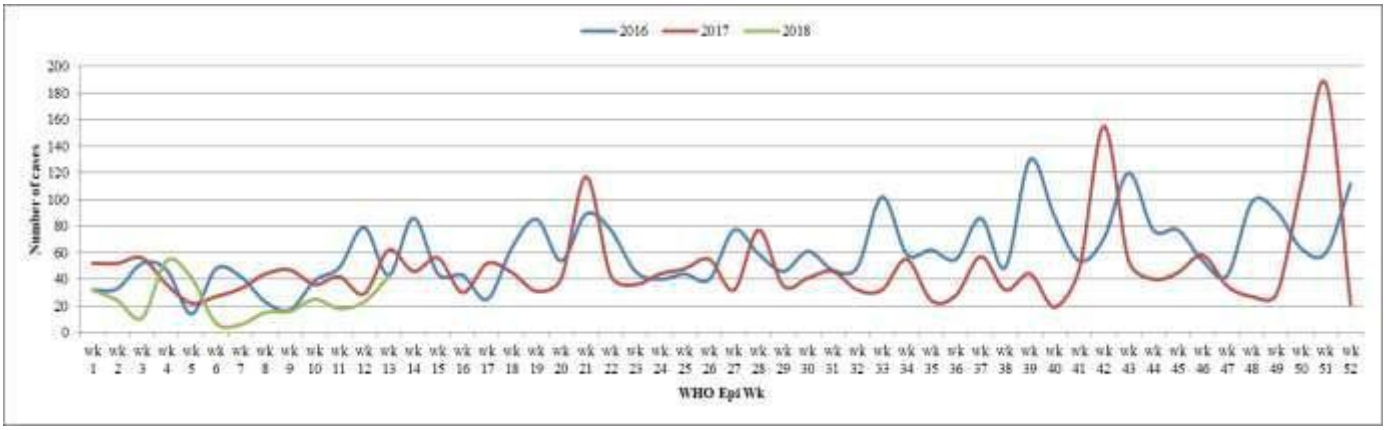


Figure 63: Relapsing fever cases trend by week, 2016-2018, Ethiopia.

(17 cases) and Tigray Region (5 cases) during the week.

6. Epidemic Typhus

A total of 10,595 cases of epidemic typhus without death were reported during the week, which was 0.5% (50 cases) higher than the last week. The number of cases reported during 2018 are continued to be higher than the number of cases reported during the similar weeks of 2017 and 2016 with a tendency to increase.

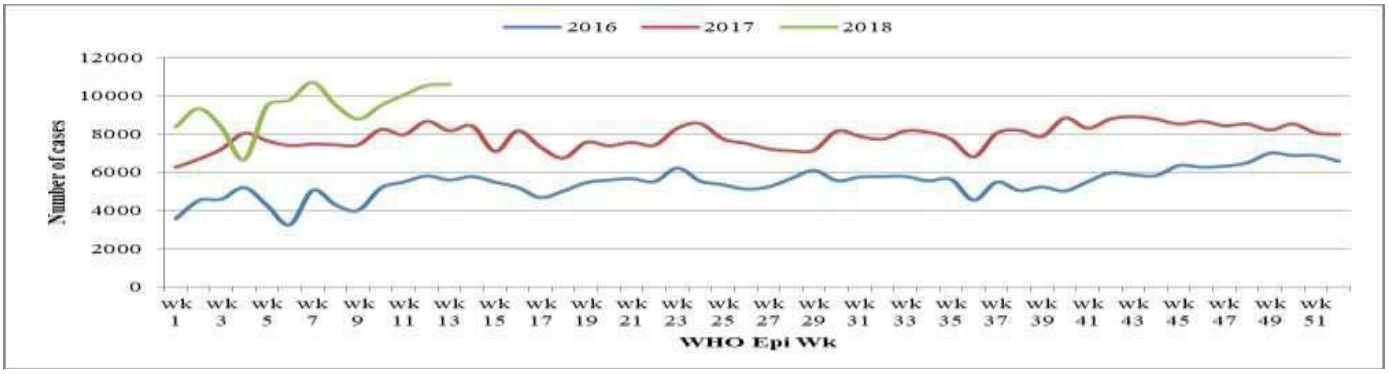


Figure 64: Epidemic typhus cases trend by week, 2016-2018, Ethiopia.

SNNP Region reported highest number of cases (3,519 cases) followed by Addis Ababa City Administration (3,178 cases) and Amhara Region (1,875 cases) during the week.

7. Severe Acute Malnutrition

During the week, a total of 4,916 cases with eight deaths were reported which showed 8.8% (399 cases) increment as compared to last week. The severe acute malnutrition cases reported during the week were lower than the number of cases reported during the same week of 2016 but higher than the number of cases in 2017.

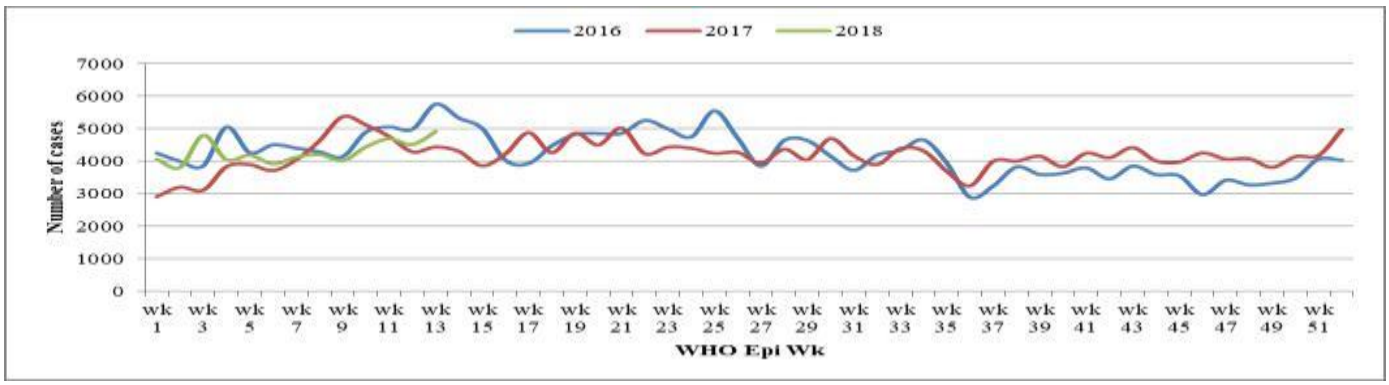


Figure 65: Severe acute malnutrition cases trend by week, 2016-2018, Ethiopia.

About 435 (8.8%) of the total reported SAM cases were treated in patient during the week nationally. Oromia Region reported highest number of cases (2,064 cases) followed by Somali Region (923 cases) and SNNP Region (822 cases) during the week.

The top ten severe acute malnutrition leading woredas during the last one month (week 10-13) were from Oromia and Somali Regions.

Table 32: Top ten severe acute malnutrition cases reporting woredas, week 10-13, 2018, Ethiopia.

Region	Zone	Reporting sites	wk 10	wk 11	wk 12	wk 13	Grand Total
Oromia	East Hararge	Bedeno	41	54	34	111	240
Oromia	West Hararge	Chiro Zuriya	34	39	14	79	166
Somali	Afder	ElKare	44	49	22	55	170
Oromia	East Hararge	Fedis	25	73	41	91	230
Somali	Shabeele	Kalafo	53	41	46	39	179
Oromia	East Hararge	Midega Tole	28	54	41	37	160
Oromia	West Arsi	Shala	62	58	57	54	231
Oromia	West Arsi	Shashemene Rural	36	74	79	87	276
Oromia	West Arsi	Siraro	98	78	75	89	340
Somali	Shabeele	EastImey	54	51	56	0	161
Grand Total			**475**	**571**	**465**	**642**	**2153**

8. Scabies

During the week a total of 3,140 cases were reported which is 92.8% (2,913 cases) lower than the last week. Amhara Region reported highest number of cases (1,549 cases) followed by Oromia Region (744 cases) and SNNP Region (516 cases) during the week.

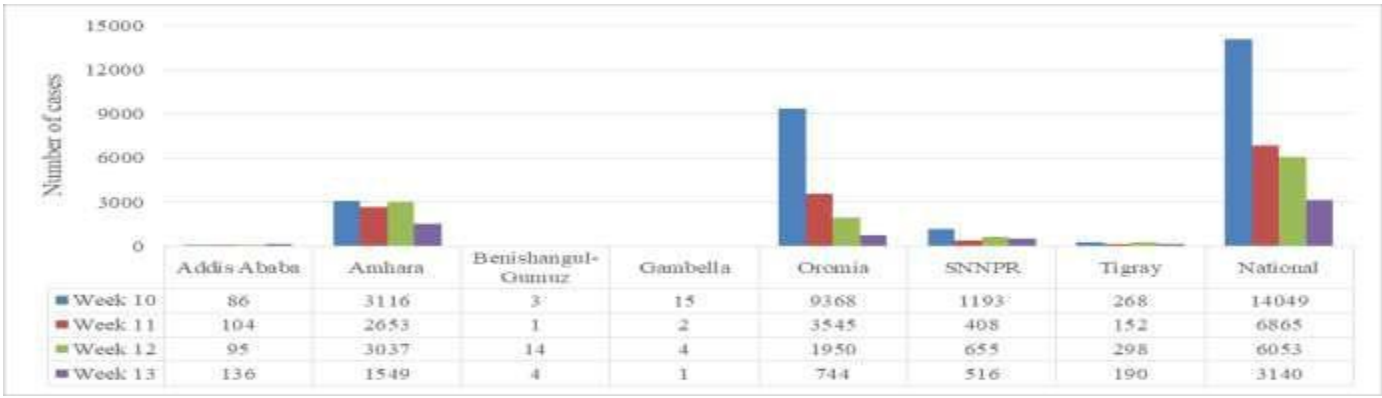


Figure 66: Scabies cases distribution and trend by Region, week 10-13, 2018, Ethiopia.

9. Acute Flaccid Paralysis (AFP)

During the week a total of 14 suspected AFP cases were reported which was 6.7% (one suspected case) lower than the number of the suspected cases during the last week.

Table 33: Distribution of acute flaccid paralysis cases by reporting woredas, week 13, 2018, Ethiopia.

Region	Zone	Reporting sites	Suspected cases	Death
Oromia	Adama Special Town	Adama Town	2	0
Benishangul-Gumuz	Assosa	Assosa Rural	1	0
Amhara	Awi	Dangla Zuria	1	0
Oromia	Guji	Dima	1	0
Gambella	Agnuwak	Gambella Hospital	1	0
Oromia	Bale	Ginir Town	1	0
Amhara	East Gojjam	Gozamin	1	0
Oromia	Jimma Spe Town	Jimma Spe Town	1	0
Oromia	Jimma	Limu Hospital	1	0
Amhara	North Gondar	Metema	1	0
Amhara	North Shewa	Moretna Juru	3	0
Grand Total			**14**	**0**

10. Suspected Anthrax

A total of 22 suspected anthrax cases without death were reported from Amhara and Tigray Regions during the week which is 8.3% (2 suspected cases) lower than the number of suspected cases during the last week.

Table 34: Distribution of suspected anthrax cases and deaths by woredas, week 13, 2018, Ethiopia

Region	Zone	Reporting sites	Suspected cases	Death
Amhara	South Wollo	Sayinit	7	0
Amhara	Wag Himra	Sehale Seyemt	3	0
Amhara	North Gondar	Tselemet	3	0
Amhara	South Gonder	Sedie Muja	3	0
Amhara	North Gondar	Jan Amora	2	0
Amhara	East Gojjam	Enemay	1	0
Tigray	North Western Tigray	Laelay Adiabo	1	0
Tigray	Mekele Especial Zone	South & North Mekele	1	0
Amhara	Wag Himra	Zikwala	1	0

Grand Total	**22**	**0**

11. Suspected Measles

During the week, a total of 106 suspected measles cases without death were reported and as compared to last week there was 29.8% (45 suspected cases) decrement. Measles suspected outbreak threshold was surpassed in twenty five woredas based on the national outbreak threshold criteria (woreda that reported greater than five suspected cases over the last four weeks, 10-13 weeks).

Table 35: Woredas in which suspected measles outbreak threshold is surpassed as of week 13, 2018, Ethiopia

Region	Zone	Reporting sites	Suspected cases				
			wk 10	wk 11	wk 12	wk 13	Grand total
Somali	Korahe	Shilabo	6	4	7	9	26
Addis Ababa	Gulele	Gulele Woreda03	4	2	5	7	18
Somali	Faafan	Aw-Bare	0	0	0	5	5
Somali	Jarar	Gashamo	0	4	7	5	16
Oromia	Shashamane Town	Shashamane Town	-	0	0	5	5
Amhara	North Wollo	Bugna	0	7	0	4	11
Addis Ababa	Bole	Bole Woreda14	0	1	3	4	8
Benishangul-Gumuz	Assosa	Menge	1	4	4	3	12
Addis Ababa	Bole	Bole Woreda10	1	0	1	3	5
Somali	Doollo	Warder	0	0	5	2	7
Addis Ababa	Chirkos	Kirkos Woreda06	1	0	2	2	5
Addis Ababa	Nefas Silk Lafto	Nefas Silk Lafto Woreda03	0	5	0	2	7
Addis Ababa	Yeka	Yeka Woreda06	1	3	1	2	7
Addis Ababa	Yeka	Yeka Woreda13	0	12	6	2	20
Somali	Liben	Dolo Odo	4	0	1	1	6
Amhara	East Gojjam	Gozamin	5	1	0	1	7
Tigray	North Western	Laelay Adiabo	0	0	4	1	5

	Tigray						
Oromia	Sebeta Town	Sebeta Town	3	1	0	1	5
Addis Ababa	Arada	Arada Woreda07	0	2	3	1	6
Somali	Doollo	Danot	0	0	17	0	17
Amhara	North Gondar	Tach Armacho	0	0	5	0	5
Somali	Shabeele	Gode Rural	0	0	10	0	10
Addis Ababa	Arada	Arada Woreda02	2	1	2	0	5
Addis Ababa	Kolfe Keraniyo	Kolfe Keraniyo Woreda06	1	4	3	0	8
Addis Ababa	Nefas Silk Lafto	Nefas Silk Lafto Woreda06	3	2	0	0	5
Grand Total			32	53	86	60	231

Note: "-"= the woreda has not reported during the week

12. Rabies Exposure

A total of 89 exposure cases without death were reported during the week which was 21.9% (26 exposure cases) lower than the last week exposure cases

Table 36: Distribution of suspected rabies exposure cases and deaths by reporting sites, week 13 of 2018, Ethiopia

Region	Zone	Reporting sites	Exposure cases	Death
Tigray	North Western Tigray	Shire Enida Silase Town	18	0
Benishangul-Gumuz	Assosa	Assosa Hospital	9	0
Tigray	Mekele Especial Zone	South & North Mekele	8	0
Tigray	Central Tigray	Adwa Town	7	0
Tigray	North Western Tigray	Shiraro Town	6	0
Addis Ababa	Chirkos	Kirkos Woreda11	6	0
Tigray	Eastern Tigray	Wekero Town	5	0
Tigray	Central Tigray	Akisum Town	4	0
Tigray	South East	Degua Tembien	4	0
Tigray	South Tigray	Korem Town	4	0
Oromia	West Arsi	Adaba	3	0
Oromia	Shashamane Town	Shashamane Town	3	0

Oromia	West Shewa	Gojo Hospital	2	0
Tigray	Eastern Tigray	Adi Girat Town	1	0
Amhara	North Shewa	Asagert	1	0
Oromia	Qeleme Wellega	Dambi Dolo Hospital	1	0
Amhara	North Shewa	Debrebrehan Hospital	1	0
Amhara	North Shewa	Enat Hospital	1	0
Tigray	Western Tigray	Humera Town	1	0
Tigray	North Western Tigray	Laelay Adiabo	1	0
Oromia	Qeleme Wellega	Seyo	1	0
Addis Ababa	Addis Ketema	Addis Ketema Woreda09	1	0
Addis Ababa	Yeka	Yeka Woreda08	1	0
Grand Total			**89**	**0**

13. Maternal Death

During the week a total of 30 maternal deaths were reported from 28 reporting sites of Oromia Region (12 deaths), Amhara Region (8 deaths), Addis Ababa (3 deaths), Dire Dawa (2 deaths), Tigray Region (2 deaths), SNNP Region (2 deaths) and Gambella Region (1 death).

Table 37: Distribution of maternal deaths by reporting sites, week 13 of 2018, Ethiopia

Region	Zone	Reporting sites	Death
Dire Dawa	Dire Dewa	Dilchora Hospital	2
Oromia	Jimma Spe Town	Jimma Spe Town	2
Oromia	Guji	Adola Hospital	1
Amhara	North Gondar	Alefa	1
SNNPR	Segen	Amaro	1
Amhara	North Wollo	Bugna	1
Oromia	East Hararge	Chinakesen	1
Oromia	Qeleme Wellega	Dale Sedi	1
Amhara	South Gonder	Dera	1
Amhara	South Gonder	Estea	1

Addis Ababa	Chirkos	Gandi Mem Hos[pital	1
Oromia	Qeleme Wellega	Gawo Qebe	1
Amhara	North Gondar	Gondar Zuriya	1
Oromia	Horo Gudru Wellega	Hababo Guduru	1
Oromia	East Hararge	Jarso	1
Tigray	Central Tigray	Lailay Mayichewu	1
Gambella	Mejenger	Mengesh	1
Oromia	East Hararge	Meyu Muleke	1
Amhara	West Gojjam	Quarit	1
Amhara	South Wollo	Sayinit	1
Amhara	West Gojjam	Sekela	1
Oromia	South West Shewa	St.Luke Hospital	1
Oromia	Borena	Teltele	1
SNNPR	Dawuro	Tercha Town	1
Addis Ababa	Lideta	Tikur Anbesa	1
Oromia	Guji	Wadara	1
Tigray	Western Tigray	Welqayet	1
Addis Ababa	Lideta	Lideta Woreda09	1
Grand Total			**30**

14. Other Immediately Notifiable Diseases/Conditions

During the week zero suspected cases of avian human influenza, drancunculiasis, neonatal tetanus, pandemic influenza, small pox, hemorrhagic fever, SARS and yellow fever were reported.

IV. Diseases/Conditions Outbreaks

1. Acute Watery Diarrhea Outbreak

Acute watery diarrhea outbreak is ongoing in some woredas of Tigray Region and Somali Region and no case was reported during the week.

In order to learn a lesson from the outbreak investigation and response, post epidemic assessment is started in Oromia Region.

Rumor collection through toll free phone, 8335 and new PHEOC E-mail, ephieoc@gmail.com in addition to daily case and death due to AWD report collection from the affected areas is maintained at the PHE

1. Vaccine Preventable Diseases Surveillance and Response and Climate Sensitive Diseases Surveillance Sentinel Sites Supportive Supervision

As part of strengthening public health emergency management system supportive supervision of selected zones and woredas of Oromia Region is started. Woredas and zones with low surveillance performances indicators of vaccine preventable diseases and selected areas for climate sensitive diseases surveillance will be covered.

2. PHEOC SOP Revision Workshop

A draft PHEOC SOP was revised by technical inputs of experts from US CDC, Public Health Emergency UK, National Disaster Risk Management Commission, US Forest Service International Programs, African CDC, WHO, UNICEF and EPHI during workshop held in EPHI Training Center from April 3-5, 2018.

3. Weekly Epidemiological Feedback

Weekly epidemiological surveillance data feedback were prepared by regional focal and communicated to the respective regions.

Acknowledgements

Many thanks go to all regional states health bureau, zonal health departments, woreda health offices and governmental and nongovernmental health facilities for sharing to national PHEM their respective regional weekly surveillance data, data managers of EPHI/cPHEM for compiling all regional surveillance data and all national PHEM officers for their close follow-up and sharing updates. Additionally, the center would like to extend its gratitude to partners including US CDC, African CDC, WHO, UNICEF, PHE UK, Carter Center and MSF.

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9.2.Weekly Feedback to Regional PHEM-2018

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Weekly Surveillance Report Feedback, Afar, Week 13/ 2018

High light of the week 13, 2018

- Week 13 completeness rate and timeliness rate were 299/361*100) =82.8%.
- Number of expected Health Facilities are not consistent .
- Relapsing Fever cases had increased by three folds while Epidemic Typhus cases decreased by 9.1%.
- Malaria, Malnutrition, typhoid fever and dysentery cases had decreased by (19.9%, 13.6%, 5.6% and 2.9%) from previous week respectively.
- Relapsing fever continuously increasing in the region specially in Dulecha Woreda . The region should follow the status cases.
- Number of expected Heath Facilities should be consistent and if new health facility starts to report it should be updated officially.

1. Surveillance Report Completeness

The surveillance report completeness rate for week 13 were 82.8% (299/361*100) and it is above the minimum requirement (Fig 1). The completeness status was similar with the previous week. All zones achieved completeness above the minimum requirement (80%) except Zone 2 and Zone 5. some woredas and Hospitals (Assayta DHP, Kori, Abala, ,Abala DHP, Biiddu, Erebti, Megale, Amibara, Teru, Dalifage, Dalifage DHP and Dewe) had 0% completeness rate (Fig2).

2. Surveillance Report Timeliness

In week 13, Afar region report timeliness rate was 82.8%. It was above the minimum requirement and received timely at EPHI. It is good should be continued

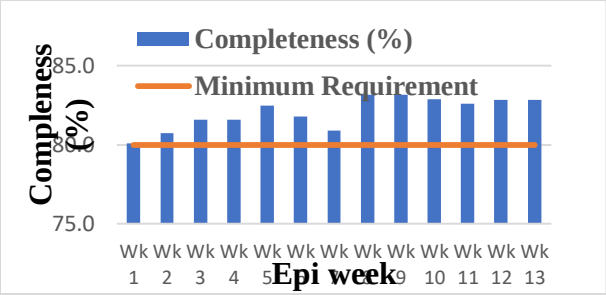

Figure 67: Weekly report completeness for Week 1-13/2018, Afar Region

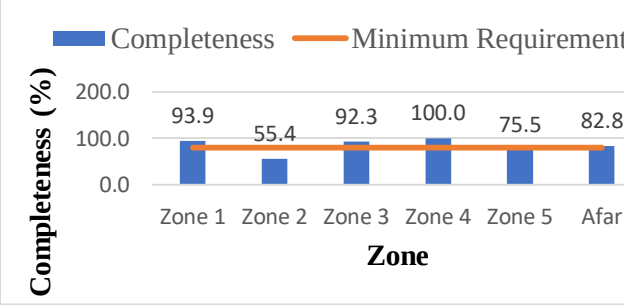

Figure 68: Zonal Completeness for Week 13, 2018 Afar region

3.Data Quality

Reporting date is in concise with the week.

Number of expected Health Facilities are not consistent(Flactuate from week to week i.e In week 11 Number of expected HF were 369 but in week 12 and week 13 number of expected HF are 361)

4. Immediately reportable disease

All other immediately reportable diseases were reported zero.

5. Weekly Reportable Diseases

Malaria

A total of 1274(19.9% lower than last week) cases of clinical and confirmed malaria cases were reported with no inpatient cases and death. Trend of malaria was decreasing compared with previous year.

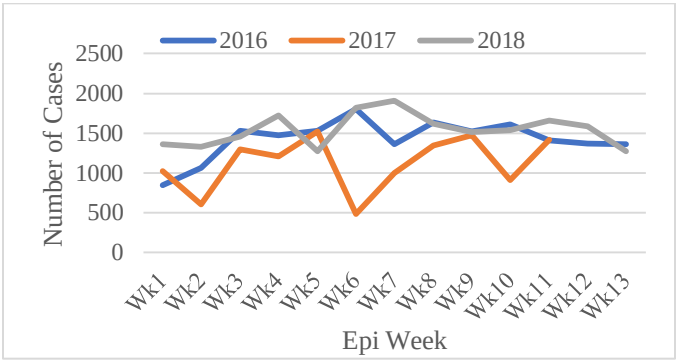

Figure 69: Trend of malaria cases, week 1-13/2016-2018, and Afar region

Malnutrition

Atotal of 222 (13.6% lower than last week) cases were reported with 33 inpatient and nodeaths in Afar region.Trend of malnutrition was decreasing compared with previous year.

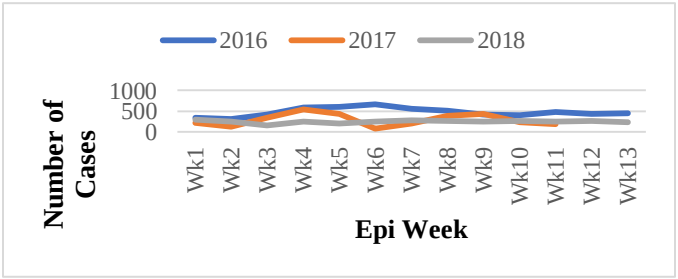

Figure 70: Trend of malnutrition from week 1-13/2016-2018, Afar region

Typhoid Fever

Atotal of 501(5.6% lower than last week) new typhoid fever cases were reported and with no inpatient cases and no death were reported.

Dysentery

A total of 166(2.9% lower than last week) new Dysentery cases were reported in week and no inpatient cases and deaths were reported.

Relapsing Fever

A total of 17 (76.5% higher than last week) new relapsing fever cases and without death were reported from 8 cases from Dulacha woreda & 9 cases from Dalol Woreda

Epidemic Typhus

A total of 33 (9.1 % lower than last week) new epidemic typhus cases and no inpatient cases and death were reported.

6. Laboratory: No laboratory sample received nationally.

7. Recommendation

- Completeness and timeliness rate was above minimum requirement. It increased from the last week. Regional PHEM should further improve and maintain highest regional Completeness and Timeliness by continuously encouraging and supervising lower reporting level
- Weekly surveillance data reaches at national level timely (on Thursday morning). So, it better should be continued.
- All woredas who has zero completeness of should strive to achieve higher completeness rates so that the data should be representative of the community.
- All variables that are left blank should be completely filled in the report (including zero reports) and the quality of data should be improved.
- Number of expected Heath Facilities should be consistent and if new health facility starts to report it should be updated officially.
- Relapsing fever continuously increasing in the region especially in Dulacha Woreda. The region should follow the status cases.

9.3. Coordinating Preparedness activity of Ebola Viral Disease (EVD) in Ethiopia

Introduction: Ebola Viral Disease (EVD) is one of numerous viral hemorrhagic fevers. It is a severe, often fatal disease in humans and non-human primates (such as monkeys, gorillas, and chimpanzees).

Ebola virus disease is caused by infection with a virus of the family Filoviridae, genus Ebola virus. When infection occurs, symptoms usually begin abruptly. There are five identified subspecies of Ebola virus. Four of the five have caused disease in humans, Ebola virus (Zaire Ebola virus); Sudan virus (Sudan Ebola virus); Taï Forest virus (Taï Forest Ebola virus, formerly Côte d'Ivoire Ebola virus); and Bundibugyo virus (Bundibugyo Ebola virus). The fifth, Reston virus (Reston Ebola virus), has caused disease in non-human primates, but not in humans.

The natural reservoir host of Ebola viruses remains unknown. However, on the basis of available evidence and the nature of similar viruses, researchers believe that the virus is zoonotic (animal borne) with bats being the most likely reservoir [1].

The most widespread epidemic of Ebola virus disease in history was recorded in West African countries in 2014/15. It had caused significant mortality, with reported case fatality rates of up to 70% and specifically 57–59% among hospitalized patients. Ebola virus disease was first described in 1976 in two simultaneous outbreaks in sub-Saharan Africa; this is the 26th outbreak and the first to occur in West Africa. The outbreak began in Guinea in December 2013 and then spread to Liberia and Sierra Leone. A small outbreak of twenty cases occurred in Nigeria and one case occurred in Senegal. Several cases were reported in Mali, and an isolated case occurred in the United Kingdom. Imported cases in the United States and Spain led to secondary infections of medical workers but did not spread further. Liberia was officially declared Ebola free on 9 May after 42 days without any further cases being recorded, but remains on high alert for new outbreaks. As of 24 May 2015, the World Health Organization (WHO) and respective governments have reported a total of 27,049 suspected cases and 11,149 deaths, though the WHO believes that this substantially understates the magnitude of the outbreak.

This is the second largest Ebola outbreak is ongoing in DRC; a dysfunctional healthcare system, a mistrust of government officials after years of armed conflict, and the delay in responding to

the outbreak for several months have all contributed to the failure to control the epidemic. Other factors include local burial customs that include washing of the body after death and the spread to densely populated cities [2].

Purpose of Ebola preparedness activities was due to the infectivity and high case fatality rate of EVD, early detection; timely specimen collection and processing, immediate isolation of new cases and meticulous contact tracing will limit new chains of transmission and have a significant impact on control of the epidemic. Due to the EVD outbreak in DRC, its surveillance was initiated at ports of entry (airports and land crossing areas) and in the general health system and at community level. The purpose of this surveillance is:

- For early and timely detection of suspected cases and/or outbreaks,
- Rapid investigation and early laboratory verification of the etiology,
- Contact tracing and follow up of contacts.

Case Definition of Ebola Virus Disease

Suspected case: A person who has both consistent symptoms and risk factors as follows: Clinical criteria, a person having fever of greater than 38.60C , and additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; and/or Epidemiologic risk factors within the past 21 days before the onset of symptoms, such as contact with blood or other body fluids or human remains of a patient known to have or suspected to have EVD; residence in or travel to an area where EVD transmission is active; or direct handling of bats or non-human primates from disease-endemic areas.

Probable Case is defined as illness in any person suspected to have EVD who was evaluated by a clinician or any person who died from suspected Ebola and had an epidemiological link to a person with a confirmed case but was not tested and did not have laboratory confirmation of the disease.

Confirmed Case must be confirmed via laboratory testing and a probable or suspected case is classified as confirmed when a sample from the person was positive for Ebola virus in laboratory testing [1].

Major activities done during preparedness period

Screening of Passengers at Ports of Entries With the evidence of DRC, which contribute to early detection of cases and prevent the importation of a the disease.

We did the following major activities on passengers screening;

- Raised awareness of EVD and disseminate information among all relevant stakeholders at Addis Ababa Bole International airport (ports of entry)
- We sensitized public health authorities at ports of entry Provided a training on EVD to health workers
- Gave onsite orientation on the Case definition of EVD and infection prevention for all health workers working on screening of passengers
- Prepared Ebola Treatment Unit In Bole Chefa
- We have done daily drill and exercise in ETU
- We followed passengers from those EVD affected country to Ethiopian on daily basis

Strength of EVD Preparedness

Screening of all passengers from Ebola affected country at Airport and ports f entry

Daily follow up of the travelers and residents from those affected country foe 21 days

Preparation of Ebola treatment units and isolation centers in Addis Ababa and most regions

Awareness creation for the community through hotline (8335) and training for health workers at deferent levels

Weakness EVD preparedness

Passengers out of Addis were not followed well

No system in place for passengers of invalid address

Follow up system was not cascaded to the regions; done only at federal level

Recommendations

The Federal Ministry of Health or EPHI should cascade the follow up system to all the regions including Addis Ababa so that passengers out of Addis Ababa were also not missed

Some passengers were reported with invalid address or purposely changed their address not to be followed. Therefore, EPHI has to do in collaboration with police for addressing those who refused

Figure 71: Ebola Treatment unit in Bole Chafe, Addis Ababa, Ethiopia, 2019

References

1. Ethiopian Public Health Institute, Ebola viral disease interim guideline, 2014.

2. CDC, Ebola virus epidemic in West Africa. 2015.

9.4. Regional Health Bureau Public Health Emergency Operation Center (PHEOC) Establishment Report 2019

Introduction

An emergency operations center (EOC) is a physical location or virtual space in which designated emergency management functions are performed, supported by appropriate legislation and regulations, and designed and resourced with sustainability in mind. EOCs play a vital role in the coordination of information and resources for efficient and effective responses. Such an operations center may be a temporary facility or may be established in a permanent location.

In Ethiopia, PHEOC Launched in August 2017, Located at Ethiopian Public Health Institute, to coordinate Acute Watery Diarrhea (AWD) outbreak response occurred in multiple regions. Previously EPHI planned to expand Public Health Emergency Operation Center (PHEOC) to all regions.

Based on EOC expansion plan to region, EPHI work together with regions, some region had already established EOC last month in the first round. Ethiopian Public Health Institute (EPHI) and WHO deployed team to Afar and Tigray regional Health Bureau to established Public Health Emergency Operation Center (PHEOC) in order to effectively and efficiently control public health threats by ensuring maximum coordination and managing resources (material and human) and avoiding duplicated and divided efforts.

2. Objective

To support establishment of Public Health Emergency Operation Center, room arrangement, computer installation, SOP adaptation and to provide orientation on IMS functions in Afar and Tigray regional Health Bureau from 11, February -23 March, 2019.

3. Activities performed on PHEOC establishment in Tigray RHB

3.1. Team Deployment and Briefing purpose of PHEOC establishment for RHB

Firstly, 12 February 2019, we discussed with Regional Health Bureau (RHB) Deputy Head, Public Health Emergency Management (PHEM) case team coordinator and HPDP core process Head on purpose of PHEOC establishment and .we briefed them about IMS Structure and its function during emergency. We discussed with them to provide adequate room for RHB EOC.

We also provided Public health Emergency Operation guide line and discussed on its adaptation according to regional context.

Then on second round we went to Mekelle on 10 March, 2019 afternoon. And on 11 March 2019, we discussed with Regional Health Bureau (RHB) Head and Deputy Head, Public Health Emergency Management (PHEM) case team coordinator and HPDP core process Head on purpose of PHEOC establishment and we briefed them about IMS Structure and its function during emergency. We also provided Public health Emergency Operation guide line and discussed on its adaptation according to regional context.

3.2. Room setup and furniture maintenance

We had establishment EOC, give IMS orientation, room setup and other necessary preparations was performed in both region during respective period.. We provide brief orientation for both regional PHEM staffs about IMS structures and functions and EOC Guide line/ sop adaption

3.3. Computer Installation on RHB EOC

Both regional health Bureau public health emergency operation center room was arranged accordingly and computers were installation was done. Afar And Tigray RHB PHEOC common email afarrhbeoc@gmail.com and tigrayrhbeoc@gmail.com were created respectively and notified to all stake holders about establishment.

3.4. Afar RHB EOC Permanent Staff Assignment

We discussed with RHB Deputy Head HPDP Core process Head on staffing of Public Emergency Operation Centers (PHEOC). RHB Deputy Head assigned Wassie Sedik as EOC manager and assigned another four Public Health Emergency Management PHEM officers as watch staffs.

3.4.2. Tigray RHB EOC Permanent Staff Assignment

We discussed with RHB Deputy Head PHEM Core process Head on staffing of Public Emergency Operation Centers (PHEOC). Samuel was assigned as EOC manager and other three PHEM officers were assigned as watch staffs.

We also listed surge staff roster for IMS functions and assigned them on IMS Structure. We also discussed on EOC guide line adaptation to regional context.

3.5. Orientation PHEOC IMS and adaptation of guideline

We discussed on PHEOC guide line or SOP adaptation with regional Health Bureau Heads and relevant RHB officers. And orientation on IMS functions was provided to 20 afar and 18 Tigray region relevant officers who will have contribution on core IMS functions of EOC. We also discussedon EOC guide line adaptation to regional context.

4. Challenges and action taken

EPHI provided EOC furniture to Tigray region wrongly distributed to Humera blood bank and other purposes. We discussed with RHB head to replace the furniture. RHB head agree to replace

Double PHEM structure was found in Tigray region. We recommend integrating both PHEM structures in the region as one unit to deliver better performance.

5. Conclusion

PHEOC establishment to regional health Beauro was successfully completed in both regions up to 15 March, 2019. We supported RHB on room site selection and set up, on furniture arrangement and computer installation, on orientation and mentoring of relevant officer on IMS functions and on EOC guideline adaptation to regional context. Finally, we meet both RHB Deputy Head and HPDP Core process Head debrief on activities performed. We completed our mission and return back to Addis Ababa on March 17, 2019

9.5. Short Term Training and work shop

1. Participated on PIP and EVD Workshop conducted from April 11-16, 2019.
2. HPAI Tabletop Simulation Exercise Workshop conducted from-May 24-25, 2019
3. Training given Front line Field Epidemiology for Afar Region PHEM officers Nazareth and Ardi Hotel Samara (three round)
4. Training given on Ebola Case management and Surveillance for health workers assigned on Ebola screening and ETU in Bin Hotel, Debrezit
5. Training attended on ArcGIS by EPHI-CDC jointly
6. Training attended on EOC by EPHI-CDC jointly
7. Training given on Cholera cases management and surveillance in Awash sebet in December 2018.
8. Training given on PHEM basic level TOT for university lectures in May 13-17, 2019

Annex1: Questionnaires for Case - control study on Measles outbreak Afar Region, September 2018

Patient Name_____Respondent Status: A. Case B. Control

Date of data collection_____

Region_____ Zone_____ Woreda_____ Kebele _____

Got _____ Phone_____ Location: Longitude: _____ Latitude: _____

I. Socio-demographic Characteristics

S.No.	Questions	Alternatives
1.1	Sex	1. Male 2. Female
1.2	Age	years_____ Months_____
1.3	Occupation of the patient	1. Farmer 5. Daily laborer 2. House wife 6. Merchant 3. Student7. Gov't employee 4. Unemployed 8. Other (specify)_____
1.4	Family Occupation	1. Farmer 5. Daily laborer 2. House wife 6. Merchant 3. Student7. Gov't employee 4. Unemployed 8. Other (specify)_____
1.5	Educational level of the patient	1. Illiterate 4. Secondary 2. Read and write 5. Above secondary 3. Elementary 6. Under school age
1.6	Educational level of the family	1. Illiterate 4. Secondary 2. Read and write 5. Above secondary 3. Elementary
1.7	Marital status of the patient	1. Single 4. Widowed 2. Married 5. Separated 3. Divorced
1.8	Family size	_____
1.9	Is there any sick person with rash, fever, running nose In the family?	1. Yes 2. No
1.10	If yes, number of sick person	

II. Clinical History of Diseases:

2.1	What was the symptom?	1. fever 2.Rash 3.cough 4.coryza (runny nose), 5. Conjunctivitis (red eyes) 6. Others_____
2.2	ONLY if complication	a) Pneumonia: 1. yes 2. no b) Cornea: 1. yes 2. no c) Blindness: 1. yes 2. no d) Convolution 1. Yes 2. no e) Otitis media (ear discharge): 1. yes 2. no f) Diarrhea: 1. yes 2. no g) Feeding problem 1. Yes 2. no
2.3	Date of onset of rash	_____/____/_____
2.4	Duration of rash_____	
2.5	Date seen at health facility	____/_____/____
2.6	Illness duration before visiting the health facility	_____in days/hours
2.7	Did you (he/she) take treatment?	1.Yes 2.No
2.8	If yes, treatment taken	1.ORS 2.Antibiotics 3.Vitamin A 4.Supplementary food 5. TTC ointment 6.Anti pyretics 7.Others given_____
2.9	Did you recovered after the treatment?	1.cure 2. partially 3. deteriorated/disabled 4.death

III. Risk factor

3.1	Did you ever vaccinated for measles?	1. Yes 2. No 3. Unknown 4. Not applicable
	Is there vaccination card	1. Yes 2. No
	If yes last vaccination date	1.patient recall____/____/____dd/mm/yy 2. Vaccination card____/____/____dd/mm/yy 3. I don't remember
3.2	Number of vaccine doses received	1.one dose 2. two dose 3.three and above
3.3	Age at first vaccination.	_____
3.4	If not vaccinated why?	1. lack of knowledge about vaccination campaign, 2. absence during vaccination campaign, 3. Religious exemptions 4. other, specify
3.5	Did you have any travel history 7-18 days to areas with active measles cases before onset of symptoms?	1.Yes 2.No
	If Yes, (where) place of travel	1.School 2.Neighbor 3.Market 4.Other_____
3.6	Did you contact with a person with measles symptoms within the last 2- 3 weeks?	1.Yes 2.No
3.7	Do you have any travel history four days before and after rash onset	1.Yes 2.No If Yes where _____
3.8	Do you have any contact history with someone else four days before and after rash onset	1.Yes 2.No If Yes with whom _____
3.9	Do you know modes of transmission for measles?	1.Yes 2.No 3. If yes specify_____

3.10	Nutritional status of the cases/control	1. Normal 2. Moderate 3.Severely malnourished
3.11	What is the estimated area of the house?	_____
3.12	House condition?	1. ventilated 2. not-ventilated
3.13	Distance from house to HC?	1.greater than 5 km 2. equal or less than 5 km
3.14	Where did you go first when you get ill?	1. Health Facility 2. Traditional Healers 3. Holy Water 4. Stayed at home 5. Other :(Specify)_____
3.15	How do you think people get measles?	1. Contact with a virus from ill person 2. From God 3. Bad attitude of other people 4. Other(Specify)
3.16	Do you Know measles is vaccine preventable?	1. Yes 2. No 3. Don't Know
3.17	Who do you think can be affected by measles?	1. Children of aged less than 5 years 2. Children of aged less than 18 years 3. Women of any ages 4. Any age groups of both male and women 5. Other (specify):_____
3.18	How do you think measles can be cured?	1. Using modern medicine 2. Using traditional Medicine 3. Holy water 4. By feeding nutritious foods 5. Keeping the sick person indoor 6. Other(Specify)_____

Annex 2: Check list to evaluate the surveillance system of Addis Ababa city Admnistration-2018

2.1. Addis Ababa Health Beauro, Sub city Health office and Woreda Health Office

Background:

Date----------Assessment team name: _____

Interviewer name: _____Respondent name & position: ----------

Surveillance System: _____Catchment population_____

Address: Office no _____ Cell phone no _____ e-mail _____

PART ONE:

A. Communication and reporting system assessment

1. Which communication material did you have? A. E-mail B. wired phone C. mobile D. radio E. fax other_____

Did you have address of Health Center/ PHEM officers? A. Yes B. No

2. How frequently you communicate with the 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 others----

3. When are you expected to send weekly report to respective higher PHEM unit? A. Monday B. Tuesday C. Wednesday D. Thursday E. Friday F. Saturday G. Sunday

4. When are you expected to receive weekly report from PHEM officers? A. Monday B. Tuesday C. Wednesday D. Thursday E. Friday F. Saturday G. Sunday

5. How is the regional/Sub city PHEM communicating the woreda PHEM officers in case of immediately reportable diseases? A. by -email B. by phone C. by fax D. regular weekly report E. others

6. Did you send summary or short report to the administrative /program leaders or other responsible organs?A. Yes B. No

7. On planning, prevention and control activities addressing important issues at community level that have arisen through the surveillance system? A. Yes B. No
8. If answer for Q7 is yes to whom did you send? ----------

B. Assessment of availability of Surveillance Documentation, Registers, and Forms

1. Is there a national manual for malaria and Measles surveillance? A. Yes B. No C. NA
2. Did you have National Guide line for PHEM? A. Yes B. No C. Not Applicable
3. Did you have standard case definition for all country priority diseases? (Measles, Malaria) A. Yes B. No C. NA
4. Was the case definition posted? A. Yes B. No
5. If answer for Q4 is No, for which disease(s) did you lack the case definition?
   - ----------
   - ----------
   - ----------
6. Did you have case based reporting formats for out breaks? A. Yes B. No C. NA
7. Was there guide line for specimen collection, handling and transportation to the next level? A. Yes B. No C. NA
8. Did you have line list for reporting outbreaks? A. Yes B. No C. Not Applicable

C. Data analysis, Computer skill and training assessment

1. Had you trained on surveillance system? A. Yes B. No
2. If answer for Q1 is yes

A) when--------

B) Topic----------

C) For how long----------

3. Did you give any onsite orientation about surveillance system for PHEM focal persons?

A. Yes B. No

4. Was data compiled? A. Yes B. No

5. Did you have computer? A. Yes B. No
6. Is it functional)? A. Yes B. No
7. How the data entry and compilation is accomplished? A. Manual B. Computer C. other---
8. Did you have computer skill on A. MS word B. MS excel C. MS power point D. Epi-info?
9. Did you analyze data of the surveillance system? A. Yes B. No
10. If answer for Q9 is yes, did you describe data by time, place, and person: □Yes □No
11. Did you have denominators for data analysis? A. total pop B. male C. female D. <5yrs
12. Please indicate the frequency of your data analysis. A. weekly B. every two week

C. Monthly D. quarterly E. every 6 month F. annually G. No regular time

13. Did you notify the results of your analysis to the higher level PHEM? A. Yes B. No
14. Did you notify the results of your analysis to the lower level PHEM? A. Yes B. No

D. Epidemic response and preparedness assessment

1. Did you have plan for epidemic response and preparedness? A. Yes B. No
2. Did you have emergency stocks of drugs and supplies? A. Yes B. No
3. If answer for Q2 is No, how did you control epidemics? ----------
4. Had you experienced shortage of drugs, vaccines and supplies in 2010 EFY? A. Yes B. No
5. Was an epidemic management committee built in your office? A. Yes B. No C. Not Applicable
6. Did the epidemic management committee have regularly scheduled meeting time? A. Yes B. No
7. Was Rapid response team (RRT) built in your office? A. Yes B. No C. Not Applicable
8. Did the RRT have regularly scheduled meeting time during epidemics? A. Yes B. No
9. Did you have case management protocol for epidemic prone diseases? A. Yes B. No C. NA
10. Did your PHEM have multi sectorial emergency preparedness and response task force?

A. Yes B. No C. NA

11. Were partners working together with your office on emergencies? A. Yes B. No
12. If answer for Q11 is yes, what type of supports did they give to your office?----------

13. Was there a budget for epidemic response? A. Yes B. No

14. Who had the authority to mobilize the emergency finance?

A. Health Bureau head B. PHEM case teamleader C. PHEM officer D. Others----------

15. Had you a vehicle assigned for emergencies (PHEM)? A. Yes B. No C. Not applicable

16. If answer for Q15 is No, how did you address emergencies?

E. Outbreak investigation and case confirmation assessment

1. Had you investigated any outbreak in 2010 EFY? A. Yes B. No, list if any

2. Did you have outbreak investigation check list? A. Yes B. No

3. If answer for Q2 is No, how did you know possible factors for the outbreak ----------

4. Where was laboratory confirmation of cases? A. regional lab B. Hospital C. EPHI D. HC E. other----------

5. Who was responsible to investigate an outbreak? A. RRT B. HEWs C. Health Bureau Staffs D. experts organized randomly health facility staffs other----------

6. Had you faced any challenge in outbreak investigation in 2010 EFY? A. Yes B. No

7. If answer for Q6 is yes,

a) List the challenges ----------

---

b) List the alternatives that you take to tackle the challenges ----------

---

F. Supervision and feedback assessment

1. Did you have supervision plan in 2010 EFY? A. Yes B. No

2. If answer for Q1 is No, how did you supervise? ----------

3. If for Q1 is yes, did you supervise according to your plan in 2010 EFY? A. Yes B. No

4. If answer for Q3 is No, what is the reason? ----------

5. If answer for Q3 is yes, how many times did you supervise 2010 EFY? _____

6. Had you reviewed about surveillance practice by higher level supervision? A. Yes B. No

7. Did you have regular supervision checklist? A. Yes B. No
8. If answer for Q7 is No, how did you supervise the health facilities? ----------
9. Were you supervised by higher level officers in 2010 EFY? Yes No
10. If answer for Q9 is yes how many times in 2010 EFY? ----------
11. Did you send feedback of your supervision to the supervised /indicating their strong and weak sides? A. Yes B. No
12. If answer for Q11 is No, why? ----------
13. If answer for Q11 is yes, for how many feedbacks did you send in 2010 EFY.
14. Had you received feedback from higher level supervisors in 2010 EFY? A. Yes B. No
15. If answer for Q14 is yes how many feedbacks did you received in 2010 EFY? ----------
16. Had you faced any challenge on supervision and feedback in 2010 EFY? A. Yes B. No

PART-TWO

Is The Surveillance System Helpful?

1. To detect outbreaks early on time to permit accurate diagnosis? A. Yes B. No
2. To estimate the magnitude of morbidity and mortality? A. Yes B. No
3. Permit assessment of the effect of prevention and control programs? A. Yes B. No
4. To estimate research intended to lead to prevention and control? A. Yes B. No

Describe Each System Attributes:

I. Simplicity:

1. Is the case definition easy for case detection by all level health professionals? A. Yes B. No
2. Does the surveillance system allow all levels of professionals to fill data? A. Yes B. No
3. Does the surveillance system help to record and report data on time? A. Yes B. No
4. Does the surveillance system have necessary information for investigation? A. Yes B. No
5. Does the surveillance system allow updating data on the cases? A. Yes B. No
6. How long does it take to fill the format? A. <5 min B. 5 to 10 min C. 10 to15min D. >15 min
7. How long does it take to have laboratory confirmation? ----------

II. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? A. Yes B. No
2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? A. Yes B. No, Add your explanation----------
3. Is the system easy to add new variables? A. Yes B. No
4. Is the surveillance system easy to integrate with other systems? A. Yes B. No
5. Is the surveillance system easy to add new disease on report? A. Yes B. No
6. Is the system easy to add new information technology? A. Yes B. No

III. Data quality

1. Are all reported forms Complete? A. Yes B. No
2. If answer for Q1 is No, how many unfilled spaces are in your 2010 EFY report? ----------
3. Percentage of unknown or blank responses to variables from the total reports of 2010 EFY report--
4. Percent of reports which are complete (that is with no blank or unknown responses) from the total reports ----------
5. Is the recorded data clear to read and understand? A. Yes B. No
6. If answer for Q5 is No, how many records are not clear/are difficult to understand in 2010 EFY report? ----------
7. Percent of records which are difficult to read/ understand. ----------

IV. Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? A. Yes B. No

2. If yes, how many are active participants (of the expected)? ----------

3. If No, what is the reason for their poor participation in the surveillance activity?

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

B) No feedback / or recognition given by the higher bodies for their contribution

C) Reporting formats are difficult to understand

D) Report formats are time consuming

E) Other: ----------

4. Were all participants using the standard case definition to identify cases? A. Yes B. No

5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? A. Yes B. No

6. Were all the health professionals aware about the surveillance system? A. Yes B. No

7. Was all PHEM officers send report on time? A. Yes B. No

V. Representativeness

1. Was the surveillance system enabled to follow the health and health related events in the whole community? A. Yes B. No
2. If answer for Q1 is no, who do you think is well benefited by the surveillance system?
A. The urban B. the rural C. both
3. Are all the Socio demographic variables included in the surveillance reporting format? A. Yes B. No
4. If the answer for Q3 is No, which variable?

A) Sex B) age group C) ethnic group
D)religion

VI. Timeliness

1. Are all reporting sites reporting on time? A. Yes B. No
2. Percent of reporting sites that report on time. ----------

VII. Completeness

1. Are all reporting sites reporting? A. Yes B. No

2. Percent of respective PHEM unit that send report of each week in 2010 EFY. ----------

VIII. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance? A. Yes B. No
2. Was there lack of resources that interrupt the surveillance system? A. Yes B. No

3. Was there any time /condition in which the surveillance is not fully operating? A. Yes B. No

4. If the answer for Q3 is yes, explain why? ----------

2.2. Health Facility Level Questionnaire for Malaria surveillance System Evaluation

Background:

Town/woreda _____Health center/Hospital Name_____

Catchment population _____Respondent(s) _____

Address: Office no _____ Cell phone no _____e-mail _____

PART ONE:

A. Communication and reporting system assessment

1. Which communication material did you have? A. E-mail B. wired phone C. mobile D. radio E. fax G. other----------

2. Did you have address of Sub city/woreda PHEM officers? A. Yes B. No

3. How frequently you communicate with the Health Bureau/sub city 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----------

4. Did you have address of HEWs? A. Yes B. No

5. How frequently you communicate with the HEWs on emergencies and other daily activities? A. daily B. weekly C. every 2 week D. monthly E. quarterly F. every 6 month G. yearly others--- ----------

6. When are you expected to send weekly report to respective higher PHEM Unit? A. Monday B. Tuesday C. Wednesday D. Thursday E. Friday F. Saturday G. Sunday

7. When are you expected to receive weekly report from HEW? A. Monday B. Tuesday C. Wednesday D. Thursday E. Friday F. Saturday G. Sunday

8. How is the Health Center/Hospital communicating the HEWs in case of immediately reportable diseases?

A. by email B. by phone C. by fax D. regular weekly report E. others

9. 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? A. Yes B. No

10. If answer for Q9 is yes to whom did you send? ----------

B .Assessment of availability of Surveillance Documentation, Registers, and Forms

1. Did you have National Guide line for PHEM? A. Yes B. No C. Not Applicable
2. Did you have standard case definition for all country priority diseases? A. Yes B. No C. NA
3. Was the case definition posted? A. Yes B. No
4. If answer for Q10 is No, for which disease(s) did you lack the case definition?
5. Did you have case based reporting formats for out breaks? A. Yes B. No C. NA
6. Was there national manual for surveillance? A. Yes B. No C. NA
7. Was there guide line for specimen collection, handling and transportation to the next level? A. Yes B. No C. NA
8. Did you have line list for reporting outbreaks? A. Yes B. No C. Not Applicable

C .Data analysis, Computer skill and training assessment

1. Had you trained on surveillance system? A. Yes B. No

2. If answer for Q1 is yes a) when---------- ? b) Topic---------- ? c) For how long? ----------

3. Did you give any onsite orientation about surveillance system for PHEM focal persons?

A. Yes B. No Was data compiled? ? A. Yes B. No

4. Did you have computer? ? A. Yes B. No
5. Is it functional)? A. Yes B. No

6. How the data entry and compilation is accomplished? A. Manual B. Computer C. other---
7. Did you have computer skill on A. Ms word B. Ms excel C. MS power point D. Epi-info
8. Did you analyze data of the surveillance system? A. Yes B. No
9. If answer for Q9 is yes, did you describe data by time, place and person: A. Yes B. No
10. Did you have denominators for data analysis? A. total pop B. male C. female D.<5
11. Please indicate the frequency of your data analysis. A. weekly B. every two week
C. Monthly D. quarterly E. every 6 month F. annually G. No regular time
12. Did you notify the results of your analysis to the higher level PHEM? A. Yes B. No
13. Did you notify the results of your analysis to the lower level PHEM? A. Yes B. No

D .Epidemic response and preparedness assessment

1. Did you have plan for epidemic response and preparedness? A. Yes B. No
2. Did you have emergency stocks of drugs and supplies? A. Yes B. No
3. If answer for Q2 is No, how did you control epidemics? ----------
4. Had you experienced shortage of drugs, vaccines and supplies in 2010 EFY? A. Yes B. No
5. Was an epidemic management committee built in your office? Yes No Not Applicable
6. Did the epidemic management committee have regularly scheduled meeting time? A. Yes B. No
7. Was Rapid response team (RRT) built in your office? A. Yes B. No C. Not Applicable
8. Did the RRT have regularly scheduled meeting time during epidemics? A. Yes B. No
9. Did you have case management protocol for epidemic prone diseases? A. Yes B. No C. NA
10. Did your PHEM have multi sectorial emergency preparedness and response task force? A. Yes B. No C. NA
11. Were partners working together with your office on emergencies? A. Yes B. No
12. If answer for Q11 is yes, what type of supports did they give to your office?
13. Was there a budget for epidemic response? A. Yes B. No
14. Who had the authority to mobilize the emergency finance? Health center head experts other---

15. Had you a car assigned for emergencies (PHEM)? A. Yes B. No C. Not applicable

16. If answer for Q15 is NO, how did you address emergencies?

E .Outbreak investigation and case confirmation assessment

1. Had you investigated any outbreak in 2010 EFY? A. Yes B. No, list if any

2. Did you have outbreak investigation check list? A. Yes B. No

3. If answer for Q2 is No, how did you know possible factors for the outbreak?

4. Where was laboratory confirmation of cases? A. regional lab B. Hospital C. EPHI D. HC E. other

5. Who was responsible to investigate an outbreak? A. RRT B. HEWs C. staffs of Health Bureau D. experts organized randomly E. health facility staffs F. other----------

6. Had you faced any challenge in outbreak investigation in 2010 EFY? A. Yes B. No

7. If answer for Q7 is yes,

a) List the challenges ----------

---

b) List the alternatives that you take to tackle the challenges ----------

---

F. Supervision and feedback assessment

1. Did you have supervision plan in 2010 EFY? A. Yes B. No

2. If answer for Q1 is No, how did you supervise? ----------

3. If for Q1 is yes, did you supervise the HEWs according to your plan in 2010 EFY? A. Yes B. No

4. If answer for Q3 is No, what is the reason? ----------

5. If answer for Q3 is yes, how many times did you supervise each HEW in 2010 EFY? _____

6. Had you reviewed about surveillance practice by higher level supervision? A. Yes B. No

7. Did you have regular supervision checklist? A. Yes B. No

8. If answer for Q7 is No, how did you supervise the HEWs? ----------

9. Were you supervised by higher level officers in 2010 EFY? A. Yes B. No

10. If answer for Q9 is yes how many times in 2010 EFY? ----------

11. Did you send feedback of your supervision to the HEW commenting/indicating their strong and weak sides? A. Yes B. No

12. If answer for Q11 is No, why? ----------

13. If answer for Q11 is yes, for how many HEW did you send a feedback in 2010 EFY_____

14. Had you received feedback from higher level supervisors in 2010 EFY? A. Yes B. No

15. If answer for Q14 is yes how many feedbacks did you received in 2010 EFY? ----------

16. Had you faced any challenge on supervision and feedback in 2010 EFY? A. Yes B. No

PART-TWO

Is The Surveillance System Helpful?

1. To detect outbreaks early on time to permit accurate diagnosis? A. Yes B. No

2. To estimate the magnitude of morbidity and mortality? A. Yes B. No

3. Permit assessment of the effect of prevention and control programs? A. Yes B. No

4. To estimate research intended to lead to prevention and control? A. Yes B. No

Describe Each System Attributes:

1. Simplicity:

1. Is the case definition easy for case detection by all level health professionals? A. Yes B. No

2. Does the surveillance system allow all levels of professionals to fill data? A. Yes B. No

3. Does the surveillance system help to record and report data on time? A. Yes B. No

4. Does the surveillance system have necessary information for investigation? A. Yes B. No

5. Does the surveillance system allow updating data on the cases? A. Yes B. No

6. How long does it take to fill the format? A. <5 min B. 5 to 10 min C. 10-15min D. >15 min

7. How long does it take to have laboratory confirmation? ----------

2. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? A. Yes B. No
2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? A. Yes B. No, Add your explanation----------
3. Is the system easy to add new variables? A. Yes B. No
4. Is the surveillance system easy to integrate with other systems? A. Yes B. No
5. Is the surveillance system easy to add new disease on report? A. Yes B. No
6. Is the system easy to add new information technology? A. Yes B. No

3. Data quality

1. Are all reported forms Complete? A. Yes B. No
2. If answer for Q1 is No, how many unfilled spaces are in your 2010 EFY report? ----------
3. Percentage of unknown or blank responses to variables from the total reports of 2010 EFY report--
4. Percent of reports which are complete that is with (no blank or unknown responses) from the total reports ----------
5. Is the recorded data clear to read and understand? A. Yes B. No
6. If answer for Q5 is No, how many records are not clear/are difficult to understand in 2010 EFY report? -
7. Percent of records which are difficult to read/ understand. ----------

4. Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? A. Yes B. No
2. If yes, how many are active participants (of the expected)? ----------
3. If No, what is the reason for their poor participation in the surveillance activity?

A) Lack of understanding of the relevance of the data to be collected
B) No feedback / or recognition given by the higher bodies for their contribution
C) Reporting formats are difficult to understand
D) Report formats are time consuming
E) Other: ----------

4. Were all participants using the standard case definition to identify cases? A. Yes B. No

5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? A. Yes B. No

6. Were all the health professionals aware about the surveillance system? A. Yes B. No

7. Was all PHEM officers send report on time? A. Yes B. No

5. Representativeness

1. Was the surveillance system enabled to follow the health and health related events in the whole community? A. Yes B. No

2. If answer for Q1 is no, who do you think is well benefited by the surveillance system? A. The urban B. the rural C. both

3. Are all the Socio demographic variables included in the surveillance reporting format? A. Yes B. No

4. If the answer for Q3 is No, which a) Sex---- b) age group---C) ethnic group----d) religion---- is less Represented?

6. Timeliness

1. Are all reporting sites reporting on time? A. Yes B. No

2. Percent of reporting sites that report on time. ----------

7. Completeness

1. Are all reporting sites reporting? A. Yes B. No

2. Percent of HEW that send report of each week in 2010 EFY. ----------

8. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance? A. Yes B. No

2. Was there lack of resources that interrupt the surveillance system? A. Yes B. No

3. Was there any time /condition in which the surveillance is not fully operating? A. Yes B. NoIf the answer for Q3 is yes, explain why? ----------

Annex 3: Data collection tools for Woreda 06 Nifas silk Lafto sub city, Addis Ababa city Administration health profile description, 2018

1. Historical Aspects of the area

How and why the name_____

How was the district formed? _____

Any other historical aspect_____

2. Geographic and Climatic conditions

Total Area of the District _____

Altitude _____Latitude_____

Longitude _____Average Annual rain fall _____

Average Annual temperature_____

Boundaries North---------- South----------

East---------- West----------

Climatic zone

dega--------% woynadega-------%kola------% bereha---------%

3. Socio Demographic information

Total Population _____Male_____Female_____

Urban_____ Rural_____

Sex ratio (Male to Female) _____Women child bearing age (15-49) years_____

Percentage of pregnant women_____ Annual growth rate----------

4. Population size by religion

Orthodox_____Catholic_____Protestant_____Muslim_____Others_____

Ethnic composition -%----------Estimated Population size by Kebeles in 2017/18

5. Administrative setup

Total number of Kebeles(if it applies): _____

Urban Kebele _____Rural Kebele _____

Supporting NGOs----------

6. Health status

Number of health facilities, 2017/18

S.N	Type of Health facility	Number
1	Hospital	
2	Health center	
3	Private clinic	
4	Pharmacy	
5	Drug store/Rural drug vender	
6	Diagnostic Laboratories	
8	Health posts	

7. Man power of the Woreda health office and health facilities, 2017/18

S.N	Type	Number		
		No		Remark
		Government	Private	
1	Physicians			
2	Health officers			
3	Laboratory technician/technologist			
4	Pharmacy technician/Pharmacist			
5	Nurses			
6	Midwife			
7	X-Ray technician			
8	ENHS			
9	HEWs			
10	TBA			
11	Others			

8. Ratio of health facility and professional to population 2017/18

S.N	Description	Ratio
1	Hospital: population	
2	Health center: population	
3	Health post: population	
4	Physician; population	
5	Health officer: population	
6	Nurse: population	
7	Midwife: population	
8	HEW: population	

9.

10. Health service institutions and infrastructures

	Type of institution		No of institutions	Remark
1	Number of hospitals	With sustainable 24 hours electric power supply		
		without sustainable/ 24 hour /electric power		
		with telephone service (cable based/mobile)		
		without telephone service (cable based/mobile)		
		with piped water supply		
		Without piped water supply		
		No of hospitals which have vehicles		
2	Number of health centers	with sustainable/ 24 hour /electric power		
		without sustainable/ 24 hour /electric power		
		with telephone service (cable based/mobile)		
		without telephone service (cable based/mobile)		
		with piped water supply		
		Without piped water supply		
		No of HC which have vehicle		
3	Health posts	with sustainable/ 24 hour electric power		
		without sustainable/ 24 hour electric power		
		with telephone service (cable based/mobile)		
		With out telephone service (cable based/mobile)		
		with piped water supply		
		Without piped water supply		
		No of health posts which have vehicle		

10. Top causes of morbidity and mortality 2017/18

A. Top ten leading causes of OPD visit (morbidity)

S. N	Adult	Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

11. Top ten causes of deaths (mortality).

S.N	Adult	Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Vital statistics 2017/18

CBR_____CDR_____

NMR_____PNMR_____

IMR_____MMR_____

GR_____

12. MCH and EPI coverage of the district 2017/18

S.N	Description	Coverage	Remark
1	ANC 1 coverage		
2	ANC 2 coverage		
3	Institutional (skilled) delivery coverage		
4	PNC coverage		
5	BCG coverage		
6	Measles vaccine		
7	OPV		
8	Penta1		
9	Penta3		
10	Full immunization coverage%		
11	Contraceptive acceptance rate		
12	TT2 coverage for pregnant		
13	TT2 coverage for non pregnant		

13. Environmental sanitation and availability of safe drinking Water 2017/18

S.N	Description	Number (%)
1	Latrine utilization coverage	
2	Number of house hold with latrine	
3	Safe water supply coverage	
4	Number of Kebeles accessed to safe water supply	

14. Endemic Diseases

Prevalence of TB/Leprosy: 2017/18

S.N	Description		Population no. (%)
1	Prevalence of TB		
2	Pulmonary TB	Smear positive	
		Smear negative	
3	Extra PTB		
4	TB detection rate		
5	TB Rx completion rate		
6	TB cure rate		
7	TB Rx success rate		
8	TB defaulter rate		
9	Death on TB Rx		
10	Total TB patients screened for HIV		
11	HIV prevalence rate among TB cases		HIV/TB &HIV=

12	Prevalence of Leprosy	

HIV/AIDS IN 2017/18

S.N	Activities	Male	Female	Total	Remark
1	Total number of people screened for HIV				
2	VCT				
3	PICT				
4	PMTCT				
5	HIV Prevalence				
6	Total PLWHIV				
7	On ART				
8	No. of pregnant mothers on ART	Not applicable			
9	No. of pregnant mothers Pre ART	Not applicable			
10	Condom Distribution				
11	Health education coverage				
	Number of OVC				

Topics for health education----------

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15. Socio economic conditions 2017/18

Education and school Health

S. N	Type of School	# schools	# teachers			# students			student school drop out	Female Student School Drop out
			male	Female	total	male	female	Total		
1	Primary									
	1-4									
	5-8									
	1-8									
2	Secondary									
	9-10									
	11-12									
	9-12									
3	Others (Take note)*									
	Total									

*Private Schools e.g. Nursery…

School health activities:

Schools with water supply_____ Schools with functional latrines _____

Schools with HIV/other Health clubs_____ Literacy ratio_____

Health education----------

16. Income

Main source of income _____No. of the population committed in:

Government employee_____ Trade _____

Hotel and catering _____Others (specify) _____

Yearly income per house hold_____Average income per capita_____

Social aspects

Number of youth clubs_____Number of public libraries_____

17. Communication and Utilities

How many of the health facilities and Kebeles have access to:

Transportation: Kebeles _____ (%) Telecommunication: Kebeles _____ (%)

Health facility_____ (%) Electric power: Kebeles _____ (%)

18. Health Sector Expenditure and Financing 2017/2018

	Source	**2017**	**2018**
1	Total Woredat Budget (Birr)		
2	Allocated to Health Sector (Birr)		
3	Total Per Capital Health Expenditure(Birr)		

*Name of NGOs which Support the health Sector:_____

17.1 Health sector Budget Distribution (2006- 2010 EFY)

S.N	**Health institution**	**2016**		**2017**		**2018**	
		Recurrent (birr)	Salary (birr)	Recurrent (birr)	Salary (birr)	Recurrent (birr)	Salary (birr)
1							
2							
3							

4							
5							
6							

*Salary = Salary + Allowance

19. Disaster situation in the district 2017/2018.

Was there any disaster (natural or manmade) in the district in the last two years?

(Specify) _____

Any recent disease outbreak/other public health emergency?

Yes (specify) _____ _____

No_____

If yes cases_____ and deaths_____

20. Nutrition intervention in the woreda, 2017/2018

S.N	**Type of food intervention program**	
1	OTP sites	
2	TFU program	
3	TSF program	
4	CBN program	
5	EOS program	
6	Others	

No. population screened for malnutrition = children----------pregnant----------

Received therapeutic food----------

What do you think are major Health problems of woreda ?

What do you think are solutions of the problems?

What are the main zoonotic diseases in woreda ?

A.

B.

C.

D.

Annex 4: Questionnaire for Assessment of magnitude of vaccination statue and factors related Among Children Age 12 – 23 Months in Adaar District-2019.

Identification code : _____

Name of House hold head: _____House Number: _____

Kebele: _____ Residence: A, Urban B, Rural.

1. Child birth date day / month/ year _____ Or Age of child in months_____
2. Sex of the child A, male B, female
3. Number of children's older siblings_____
4. Family size_____
5. Mother's age _____
6. Mother's marital status

A, single B, married C, separated D, divorced E, widowed

7. Mothers educational status

A, illiterate B, read and write C, grade 1-8 D, grade 9-12 E, college/university

8. Number of children ever born by the mother_____
9. Number of children alive _____
10. What is occupation of the mother? A, House wife B, Government employee C, merchant D, daily laborer E, Pastoralist_____
10. What is your family monthly income per month? _____
11. Ethnicity A, Oromo B, Amhara C, Others
12. What is your religion? A, orthodox B, protestant C, catholic D, Muslim E, other specify__----------
13. Have you attended ANC during your last pregnancy? A, Yes B, No
14. If yes how many times did you attend? _____
15. Have you received tetanus vaccination during your last pregnancy? A, Yes B, No.
16. If yes, how many injections did you received?_____
17. Where did you deliver your last baby 1= at home 2= at health institution 3=other_____

18. Is there any health facility which vaccination service near to you? 1=Yes 2=No
19. If yes to above question which health facility is near to you? A. health center B. hospital C. health post D. private clinic

20. How does it take you to reach there in minutes?

A. Less than 15 minutes B. 15-30 minutes C. 30-1hour minute D.> 1 hour

Questions on immunization

21. Do you heard about vaccination and vaccine preventable

disease? A, Yes b, No

22. If yes to above question, from where do you heard about the vaccination

and vaccine Preventable disease?

A, Radio B, Television C, from friends/peers D, from school 5=Health personnel E, other, specify

24. Do you mention the objective of vaccinating a child?

A, to prevent the disease B, for specific disease C, for child health D,

don't know

25. How many vaccine preventable diseases do you know? _____

a. Measles b. Tetanus c. Pertussis d. Tuberculosis e. Diphtheria f. Polio g. Hepatitis

b. Homophiles influenza b I. Pneumonia J. Rota

26. How many vaccination sessions are needed for a child to be fully protected?

A, one B, repeated C, five D, don't know

27. Do you tell me the age at which the child begins immunization?

A, just after birth B, one month after a birth C, any time D, after one year E, I

don' know E, other specify_____

28. At what age the child should complete immunization? _____
29. Do you think vaccination will make your child sick? A, Yes B, No C, don't know

30. Do you bring a sick child for vaccination? A, Yes B, No
31. Does your child take any vaccination? A, Yes B, No
32. Do you have a card where vaccinations are written down? 1= Yes 2= No
33. Copy the immunization data from the card.

Vaccine taken	Day	Month	year
BCG			
OPV0			
OPV1			
OPV2			
OPV3			
Pentavalent1			
Pentavalent2			
Pentavalent3			
PCV			
Rota			
Measles			

34. Has a child had any vaccinations that are not recorded on this card, including vaccinations given in a national immunization day campaign? 1=Yes 2= No
35. If question above question is no, did a child ever have any vaccinations to prevent him/her From getting diseases, including vaccinations received in a national immunization day Campaign? A, Yes B, No C, I don't know

36. Please tell me if the child had any of the following vaccinations

    i. BCG vaccination against tuberculosis that is, an injection in the arm or shoulder thatUsually causes a scar A, Yes B, No
    ii. Polio vaccine, that is, drops in the mouth? A, Yes B, No
    iii. Was the first polio vaccine given in the first two weeks after birth or later? A, Yes B, No How many times was the polio vaccine given _____?

iv. Pentavalent vaccination, that is, an injection given in the thigh or buttocks? A, Yes B, No. How many times pentavalent vaccination is given? _____

v. A measles injection that is, a shot in the arm at the age of 9 months or older to prevent Him/her from getting measles? A, Yes B, No.

37. What are the reasons for the not receiving any vaccine? If the child has not received any Vaccine yet

a. Absence of health facility in the locality

b. Health workers did not come and give vaccine at our village

c. Vaccination is of no use

d. Vaccination hurts children

e. Religion and culture refute vaccination

f. Lack of awareness about vaccination

g. Fear of side effect

h. Others

38. What are the reasons for defaulting? If child is a defaulter)

a. Vaccination site is far-away

b. Vaccination time is inconvenient

c. Absenteeism of vaccinators

d. Lack of awareness on the importance of vaccination

e. Not knowing vaccination time and site

Annexes 5: Epi Project Consent Form

Title: Assessment of immunization status and factors affecting its among children aged 12-23 months old in Adaar Woreda of Zone 01 Afar Region, Eastern Ethiopia,2019

Objective: To assess immunization status and factors affecting it's among children aged 12-23 months old.

Procedure: This project will take about 30 minutes of your time. There are two parts. First, we will clearly explain you the purpose, benefits and risks of the study. We will give you a chance to ask questions and gate answers about the study. Second, we will ask you about immunization status and factors affecting among your children. All information collected during this study will be kept private and will only be known by the investigators.

Benefits: This project will help the government of Ethiopia and all level government health sectors to enhance the immunization coverage and maximize the benefits.

Risks: There is no risk to you from answering the questions or being participated in this study. We will give you a copy of this consent.

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 study 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. The approximate time that this study will take is 30 minutes. There will be no involvement past today.

Participant Agreement: The project has been explained for me. 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. The purpose of the study and confidentiality procedures has been explained to me and me on my own consent:

a) Agree _____ b) Disagree_____

Signature of Interviewer_____

Date of interview _____Time started_____ Time completed_____

Checked by supervisor: Name_____ Signature_____ Date_____

Declaration

I, the undersigned, declare that this is my original work and never been presented by another person in this or any other University and that all the source materials and references used for this thesis have been duly acknowledged.